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The Relationship Between Green Marketing Adoption and Business Size: Evidences from Agro-processing Sector in Morogoro, Tanzania

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Abstract
Green Marketing is among the contemporary issues in the field of Marketing. While many studies have been done in this field elsewhere, little studies have been conducted in Tanzania. Thus, this study aimed at identifying the level of green marketing adoption among agro-processing businesses in the context of Tanzania and studying the influence of business size on green marketing adoption. Data were collected from 120 micro, small and medium enterprises operating in agro-processing sector in Morogoro region. The findings show that, the level of adoption of green marketing practices is low as most businesses adopted relatively few practices. Also, it was found that, there is an association between business size and level of adoption of green marketing practices. It has to be noted that, the findings are limited to agro processing industry in Morogoro since the applicability of these findings to other industries is uncertain as data were collected in agro-processing industry.

Keywords: Green Marketing, Green Marketing Practices adoption and Business size

1. Introduction

Sustainability and ecological matters are among the contemporary pressing concerns for modern humanity, governments, and green conscious consumers (Hsu et al, 2013). It has to be noted that, business activities including marketing have a role to play to enhance sustainable development. Polonsky (1997) adds that, marketing as business function has to ensure the future generations' ability to meet their needs and wants is not compromised. On the other hand, Robert (2011) argues that, sustainable development needs sustainable marketing with strategies which are competitive but ecological sustainable as well. Therefore, the role of marketing in development is significantly reorganized (Kotler, 2010).

As we are striving to enhance sustainable development, regulatory bodies encourage the adoption of green supply chain management practices (Dubey et al, 2015; Zhu et al, 2012; Tseng et al 2015). Moreover, Ashton et al (2017) adds that, government and customer pressure are influencing factors towards adoption of green marketing. This

has made businesses to operate under strictly evaluation of government and non-government stakeholders for their accountability towards both environmental and social concerns (Lee, 2008). On the other hand, Kirchoff et al (2016) adds that, managers are motivated by benefits associated with green practices such as enhanced reputation, efficiencies, effectiveness, differentiation, and revenue growth.

According to Kirchoff et al (2016) a business would adopt green marketing practices due to internal and external forces. Nevertheless, Dardan et al (2007) argues that, the adoption of certain innovation will be affected by business size. Businesses with enough resources such as skilled human, technology, financial will be in the position to adopt the new innovation early and fully than the smaller one. According to Zhu and Sarkis (2006), the organizational size is more important for green practices adoption and has impact on organization performance (Choi et al,2001). Some findings suggest that, large businesses are in a position to adopt green Marketing practices due to the resource capacity (Mitra and Data, 2014). Also, large businesses tend to get affected much by government pressure on adopting green practices in the process compared with small businesses (Vachon and Klassen, 2006). Nevertheless, the study done by Zhu et al (2008) in china found that, organization size plays a positive role in the adoption of green practices. Unfortunately, there are mixed findings on organization size's influence on green marketing adoption. For example, a large business will be less advantaged by structural inertia that is they tend to be less agile and flexible than small organization (Vachon &Klassen, 2006 and Sulaiman, et al 2015) while the small business be flexible to receive changes at any time (Zhu et al, 2006). In addition to that, there is a limited literature in Tanzania on business size and adoption intensity of green marketing. This motivates to conduct a study on relationship between business size and green marketing adoption intensity in the context of Tanzania in Agro-processing sector. Therefore, the aim of this study is twofold: To establish the level of adoption of green marketing practices and to investigate the relationship between business size and level of adoption of green marketing practices.

2. Literature Review

This part includes the theoretical review, key terms and empirical review on business size and adoption of green marketing practices.

2.1 The Concept of Green Marketing Practices

There are various green marketing practices most of them revolve around the traditional marketing four Ps: green product, green pricing, green promotion, green distribution (Polonsky 1994; Kinoti 2011). Different researchers have reported different green practices that have been adopted by most business. Polonsky (1994) suggests that green marketing practices include product modifications, changes to the production method and process, modifying advertisement and packaging. Nevertheless, effective green marketing practices have to be based on green packaging, green branding, labeling, and advertising to create attention and demand for sustainable products (Juwaheer et al 2012). Interestingly Sarkar (2012) agreed that green marketing comprises a wide range of activities: Product modification, packaging, changes to production process, remodeling and coming with a new style as well as basing on ads that promote green consumption. For the purpose of this study, the green marketing practices as suggested by Polonsky (1994) and Kinoti (2011) were examined to measure the level of green marketing adoption. Moreover, it has to be considered that, the level of adoption of green marketing practices is based on the number of practices been adopted.

2.2 Business Size

Business size refers to the scale of organization and operations of a business enterprise. Different countries use various measures of size depending on their level of development. The commonly used indexes are total number of employees, total investment and sales turnover. According to United republic of Tanzania (URT) small and medium enterprises development policy of 2003, businesses are being categorized into four groups: Micro, small, and medium enterprises (SMEs). It has to be noted that, SMEs are considered the engine of innovation and achieving sustainable development. They may solve societal and environmental problems (Kardosa 2012). Then,

studying the relationship between business size (micro, small and medium enterprises) and level of adoption of green marketing was essential.

2.3 Resource based theory (RBT)

Resource based theory holds that in order for a business to be and remain competitive in a market, has to seek and protect the unique resources (Barney & Warnerfelt, 1995). Dowel & Heart (2011) recommends that, a business has to seek, protect and utilize both intangible and tangible resources in order to remain competitive. In that sense, if resources are made available in a required capacity and utilized in effective and efficiency manner, realization, of business success become certain. Therefore, in line with resource-based theory, business characteristics, particularly the availability of crucial resources, can influence the levels of adoption of green practices (Uhlaner et al.2012). This is because, the available resources will be used to add more unique and inimitable resources that will make a business to remain powerful and competitive. In the context of SMEs, larger firms are more likely to engage in sustainable practices as they have more resources, and greater influence from stakeholders than small business (Uhlaner et al. 2012; Lynch-Wood and Williamson 2014). Therefore, the study draws on the theory to consider that, a business with enough resources have a potential to invest their resources to get more unique resources such as green technology which in turn help a business to be more competitive.

2.4 Green Marketing Adoption and Business Size

The size of the business is among the internal variables which affect adoption of green marketing practices. Business characteristics, in specific the availability of crucial resources, influence the levels of adoption of green practices (Uhlaner et al.2012). Dardan et al (2007) argues that, the adoption of certain innovation will be affected by the business size. Companies with enough resources like skilled human, technology, financial will be in the position to adopt the new innovation early and fully than the smaller one. Zhu & Sarkis (2006) suggest that, the organizational size is more important for green practices adoption and has impact on organization performance (Choi et al,2001). Some findings suggest that, large sized businesses are in position to adopt green marketing practices due to the resource capacity (Uhlaner et al. 2012; Lynch-Wood & Williamson 2014; Mitra & Data, 2014 and Singh et al, 2014). Also, large businesses compared to small businesses tend to get affected much by government pressure as they adopt green practices in the process (Vachon & Klassen, 2006). Nevertheless, the study done by Zhu et al (2008) in China found that, organization size plays a positive role in the adoption of green marketing practices. However, looking at it from another side, a large business will be less advantaged by structural inertia, that is they tend to be less agile and flexible than small organization (Sulaiman, et al 2015). It takes a lot of time to make decision due to its management structure. Even if small business suffers from technology and financial resources, but they will be more active and quicker to adopt and meet new needs of the market (Zhu et al, 2006). Furthermore the study about green marketing done by Ofunya (2012) and Durmaz & Yaşar (2016) findings show that green marketing adoption is influenced by regulations, customer and consumers pressure, corporate social responsibility, increasing thrust on environmental issues, firm's reputation, performance, market share, competitive advantage.

While authors such as Zhu and Sarkis (2006) and Zhu et al (2008) acknowledges that business size influences the level of adoption of green marketing, other studies such as Zhu et al (2006) and Vachon &Klassen (2006) contradicts as whether small and large businesses have equal chance of adopting green marketing practices. On the other side, little prior studies conducted in Tanzania such as Kimario (2014) focused on the relationship between customer demand and green product innovation among SMEs. Thus, this study aims at establishing the level of green marketing adoption among agro-processing businesses and studying the influence of business size on Green Marketing adoption in the context of Tanzania.
Therefore, our research questions were:
RQ1: What is the level of adoption of green marketing?
RQ2: Does the size of the business influence the level of adoption of green marketing?

3. Methodology

The study employed descriptive design with survey study approach, where by data were collected from 120 micro, small and medium enterprises operating in agro-processing sector in Morogoro region, Tanzania. The sample was obtained using purposive sampling technique, the techniques was viable due to inability of getting reliable database for agro processing small and medium enterprises in Morogoro region. As recommended by Baker (2003), the study sample should comprise people who possess the information that the research intends to gather. Therefore, business owners, leaders, marketing or operation managers were used as unit of inquiry to get the intended results. Data were collected using questionnaire. Questionnaires were refined by removing ambiguities and some difficult words after a pilot study. Thereafter, data analysis was done, whereby a chi square was used to test the relationship between dependent variable (Adoption level of Green Marketing Practices) and independent variable (Business size).

4. Findings

This part includes the finding regarding business size, adoption level of green marketing and the relationship between green marketing adoption and business size.

4.1 Business Size

Business characteristics in terms of size was captured during the study; the size of the business gauged against the amount of capital (In Tanzania Shillings) invested in the business. The size of the business ranged from Micro, Small and Large Business. Table 4.3 shows the number of businesses in their respective business categories.

Table 4.1: Business Size

Business Size	Frequency	Percent
Micro Business	38	31.7
Small Business	43	35.8
Medium Business	39	32.5
Total	120	100.0

It was found that, 31.7percent accounts for micro business those with less than Tsh. 5 million as capital invested, 35.8percent accounts for small business those with Tsh. 5million to 200million, while the rest 32.5percent are medium business those with more than Tsh.200 to 800million as capital invested. This indicates that the business sizes categories are normally distributed therefore was suitable for the researchers to run a chi square test against the level of adoption (high and low) to test its association as indicated in table 4.3.

4.2 Adoption of Green Marketing Practices

In order to establish the set of green marketing practices adopted by agro processing business, respondents were asked to indicate whether they adopted or not adopted on each practice. Twelve practices as suggested by Polonsky (1994) and Kinoti (2011) were used as shown in table 4.2.

Table 4.2: Composition of Green Marketing Practices by Adoption Counts

Green Marketing Practices	Status	Count(n)
Production of eco-friendly products	Not Practicing	13
	Practicing	107
Use of eco-friendly Packages	Not Practicing	36
	Practicing	84
Water recycling	Not Practicing	112

	Practicing	8
Use of Clean energy/Renewable (gas, biogas, solar etc.)	Not Practicing	76
	Practicing	44
Charging high Price for Green Products	Not Practicing	17
	Practicing	103
Green label usage	Not Practicing	65
	Practicing	55
Promotes Green Lifestyle	Not Practicing	51
	Practicing	69
Promotes the Benefits of Green Products	Not Practicing	45
	Practicing	75
Promotes Green Image of the Product	Not Practicing	64
	Practicing	56
Reverse Channel system (Collecting wastes for recycling)	Not Practicing	105
	Practicing	15
Use of Economic and energy efficiency Transport	Not Practicing	65
	Practicing	55
Use of Secondary Packages (Containers)	Not Practicing	89
	Practicing	31

n*-Indicates number of those who adopted and not adopted*

From the Research findings above in Table 4.2, it was found that, many businesses adopted few green marketing practices since107 out of 120 businesses engaged in Production of at least one green product, while 84 out of 120 businesses used green package and 103 out of 120 businesses was charging high price for green product (green price). Nevertheless, some green marketing practices were not adopted by many businesses these includes the use of secondary packages (89/120 businesses), reverse channel system (105/120 businesses), water recycling (112/120 businesses), and use of renewable energy (76/120 businesses). Most businesses did not adopt these green marketing practices due to cost associated with Green Technology and low demand of green products.

4.3 Level of Adoption of Green Marketing Practices

The study aimed at identifying the level of Adoption of Green Marketing Practices. The level of adoption was measured against the number of practices adopted out of 12 practices as shown in table 4.2 i.e. less than or equal to six practices was regarded as low extent while 7 to 12 practices was regarded as high extent of adoption as shown in Table 4.3.

Table 4.3 Adoption level of Green Marketing Practices in relation to business size

Adoption Level	Frequency	Percent
Low Extent (≤ 6 Practices)	81	67.5
High Extent (7 -12 Practices)	39	32.5
Total	120	100.0

The results indicate that 81/120 business that's 67.5 percent had adopted at least 1 to 6 Practices (Low extent of adoption), while 39/120 businesses that's 32.5 percent had adopted 7 to 12 Practices (higher extent). Therefore; the adoption level of green marketing practices among agro processing businesses was low, as 67.5 percent of businesses adopted only below or six practices out of twelve practices tested. This might be due to capital constraints as micro and small business had less adoption compared to medium business.

4.4 The Relationship between Business Size and Adoption Level of Green Marketing

Our purpose was to establish the relationship between business size and green marketing adoption level. Then, the two variables, business size, and adoption level were tested. Business size was measured against the capital invested as shown in table 4.1 and adoption level was gauged against the number of green marketing practices adopted as shown in table 4.2 above. Table 4.4 below shows the chi square test of independence output as generated from SPSS.

Table 4.4 Chi square Value and P value

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.359[a]	2	.025
Likelihood Ratio	7.268	2	.026
N of Valid Cases	120		

0 cells (0.0%) have expected count less than 5. The minimum expected count is 12.35.
Phi Value=.248

In order to ascertain the association between business size and adoption level the chi square of independence was performed. No any cell had expected count less than 5. The minimum expected count was 12.35, therefore the assumption was met. The relationship between business size and adoption level of green marketing practices is significant since the *P-value is 0.025* which is less than significance level of 0.05. Therefore, business size and adoption level of green marketing are not independent. Also, it was observed that the business size affects the adoption level at medium level of Phi Value .248 as shown in table 4.4.

5. Discussion and implications

The findings show that, different green marketing practices were adopted. Few of them were highly adopted among businesses. Practices like, green product, green grice, use of eco-friendly packages and green promotion (promoting green life style) were found to be adopted by many businesses compared to others. But, green marketing practices such as green process (water recycling, use of green energy), green place (use of secondary packages) were found to be less adopted, since few businesses adopted these practices compared to others. The less adopted practices could be contributed by financial associated factors as it is very costful to install green technology (Polosnky, 1994; Kinoti, 2011). Moreover, it was found that, the level of adoption of green marketing practices was low as most businesses adopted relatively few practices, which is less than or equal to six practices. On the other hand, medium businesses (those with large capital than small and micro) were found to adopt many practices than small and micro business. This could be due to financial power the medium business possess as Dardan (2007) argues that, those businesses with enough capital have a greater chance to go green than those with less capital due to the initial green technology costs associated with (Polosnky, 1994; Kinoti, 2011).

We also found that, there is an association between business size and level of adoption of green marketing practices since medium business adopted many practices than small and micro ones. Our findings appear to support earlier studies such as Dardan (2007); Uhlaner et al (2012); Lynch-Wood and Williamson (2014); Mitra and Data (2014) & Singh et al (2014) which report that, a business with enough resources including large capital has a chance to go green than one with low capital. This is due to the initial financial resources required to be invested at initial stages. Moreover, it should be noted that, the study focused only in one industry, which is agro processing industry in Morogoro region in Tanzania. There for the findings are limited to agro processing industry in Morogoro since the applicability of these findings to other industries is uncertain.

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Consumer Perceptions and Expectations of Service Quality: Assessment through SERVQUAL Dimensions

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Abstract

Service quality is very important to attract and retain customers in today's competitive business environment. Using the SERVQUAL model this research evaluates customers' expectations against their perceptions of the service quality in a private financial institute at Dhaka city of Bangladesh. To measure respondent's satisfaction level with the provided service quality of financial institutes. Fifty (50) clients were interviewed where the sample was selected non-randomly. The results showed that respondents' expectations and perception level markedly varied with the service provided by a financial institution. However, SERVQUAL tangible dimension indicated a small gap between expectation and perception level. The study concluded that level of customers' expectations on the service quality from any private financial service providers was higher than they perceived earlier. Customer services of private financial institutes should improve further through high quality services to achieve their optimum level of businesses.

Keywords: Customer, Expectation, Perception, Satisfaction, SERVQUAL

1. Introduction

In today's competitive business environment, service quality is very important to attract and retain customers as customers derive their perceptions of service quality on the levels of satisfaction they experience with a particular business. Businesses need to be able to satisfy customers and meet their expectations of service quality in order to gain competitive advantage (Gagliano, K.B. & Hathcote, J., 1994). Thus marketers need to continually assess customers' expectations of service quality in order to avoid customer dissatisfaction (Zeithaml, V.A. and Bitner, M.J., 1996). A service can be offered by any business, whose main aim is to meet or satisfy customer needs. However, the problem that customer's expectation of service quality is generally anticipated with the acceptable levels of service quality in the service providers like private financial institutions. Using the SERVQUAL model, customers' expectations against their perceptions of this kind of service quality at any financial institute like a bank can be evaluated.

"SERVQUAL" is a service research instrument that measures customer satisfaction with various aspects of service quality (Mulder, P., 2018). SERVQUAL is a frequently used approach to measure service quality which compares

customers' expectations before a service encounter and their perceptions of the actual service delivered (Gronroos. 1982). It has five generic dimensions: Reliability to perform the promised service dependably and accurately; Responsiveness to provide prompt service; Empathy for caring and individualized attention to customers; Assurance of knowledge and courtesy of employees and their ability to inspire trust and confidence; and Tangibles includes physical facilities, equipment and appearance of personnel (Van Iwaarden, J., van der Wiele, T., Ball, L., and Millen, R., 2003). Other than SERVQUAL model, the "GAP" model of service quality also offers an integrated view of the consumer-company relationship (Zeithaml, V.A., and Bitner, M.J., 1996).

The scope of this study is confined to the Dhaka City of Bangladesh where the survey was conducted on the customers who already open an account in any form at the private financial institute (bank) and do the transaction in different branches of the same bank. In Bangladesh, not much study has been conducted to measure the banking service quality SERVQUAL model. The study information could assist in improving the service quality of banking services by identifying the gaps in service quality. Therefore, the study aims to measure the customers' expectation levels of service quality in the private financial institute (bank) and their perceptions of the service quality, to determine the gap between customers' expectations and perceptions on the same service quality including the factors that contributed to those gaps.

2. Methodology

This is a descriptive type of research that briefly revealed the gaps between levels of customers' expectations and perception of service quality in the bank. The target population was different types of male-female bank account holders. Primary and Secondary data was required for the analysis. Primary data was collected through a face-to-face interview using structured pretested questionnaire. The survey was conducted based on Non-Probability Sampling techniques. Fifty customers from the bank have been chosen conveniently for interview. The survey was conducted as the part of an assignment that fulfilled the partial requirement of the Master's level course. The natures of questions used were mainly simple dichotomy with few determinant-choice questions and used level measuring rating scale. Some secondary data was collected from several published materials. Through SERVQUAL model, several statements measure the performance across five dimensions, using a five-point Likert scale measuring both customer expectations and perceptions (Gabbie, O. and O'Neill, M.A., 1996). Using SPSS software, analyses were done with different types of statistical tools including some mathematical calculations. Results are presented through tables, graphs and charts.

3. Results

It can be seen in the Table I that among 50 respondents, 44.0% are service holders, about quarter (24.0%) of them are students, 20.0% are doing business and rest 12.0% are involved with other earning activities. In the same table, it can be seen that more than two-thirds (68.0%) are male and rest 32.0% are female respondents. About 38.0% respondents are in the middle age group (36-45 years) which followed by near to one-quarters (24.0%) of the respondents are in the age ranges from 25 to 35 years, 18.0% of respondents are in the young age group, i.e. under 25 years of age. About 12.0% of respondents are above 50 years of age and another 8.0% are in the group of 46-50 years. The respondent holds multiple types of accounts. Majority (68.0%) of the respondents have a Savings account, which is followed by the Current and Fixed deposit type of account (each 40.0%). (Table 1).

Table 1. Survey respondent's profile

Respondent's Characteristics	Frequency	Percentage
Occupation		
Service	22	44.0
Business	10	20.0
Student	12	24.0
Others	6	12.0
Gender		
Male	34	68.0

Female	16	32.0
Age (years)		
< 25	9	18.0
25-35	12	24.0
36-45	19	38.0
46-50	4	8.0
> 50	6	12.0
Account type*		
Current	20	40.0
Savings	34	68.0
Fixed Deposit	20	40.0
Others	3	6.0

Total=50; * Multiple responses

Table 2 shows the respondents' level of expectation and perception in regard to five different SERVQUAL dimensions considering various statements. In the reliability dimension, the majority (highest 84% and lowest 60%) of the respondents expected that the bank keeps promise, as usual, the problem will be solved sincerely, perform services from the beginning, keep promises like excellent bank and maintain error-free records. But respondents ' perceived reliability dimension varied with all agreeable statements and prevailing lower proportion (highest 82% and lowest 46%). This is revealed from the same table that the respondent's expectation and perceived level varied widely (higher expectation vs. lower perception) with all agreeable statements under responsiveness, empathy, assurance and tangible dimensions. The proportion of these variation ranges from 60% to 80%.

The expected and perceived SERVQUAL examines different statements through five dimensions of service quality: Reliability, Responsiveness Assurance, Empathy and Tangible. Table 2 analyzed the customers' (respondents') expectation and perception towards the services levels of bank on the scale 1 to 5 with 22 statements in five dimensions.

Table 2. Expectation and perception on SERVQUAL dimensions

Statement (n=50)	Expectation (%)			Perceived (%)		
	Agree	Neutral	Disagree	Agree	Neutral	Disagree
Reliability						
1. Keep promise as usual	88.0	8.0	4.0	82.0	10.0	8.0
2. Solve problem sincerely	86.0	14.0	0.0	72.0	22.0	6.0
3. Perform service from beginning	84.0	12.0	4.0	72.0	22.0	6.0
4. Keep promise as excellent banks	76.0	18.0	6.0	58.0	34.0	8.0
5. Error free records as excellent banks	60.0	20.0	20.0	46.0	32.0	22.0
Responsiveness						
1. Inform exact services time	80.0	14.0	6.0	76.0	18.0	6.0
2. Prompt service	74.0	22.0	4.0	62.0	34.0	4.0
3. Constant helping attitude	60.0	32.0	8.0	60.0	38.0	2.0
4. Never show busyness to respond	62.0	28.0	10.0	66.0	22.0	12.0
Empathy						
1. Give individual attention	74.0	16.0	10.0	58.0	32.0	10.0
2. Customers' convenient operating hours	74.0	20.0	6.0	62.0	34.0	4.0
3. Give customers personal service	74.0	16.0	10.0	56.0	32.0	12.0
4. Customers' best interest at heart	70.0	20.0	10.0	54.0	32.0	14.0
5. Understand customers' specific needs	70.0	18.0	12.0	50.0	30.0	20.0
Assurances						
1 Confidence in employees' behavior	80.0	12.0	8.0	68.0	26.0	6.0
2. Feel safe transactions	78.0	16.0	6.0	78.0	16.0	6.0

3. Consistently courteous to customers	68.0	24.0	8.0	64.0	22.0	14.0
4. Able to answer customers' questions	66.0	22.0	12.0	62.0	22.0	16.0
Tangible						
1. Have modern equipment	78.0	18.0	4.0	68.0	24.0	8.0
2. Appealing physical facilities	80.0	16.0	4.0	58.0	32.0	10.0
3. Neat appearance of employees	76.0	14.0	10.0	56.0	26.0	18.0
4. Appealing promotional materials	60.0	26.0	14.0	58.0	30.0	12.0

Note: Five points scale (strongly agree to strongly disagree) merged into 3 (agree, neutral and disagree)

In Table 3 the Gap Score for each dimension is calculated by subtracting the average perception score from the average expectation score. Reliability in the service quality dimensions means the ability to perform the services accurately and dependably. The reliability dimension shows that the average gap ranges from 0.8 to 1.30 which implies that the customer is not getting the service accurately from the bank and dependably enough to match their expectation. The service provided is below their expectation and thus making them much dissatisfied. The role of Responsiveness is that the willingness to help customers and provide a prompt service, which shows that the average gap ranges from 0.9 to 1.2. The bank has a fair lot to do to improve the service provided in these dimensional aspects to meet the customers' expectations and satisfy their customers. Empathy contains the issues of access, communication, and understanding of the customer. The average gap shows that the variation (0.6 to 1.2) is still existing which indicates the caring individual attention given is not meeting even the minimum expectation by the employees of the bank. Assurance is a combination of competence, courtesy, credibility, and security. The result shows that the lowest and highest gap is 0.8 and 1.1, respectively. This implies that the knowledge and courtesy of the bank's employees and their ability to convey trust and confidence are not up to the mark. The customers do not feel adequately confident and trust the bank to provide service to their expectations. The Tangible part of the service quality dimension is the appearance of physical facilities, equipment, personnel, and information materials. The gap between average scores of expectation and perception are also pronounced (0.9 to 1.1). This implies that there is a gap in the appearance of the bank visually. The customer's highest expectation was that the bank will be equipped and furnished with modern equipment.

The result in the Figure 1 indicates that the overall average expectation for reliability dimension is 4.0 and perception is 3.0. The average gap for reliability dimension between expectation and perception is 1.0. Similarly, these gaps are almost same (nearly 1.0) for other dimensions; responsiveness (3.9 and 2.8), empathy (3.9 and 3.0), assurance (3.9 and 3.0), and tangible (3.9 and 2.9).

Table 3. Gap on average dimension score of expectation and perception

SERVQUAL Dimension	S. No.	Avg. Score, E	Avg. Score, P	Gap (E-P)
Reliability				
	1	4.3	3.2	1.10
	2	4.2	2.9	1.30
	3	4.1	2.9	1.20
	4	3.9	3.1	0.80
	5	3.5	2.7	0.80
Responsiveness				
	1	4.1	3.1	1.00
	2	3.9	3.0	0.90
	3	3.7	2.5	1.20
	4	3.8	2.7	1.10
Empathy				
	1	4.1	2.9	1.20
	2	4.1	3.5	0.60
	3	3.9	2.9	1.00
	4	3.7	2.9	0.80
	5	3.7	2.7	1.00
Assurances				
	1	4.1	3.0	1.10

	S. No.	E	P	Gap
	2	4.0	3.2	0.80
	3	3.8	3.0	0.80
	4	3.7	2.8	0.90
Tangible				
	1	4.1	3.1	1.00
	2	4.0	2.9	1.10
	3	3.9	2.8	1.10
	4	3.7	2.8	0.90

Note: S. No. =Statement number; E=Expectation, P=Perception
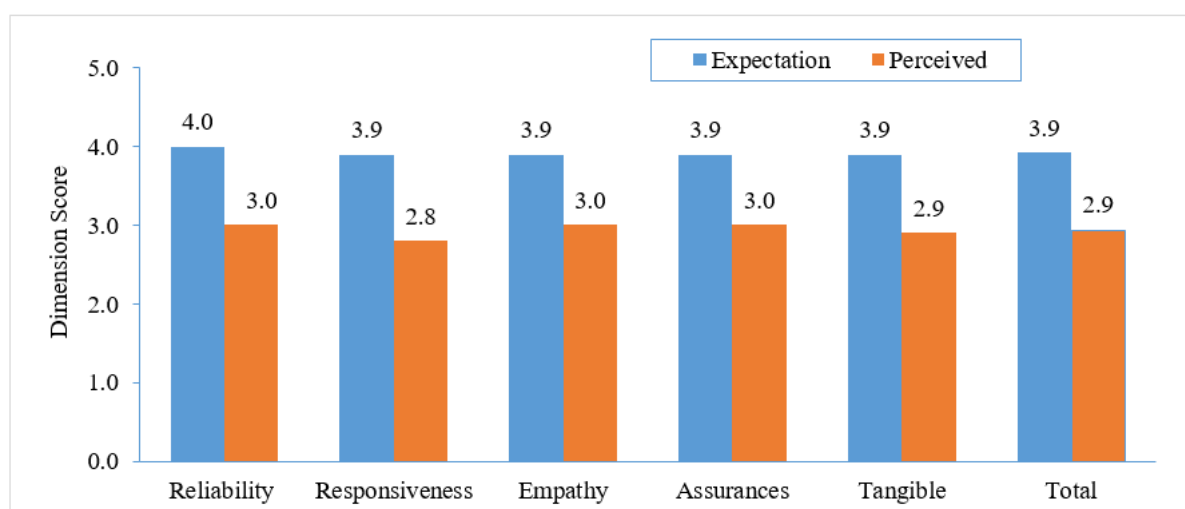
Figure1. Average total score of SERVQUAL dimension.

On an average total score of five SERVQUAL dimensions according to customers' (respondents) expectation and perception levels examined through various statements. The results indicate a total expectation score of 3.9 and a perception score of 2.9. There is a gap of -0.98 between expectation and perception. From the above summary, it is seen that the bank is consistently failing to meet customer (as per responses) expectation in every dimension. As a result, customers may get dissatisfied with the service of the banks in the near future (Figure 1).

4. Discussions

The purpose of the study was to assess consumer perceptions and expectations of service quality of banks. A total of 50 respondents were interviewed in different branches of a selected bank located at Dhaka in Bangladesh. SERVQUAL method was used to measure the gap between the expectations of the clients and their perception after receiving the services. Twenty-two service quality-related questions were administered through questionnaire which belongs to five major dimensions. The sample respondents respond to each question in five-point Likert scale.

It was found that clients' expectations were comparatively higher in terms of keeping promises and solving problem sincerely. Other important indicators where clients' expectations were higher are: bank will provide services from the beginning, the bank will inform exact service time, employees will give individual attention to clients, the operating hour will be convenient for the clients, employees will be confident in their behavior, and the bank will have modern equipment. This is also observed that clients' expectation regarding error-free record is the least, which implies that clients are suspicious about banks' ability to maintain error-free records. At the dimension level, this was observed that the clients' value almost equal expectations in all five dimensions.

By examining the perception of clients after receiving actual services from the bank, this is found that there are gaps in expectations and perceptions in all indicators with varying degrees. Among all twenty-two indicators, operating hours for the customers were found to meet the highest satisfaction from the customers. Also, a large

portion of the respondents perceived that banks keep their promises and also they feel safe about the bank transactions. The highest gaps between expectations and perceptions are observed in terms of sincere problem solving by the bank employees. Clients' perception regarding helping attitude of the bank is found to be lowest.

From the SERVQUAL analysis this study identified various weaknesses in the service provided by the financial institutions in Bangladesh. To improve the quality of service, the financial institutions need to focus on the areas where clients' perceptions are low and where the gap between expectations and perceptions are large.

It can be concluded from the study results that the level of respondents' expectations on the service quality in the bank was higher than they perceived for the same. The respondents who are maintaining different transactions with the financial institution had expectation towards quality services were not in the acceptable levels compared to other excellent banks. Usually, a respondent expected a high level of service quality from the bank, if not met that expectation may result in respondents' dissatisfaction. Under these circumstances, the private financial institutes may lose their customers in the competitive market. The service provided by the private financial institutes, however, should be maintained at a minimum level of customers' expectations whatever they perceived later. If the minimum level of customer satisfaction can be maintained by these financial institutes, their customers will not dissatisfy and retain a longer time with bank services. Also, this can be concluded that acceptable levels of service quality at the bank is still higher as indicated through the gaps between respondents' expectation and perceived level. The private financial institute like the bank should design service standards that promote reliability to customers, consistency in service delivery and give more responsive understanding to their customers and their level of service quality should be improved further.

Acknowledgment

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Study on the Relationship Between the Current Account and the State Budget

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Abstract

This paper investigates the relationship between current account balance and budget balance in Vietnam using quarterly data from 1997Q1 to 2018Q1. Other explanatory variables are interest rate of government bonds and real exchange rate. The result reveals that all four variables, current account balance, budget balance, government bonds yield and real exchange rate, are co-integrated and there is one co-integrated vector relationship. Otherwises, using the Granger causality test, it is shown that, budget balance has a directional causality relationship with current account balance which means that the research supports Keynesian's view and there are twin deficits happened in Vietnam during 1997 to 2018. In addition, there are two other directional relationships from real exchange rate to current account and current account to interest rate of government bonds. Furthermore, there are also other factors which can cause the two deficits individually.

Keywords: Current Account Balance, Budget Balance, Twin Deficits

1.Introduction

Many studies show the twin deficits occurring in many countries around the world and it has always been a concern for government. The twin deficits phenomenon indicates that an increase in fiscal deficit of one country may lead to its current account deficit. According to Bluedorn and Leigh (2011), many actions have been made in order to stabilize the macro economy including doing restructure and reducing large amount of deficit. However, the government's budget and current account are still unstable and governments in developing countries find it hard to manage. By analyzing the twin deficits problem, governments can take actions in changing and improving economic performances within their countries.

The most two famous theories are always mentioned when it comes to the relationship between fiscal deficit and current account deficit are Keynesian's view and Ricardian Equivalence's Theory. The Keynesian view (1936) supports positive relationship between the two deficits, however, Ricardian Equivalence Theory declines any relationship between them. Many studies have tried to prove that the Keynesian view is true and there is a one-way relationship between fiscal deficit toward current account deficit. Other studies also prove that Ricardian Equivalence Theory is correct. However, the "twin deficits", therefore, is still a controversial topic.

This study examines whether there is twin deficits phenomenon in Vietnam using quarterly data from 1997Q1 to 2018Q1 or not. The main goal of this study is to explain relationship between the two deficits and to be aware of its consequences.

2. Literature Review

Fiscal deficit is known as budget deficit, which refer a situation when a government spends more than its revenue in a year, creating a shortfall which makes such government borrow money to pay for budget deficits, which adds to its national debt, this can be seen as a measurement of a country's financial health. Different from budget deficit, the current account deficit is a country's measurement of trade which refers to the excessive importation over the exportation of goods and services. The current account stands for the international trade of a country and it also consists of the balance of payment (BOP) of a country along with the capital account.

According to Cavallo (2005), budget deficit presents as a decline in national savings which consists of private saving and fiscal balance by the government. Therefore, when the national savings are lower than the investment domestically, the country cannot use its savings to finance domestic investments, which leads to borrowing money from other countries. Therefore, the current account will fall into deficit.

The increase in government spending is what the policy relies on. When there is a growth in a budget deficit, people expect that the government will increase taxes in the near future in order to shorten the fiscal gap and decrease the government debt. Therefore, people have to consider saving to generate wealth and accumulation. There are two paths for people to shield from tax increase, one is spending less and saving up, and the other is an increase in the work hours to boost future income. With the second path, when people work for more extra hours, they will be more productive to the capital stock which can attract more private investment. The growing private investment may lead to an increase in governments savings, and there will be deterioration of the current account balance in response to the fall in government fiscal balance.

Many authors are trying to explain the phenomenon of twin deficits and the two popular theories mentioning about the possible connection between budget deficit and current account deficit are Keynesian view and Ricardian Equivalence Theory. According to Keynesian (1936), the fiscal deficit has a one-way relationship with the current account deficit. It can be explained that if there is an increase in fiscal deficit, it will also increase government revenue and spending, which can cause a further downfall in current account deficit by enhancing imports. On the other hand, the Ricardian Equivalence Theory declines any relationship between the two deficits. According to Barro (1989), any changes in either tax or fiscal deficit do not affect the real interest rate, investments and the current account deficit. The studies have also shown that even the current tax cut or the rise in government spending does not affect the present consumption and investment. Researchers analyzed that with the current tax cut, there might be a possible burden in the future. Therefore, the Ricardian Equivalence Theory disagreed on any relationship from the two deficits. In many foreign countries, a number of studies have been carried out in order to analyze the connection between budget deficit and current account deficit. Some article stated that the relationship ceases to exist, just as same with the Keynesian view, and it may continue for short and long period of time. However, some others disagreed and found out that there is no connection between the two, supporting the Ricardian Equivalence Theory.

According to Keynesian school, the budget deficit significantly affects the current account deficit. Studies which support this theory include *Volcker (1987), Kearney and Monadjemi (1990), Smyth et al (1995) and Fleming (1962), which shows that higher government deficits can increase the trade deficit also through other factors. In contrast, lots of articles improved on the* Ricardian Equivalence Theory which are Evans and Hasan (1994), Miller and Russek (1989) and Wheeler (1999).

There are numerous of studies analyzing the "twin deficits" phenomenon in different countries of the world. Vamvoukas (1999) investigated the twin deficits in Greece and analyzed the link between trade deficit and budget deficit from 1948 to 1994. The results showed that in both the long and short period of time, there is a one-way relationship between budget deficit towards trade deficit. Holmes (2011) shows similar results of supporting the

Keynesian view, using a data from USA from 1947 to 2009 and examined the relationship of "twin deficits" through threshold co-integration view. Another article from Pattichis (2004) also supported the Keynesian view with the topic of relationship between budget deficit and foreign trade deficit which happened in Lebanon and the author used data from 1982 to 1997. Even though the same results happened to Saleh, Nair and Agalewatte (2005) when they researched about the advantages from financial spread on the imbalance of current account in Sir Lanka with 1970-2003 data, they realized there were no long term relationship between the twin deficits but there is a causality relationship from fiscal balance to current account. In addition to this section of one-way relationship from budget deficit to current account deficit, Chowdhury and Saleh (2007) analyzed the Keynesian view in the presence of trade liberalization in Sir Lanka. A different approach applied was ARDL- autoregressive distributive lagged, the result shows a link between four factors including current account, budget balance, savings, investment gap and also the trade openness, with a highlight of positive effect on current account deficit by trade openness but it is statistically insignificant. From these researches, the budget deficit has a one-way causality towards current account deficit. Nevertheless, there are articles which shows that the current account deficit also affects the budget deficit.

According to *Kalou and Paleologou (2012)*, the current account is a causative factor effect on budget balance. Similarly, *Baharumshah, İsmail and Lau (2009) said in their studies that budget deficit is a crucial element when it comes to determine current account deficit in three countries of Malaysia, Philippines and Thailand. In addition to the research of validity of twin deficits in ASEAN, the results showed that the current account deficit will affect the budget deficit, on the other hand, there are no data showing that budget deficit is a causative element to the current account balance. Onafowora and Owoye (2006) stated that while examining the concept in Nigeria, a positive link between both of the deficits and how they will affect each other for periods of both short term and long term. Meanwhile,* Salvatore (2006) *shows that there exist relation between budget and current account deficits in the case of USA, Japan,* Germany, Britain, France, Italy and Canada from 1973 to 2005, however, the author states that the relation might be lag.

Some researchers found different results occurring when they tested with different methods in the same country. Ganchev (2010) did an article about the case of Bulgaria that had the twin deficits. By using theoretical foundations and alternative explanations, the author decided to conduct three economic approaches which are Granger causality test, vector autoregressive and vector error correction on the Bulgaria data. The result showed that, with Granger causality test, there is a two-way relationship which happened between current account deficit and budget deficit. In contrast, the vector autoregressive and error correction denied this hypothesis of twin deficits that happened in short term but forecasted that there might be a long-term relationship in the future. Turkey is also a country that has three different researches using different methods to test the hypothesis. The first research is Akbostancı and Tunç (2002)*, they tested the twin deficits in Turkey using the data from 1987 to 2001 and confirmed that there is a positive connection between the two by using error correction model. Secondly, the article from* Ümit and Yıldırım (2008) tested the validity of the hypothesis by using VAR method from 1987 to 2005, the result confirmed the validity. Finally, Kılavuz and Dumrul (2012) also tried three methods which are border test, VAR analysis and Granger causality test. The authors found out that there is a link between the two but not in a long run.

While some studies only focused on twin deficits on one single country, Khalid and Guan (1999) investigated this phenomenon through the comparisons of different countries. They conducted a test for five different countries in the periods of 1952-1994, the result did not agree on the long-term relationship between budget deficit and current account deficit in developed countries. Mumtaz and Munir (2016) *also investigated multiple countries* by using bound testing approach with ARDL model and testing Granger causality from VAR*, namely the South Asian Countries such as* Bangladesh, India, Pakistan and Sri Lanka with an annual time series data from 1981 to 2014. The main results of the research stated that there is no long-term relationship of the twin deficits. India, Pakistan and Sir Lanka showed no proof of any relationship among budget deficit, current account deficit and private saving investment. However, Bangladesh confirmed a bidirectional connection in short term from budget deficit and current account deficit. The report supported Ricardian Equivalence hypothesis for Pakistan and India. Moreover, when it comes to Feldstein Horioka Puzzle, it rejected these two countries due to high capital mobility and financial integration.

Alongside with twin deficits, there are studies that mentions this hypothesis in order to make a clear statement about fiscal deficit, Nguyen et al (2011) researched about fiscal problems which happened in Vietnam. The authors also examined the causes which lead to current account and budget deficit. Same goes for Tung (2018), the article is about how budget deficit influences economic growth in the case of Vietnam. It is concluded that the fiscal deficit has negative effect on economic growth.

Throughout some of the studies, the 'twin deficits' is confirmed to be happening in Vietnam at different time set. According to Hien Nguyen (2017), Vietnam, as one of the developing countries, encountered problems with BOP's structure from 2000 to 2016, which is the expansion of the current account deficit and the financial account surplus. However, due to the help of Samsung joining Vietnam's manufacturing sector, the current account became surplus in 2012 until date which resolved the BOP problems.

Different from other studies in Vietnam, this paper is going to be analyzed and only the twin deficits in Vietnam from the period of 1997 to 2018. This is a familiar concept, compared to foreign studies, which tests the relationship of current account and budget balance, moreover, the causality link between them. This research will use the Johansen model (1991) to test the co-integration and Granger causality test for the effect of budget deficit on current account and vice versa.

3. Methodology and Data

3.1. Data

The data in this study are collected from different sources which are the publication of the World Bank, Bloomberg, International Financial Statistics (IMF) and the Ministry of Planning and Investment of Vietnam. Moreover, the dataset is a quarterly time series data of Vietnam from 1997q1 to 2018q1. The variables included in the data are budget balance (%GDP), current account balance (%GDP), real effective exchange rate (Index) and interest rate of government bonds (%). The data will be analyzed using Stata 14.

3.2. Research methodology

This paper is going to estimate a functional relationship with all the variables

$$CA = f(BB, ER, IR) \qquad (1)$$

From the research of Erdogan and Yildirim (2014), they came up with *equation (2) in order to estimate and test the twin deficits*.

$$CA = \alpha_0 + \alpha_1 BB + \alpha_2 ER + \alpha_3 IR + \mu_t \qquad (2)$$

Where CA is current account balance (as percentage of GDP), BB is the budget balance (as percentage of GDP). The real exchange rate and interest rate of government bonds are the two factors that impact on twin deficits (Erdogan and Yildirm, 2014). ER is the real exchange rate (Index), according to Kim and Roubini (2008), the shocks of budget deficit shocks will increase the current account balance in the short-run and lead to the depreciation of real exchange rate. Therefore, this variable is also used to test twin deficits in Vietnam. IR is the interest rate of government bonds (%), depends on whether the budget balance is deficit or surplus, the interest rate of government bonds also increases or decreases to attract more funds from investors abroad. μ_t is the error term and $\alpha_{0...}\alpha_3$ is the parameters regression coefficients.

Kim and Roubini (2004) found out that when managing the effects of business cycle on current account and budget balance, there is a positive impact from budget deficit to current account in short term, despite a grow in government spending and fall in taxes which increased deficit. The explanation for this discovery is when there is a rise in budget deficit, private saving is also increased. Simultaneously, the interest rate grows also due to a rise in government borrowing, however, with higher interest rate, it can weaken the domestic investment. Therefore, Kim and Roubini (2004) combined the reason and stated that with the increase in private savings, the decrease in

domestic investment are enough to make up for the reduction of government savings in short term, also leading to a contribution for the improvement of current account.

In addition, when the budget deficit gets higher, as the result, the interest rate is also higher which can lead to the imbalance of exchange rate. This can cause the domestic products to increase in price than the imported products and with these changes, the sales of domestic products will decrease while the imported goods increase in sales as a result to a decline in trade balance's quality.

Hypothesis

Based on literature review, we will test Hypothesis:

H_0: there are no twin deficits happened in Vietnam

H_1: there are twin deficits happened in Vietnam

In this research, a test from Peseran et al. (2001) is also used to analyze the stationary and co-integration. Unit root test is going to be used to analyze the stationarity between the series and the *Augmented Dickey Fuller (ADF) to avoid spurious problems. Similar to Johansen approach, test the* co-integration *relationship between the series will be applied. Finally, the causal relationship from one variable to another will be tested by the Granger Causality test.*

Unit root test

With a time-series data, a regression analysis may create a questionable result when the variables are non-stationary. Therefore, the stationarity of the variables is crucial in order to run the co-integration test and causality test. This means that by using the unit root test, the variables may be non-stationary and cause spurious problem. When this happens, the difference in series can be presented to test the unit root again for stationary. With this technique, the information or observation from series may get lost, which may create a shortage in data for future test of co-integration. The test which is going to be used is *Augmented Dickey Fuller (ADF)*.

Co-integration Test

After testing for stationary, the Johansen approach is used to continue the next step in analyzing the co-integration. This approach was conducted by Johansen (1991) in his article about the co-integration vectors which stated that between variables there might be more than a single co-integration vector.

The Johansen approach follows the similar principles with Engle-Granger which is also a two-step co-integration test. It is used to test for stable long-run relationship which happens between variables. The approach consists of two statistics which are the likelihood ratio test that relied on the maximum eigenvalue and the test that relied on the trace, these are for the stochastic matrix. With these results, the paper can identify the amount of co-integrated vectors. The π is the long run coefficient which can help test from its examination. By checking the rank of π, the analyst of co-integration is calculated. In the Johansen approach, the first step is to do a calculation of Trace Statistics and also the Maximum Eigenvalue statistics in Stata and then continue with a comparison to suitable critical values.

Moreover, the Johansen approach has more benefits than the Engle- Granger. From the VAR based method, it is not important to distinguish the explanatory variables as endogenous or exogenous, and also the co-integration vectors should be having restrictions. This is why it is different and more upgrade than Engle-Granger. By using the Johansen approach, the paper can further use the Granger Causality test in order to determine if explanatory variables and dependent variables have the short run causality relationship.

Granger causality test

In addition, this study wants to conduct a cause-effect method to the variables which is called Granger causality test. The test was developed by Granger in 1960s. With the concept of causality, the Granger test will also help with predicting the future of the variables that are caused by each other. Despite the past, the value of one variable can be information for predicting the future development, but with Granger causality. The past value of the first variable may predict future development of the other variable which is above and beyond what the past of that variable can offer. Moreover, with the Granger test, it can analyze the short run causality between variables and in order to do this, the lag selection for the error correction model should also be used and tested on its significance.

4. Results

4.1. Stationary unit root test

Before testing the unit root test, the model should be tested for statistically significance and whether the independent variables (budget balance, interest rate of government bonds and real exchange rate) can predict the dependent variable (current account balance).

Table 1: Regression table

Current account	Coefficient	Standard Error	t-statistic	Probability
Budget Balance	0.2676143	0.1236565	2.16	0.033
Interest Rate of government bonds	-0.5548034	0.2786083	-1.99	0.050
Real Exchange Rate	-0.2582905	0.0782063	-3.30	0.001
Constant	29.1429	8.326216	3.50	0.001
Number of observations = 85 *F (3, 81) = 4.57* *Prob > F = 0.0052*		*R-squared = 0.1448* *Adj R-squared = 0.1131* *Root MSE = 7.3826*		

According to table 1, there are 85 observations from the quarterly data of Vietnam 1997-2018. The F-value of the model is 4.57 and the p-value connected with the F-value is 0.0052 which is smaller than the expected alpha value of 0.05. This means that current account balance is predicted by independent variables which are budget balance, government bond yield and real exchange rate. Moreover, the independent variables have predicted 14.48% of the variance in current account. From the t-statistic and p-value associated with t-value, all the variables are statistically significant because the p-values are smaller than 0.05. Moving on to the coefficient, with budget balance, the coefficient is 0.2676143, this means that each unit rises in budget balance, a 0.2676143 unit rises in current account. However, every unit of government bond yields increases, there is 0.5548034 unit decreases in current account when the coefficient is -0.5548034. Same goes for real exchange rate, each unit of real exchange rate increases, current account decreases by 0.2582905 because the coefficient is -0.2582905. All of the coefficient interpretation happened when all other variables are hold constant. The model is now ready to be used for further tests.

The unit root test is performed through the ADF- Augmented Dickey Fuller test which analyzed whether the variables from this model are stationary. Theoretically, the test statistics will be compared to the critical values which will be determined through levels of significance. If the result shows a greater value of test statistics than critical values, the null hypothesis which states all variables are non-stationary is rejected and vice versa.

Table 2: Unit root from Augmented Dickey-Fuller test for stationary

Variables	Level of significance	1%	5%	10%	Test statistics
Current Account Balance (CA)	At level	-3.535	-2.904	-2.587	*-3.739*
Budget Balance (BB)	At level	-3.535	-2.904	-2.587	*-1.932*
	At first difference	-3.537	-2.905	-2.588	*-5.498*
Real Exchange Rate (ER)	At level	-3.535	-2.904	-2.587	*-1.914*
	At first difference	-3.537	-2.905	-2.588	*-6.516*
Interest rate of Government Bonds (IR)	At level	-3.535	-2.904	-2.587	*-1.112*
	At first difference	-3.537	-2.905	-2.588	*-4.704*
Source: Researched from data calculation in STATA by the author					

Table 2 shows that the variables are tested for stationary at level and all of them, except for current account balance, are non-stationary because the absolute values of test statistics are smaller than absolute of critical values from all levels of significance (1%, 5%, 10%). However, after changing to first difference, the variables are stationary due to high absolute test statistics values. The current account balance is stationary at level and also the rest of variables in this model are integration of order one I (1).

4.2. Johansen Co-integration test

Before testing the Johansen test, the project should identify the lag order selection.

Table 3: Lag order selection

Lag	Log- Likelihood	LR	FPE	AIC	HQIC	SBIC
0	-1019.9		2.1e+06	25.9216	25.9697	26.0416
1	-750.145	539.52	3451.32	19.4973	19.7377*	20.0972*
2	-733.334	33.622	3392.34	19.4768	19.9094	20.5566
3	-713.136	40.396	3075.14	19.3705	19.9954	20.9302
4	-695.768	34.737*	3016.1*	19.3359*	20.153	21.3754
5	-684.517	22.502	3487.51	19.4561	20.4655	21.9755
6	-672.418	24.198	3997.24	19.5549	20.7565	22.5542
Source: from researched data calculation in STATA by the author						
* criterion selected lag order indication						

In the lag order selection table, "*" indicates the methods suggests the optimal lag order at level of significance of 5%. From Hannan-Quinn information criterion (HQIC) and Schwarz Bayesian information criterion (SBIC) methods, they support using one lag. However, the Akaike information criterion (AIC) and Final Prediction Error (FPE) prefer using lag of four. In conclusion, one lag is chosen for this model.

With the Johansen test, the null hypothesis happens when there is no co-integration relationship and the alternative hypothesis is the opposite, there is one or more co-integration vectors relationships.

Table 4: Co-integration from Johansen (1991) tests

Maximum rank	LL	Eigen value	Trace statistic	Critical value 5%
0	-864.33932		90.6546	47.21
1	-829.88757	0.55969	21.7511*1*5	29.68
2	-823.65651	0.13788	9.2889	15.41
3	-819.73368	0.08917	1.4433	3.76
4	-819.01204	0.01704		

Maximum rank	LL	Eigen value	Max statistic	Critical value 5%
0	-864.33932		68.9035	27.07
1	-829.88757	0.55969	12.4621	20.97
2	-823.65651	0.13788	7.8457	14.07
3	-819.73368	0.08917	1.4433	3.76
4	-819.01204	0.01704		
Source: data researched from calculation in STATA by the author				
According to Johansen (1991), * presents how many co-integrating equations were selected				

After choosing number of lags, the paper continues with the Johansen Co-integration test for relationship. In the statistics table above, the trace statistic presents that when r=0, the value is 90.6546 which is higher than the critical value of 47.21 at 5% level, therefore, the null hypothesis of no co-integration is accepted. However, at r=1, the trace statistic (21.7511*1*5) is smaller than its critical value (29.68) which means that the alternative hypothesis has failed to rejected and there is one co-integrating vector relationship in the model. The trace and max statistics have rejected the null hypothesis at 5% level when r=1.

4.3. Granger causality test

Finally, the research continues with the Granger causality test between variables.

Table 5: Granger causality test

Excluded \ Equation	Value	CA	BB	IR	ER
CA	Chi-squared	-	0.1494	30.851	6.9e-05
CA	P-value	-	**0.699**	**0.000**	**0.993**
BB	Chi-squared	8.2088	-	0.0142	2.9108
BB	P-value	**0.004**	-	**0.905**	**0.088**
IR	Chi-squared	0.0730	0.3715	-	0.6538
IR	P-value	**0.787**	**0.542**	-	**0.419**
ER	Chi-squared	10.958	0.0007	1.0609	-
ER	P-value	**0.001**	**0.978**	**0.303**	-
All	Chi-squared	13.235	0.5301	33.045	3.8411
All	P-value	**0.004**	**0.912**	**0.000**	**0.279**
Source: from researched data calculation in STATA by the author, p-value compared with 5% level					

By applying the Granger causality test, the orders of all variables are arranged with chi-squared statistics above and after that is p-value in order to see which variable is Granger causal to another variable. The result from table 5 indicates that at 5% level, there is a directional causality exists which shows that budget balance Granger causes current account balance because the p-value is smaller than 0.05 (0.004 < 0.05). Same goes for two other directional relationships which are current account Granger causes interest rate of government bonds (0.000 < 0.05), and real exchange rate Granger causes current account balance (0.001 < 0.05). However, there is no bi-directional causality relationship between interest rate of government bonds and real exchange rate; budget balance and interest rate; budget balance and real exchange rate.

The empirical results show that **there is no causality relationship between fiscal balance and current account balance**.

5. Conclusion

The main purpose of this paper is to investigate the twin deficits happened in Vietnam with quarterly data from 1997 to 2018. This study used the current account balance, budget balance, interest rate of government bonds and

real exchange rate as variables to test the co-integration and causality relationship by using Johansen (1991) and Granger Causality test.

Before using the two test above, all four variables were tested for the stationary from the Augmented Dickey Fuller test. The result shows that the current account balance is stationary at level while the three remained variables are non-stationary at level but stationary at first difference. Furthermore, with the Johansen co-integration test, from both the trace and maximum tests, there is one co-integration relationship between variables at level of significance 5%. Finally, the Granger causality test shows that the two main variables from the twin deficits are not on each other by Granger, however, there are three directional relationships which are from current account to interest rate of government bonds and from real exchange rate to both current account and budget balance.

With the result of no causality relationship between the current account and budget balance which means the null hypothesis is accepted, there are also many other factors which can cause them to deficit and the suggested solutions are presented to minimize the problems that current account deficit and budget deficit can have effect on Vietnam's economy.

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Appendix

```
. reg currentaccountgdp budgetbalancegdp interestrateofgovbond realexchangerateindex
```

Source	SS	df	MS			
Model	747.607407	3	249.202469			
Residual	4414.70618	81	54.5025455			
Total	5162.31359	84	61.4561142			

Number of obs	=	85
F(3, 81)	=	4.57
Prob > F	=	0.0052
R-squared	=	0.1448
Adj R-squared	=	0.1131
Root MSE	=	7.3826

currentaccountgdp	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
budgetbalancegdp	.2676143	.1236565	2.16	0.033	.0215766	.5136521
interestrateofgovbond	-.5548034	.2786083	-1.99	0.050	-1.109146	-.0004604
realexchangerateindex	-.2582905	.0782063	-3.30	0.001	-.4138964	-.1026846
_cons	29.1429	8.326216	3.50	0.001	12.57634	45.70946

```
Augmented Dickey-Fuller test for unit root          Number of obs   =        82
```

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
		Interpolated Dickey-Fuller		
Z(t)	-3.739	-3.535	-2.904	-2.587

```
MacKinnon approximate p-value for Z(t) = 0.0036
```

D. currentaccountgdp	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
currentaccountgdp						
L1.	-.4830479	.1292006	-3.74	0.000	-.7402665	-.2258293
LD.	-.1995221	.1346435	-1.48	0.142	-.4675767	.0685324
L2D.	.1366741	.1083591	1.26	0.211	-.0790523	.3524004
_cons	.0221204	.7594526	0.03	0.977	-1.489834	1.534074

Unit root test of current account at level

```
Augmented Dickey-Fuller test for unit root          Number of obs   =        82
```

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
		Interpolated Dickey-Fuller		
Z(t)	-1.932	-3.535	-2.904	-2.587

```
MacKinnon approximate p-value for Z(t) = 0.3171
```

D. budgetbalancegdp	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
budgetbalancegdp						
L1.	-.0780528	.0403979	-1.93	0.057	-.1584788	.0023731
LD.	-.1456198	.1140213	-1.28	0.205	-.3726189	.0813792
L2D.	-.0366679	.1134791	-0.32	0.747	-.2625874	.1892517
_cons	-.1122974	.2929362	-0.38	0.703	-.6954887	.4708939

Unit root test of budget balance at level

```
Augmented Dickey-Fuller test for unit root          Number of obs   =        81

                                  ———————— Interpolated Dickey-Fuller ————————
                Test          1% Critical        5% Critical        10% Critical
              Statistic          Value             Value              Value

Z(t)          -5.498            -3.537            -2.905             -2.588

MacKinnon approximate p-value for Z(t) = 0.0000
```

```
D.budget        Coef.     Std. Err.      t      P>|t|      [95% Conf. Interval]

budget
    L1.      -1.242379    .2259872    -5.50    0.000    -1.692377    -.7923805
    LD.       .0651033    .1790552     0.36    0.717    -.2914411     .4216476
    L2D.      .0087508    .1167989     0.07    0.940    -.2238257     .2413272

  _cons      -.2287776    .2984086    -0.77    0.446    -.822985      .3654299
```

Unit root test of budget balance at first difference

```
Augmented Dickey-Fuller test for unit root          Number of obs   =        82

                                  ———————— Interpolated Dickey-Fuller ————————
                Test          1% Critical        5% Critical        10% Critical
              Statistic          Value             Value              Value

Z(t)          -1.914            -3.535            -2.904             -2.587

MacKinnon approximate p-value for Z(t) = 0.3256
```

```
D.
interestrateofgovbond      Coef.     Std. Err.      t      P>|t|      [95% Conf. Interval]

interestrateofgovbond
             L1.    -.1328165    .0694022    -1.91    0.059    -.2709858     .0053527
             LD.    -.0541576    .114125     -0.47    0.636    -.2813629     .1730478
             L2D.   -.1723172    .1121428    -1.54    0.128    -.3955765     .050942

           _cons     .9448444    .5886521     1.61    0.113    -.227072      2.116761
```

Unit root test of interest rate of government bonds at level

```
Augmented Dickey-Fuller test for unit root          Number of obs   =        81

                                  ———————— Interpolated Dickey-Fuller ————————
                Test          1% Critical        5% Critical        10% Critical
              Statistic          Value             Value              Value

Z(t)          -6.516            -3.537            -2.905             -2.588

MacKinnon approximate p-value for Z(t) = 0.0000
```

```
D.inter         Coef.     Std. Err.      t      P>|t|      [95% Conf. Interval]

inter
    L1.      -1.466009    .2250032    -6.52    0.000    -1.914048    -1.017971
    LD.       .3158517    .1687143     1.87    0.065    -.0201013     .6518047
    L2D.      .0761313    .1131847     0.67    0.503    -.1492482     .3015109

  _cons      -.1151509    .1910596    -0.60    0.548    -.495599      .2652973
```

Unit root test of interest rate of government bonds at first difference

```
Augmented Dickey-Fuller test for unit root          Number of obs   =        82

                                    ———————— Interpolated Dickey-Fuller ————————
                       Test         1% Critical      5% Critical      10% Critical
                     Statistic         Value            Value            Value
    ——————————————————————————————————————————————————————————————————————————————
    Z(t)              -1.112           -3.535           -2.904           -2.587

MacKinnon approximate p-value for Z(t) = 0.7103
```

```
    D.
realexchangerateindex  |    Coef.    Std. Err.     t     P>|t|    [95% Conf. Interval]
—————————————————————————+————————————————————————————————————————————————————————————
realexchangerateindex    |
                   L1.   | -.0247116   .0222251   -1.11   0.270   -.0689583    .0195352
                   LD.   |   .420971   .1071605    3.93   0.000    .2076308    .6343112
                  L2D.   | -.0484554   .1019876   -0.48   0.636   -.2514971    .1545863
                         |
                 _cons   |  2.343116   2.196411    1.07   0.289   -2.029602    6.715835
```

Unit root test of real exchange rate at level

```
Augmented Dickey-Fuller test for unit root          Number of obs   =        81

                                    ———————— Interpolated Dickey-Fuller ————————
                       Test         1% Critical      5% Critical      10% Critical
                     Statistic         Value            Value            Value
    ——————————————————————————————————————————————————————————————————————————————
    Z(t)              -4.704           -3.537           -2.905           -2.588

MacKinnon approximate p-value for Z(t) = 0.0001
```

```
   D.rexchange    |    Coef.    Std. Err.     t     P>|t|    [95% Conf. Interval]
——————————————————+————————————————————————————————————————————————————————————————
rexchange         |
            L1.   | -.6758621   .1436682   -4.70   0.000   -.961942   -.3897821
            LD.   |  .0444437    .128626    0.35   0.731  -.2116835    .3005709
           L2D.   |  .0424848   .1011677    0.42   0.676  -.1589659    .2439355
                  |
          _cons   | -.0514753    .261268   -0.20   0.844  -.5717264    .4687757
```

Unit root test of real exchange rate at first difference

```
Selection-order criteria
Sample:  1998q3 - 2018q1                         Number of obs      =        79

  lag |   LL       LR      df    p     FPE       AIC       HQIC      SBIC
——————+———————————————————————————————————————————————————————————————————
   0  | -1019.9                        2.1e+06   25.9216   25.9697   26.0416
   1  | -750.145  539.52   16  0.000   3451.32   19.4973   19.7377*  20.0972*
   2  | -733.334  33.622   16  0.006   3392.34   19.4768   19.9094   20.5566
   3  | -713.136  40.396   16  0.001   3075.14   19.3705   19.9954   20.9302
   4  | -695.768  34.737*  16  0.004   3016.1*   19.3359*  20.153    21.3754
   5  | -684.517  22.502   16  0.128   3487.51   19.4561   20.4655   21.9755
   6  | -672.418  24.198   16  0.085   3997.24   19.5549   20.7565   22.5542

Endogenous:   currentaccountgdp budgetbalancegdp interestrateofgovbond
              realexchangerateindex
 Exogenous:   _cons
```

Lag order selection

```
                    Johansen tests for cointegration
Trend: constant                                   Number of obs =      84
Sample:  1997q2 - 2018q1                                 Lags =        1
─────────────────────────────────────────────────────────────────────────
maximum                                  trace    5% critical  1% critical
  rank     parms      LL      eigenvalue  statistic    value        value
    0        4    -864.33932               90.6546     47.21        54.46
    1       11    -829.88757   0.55969     21.7511*1*5 29.68        35.65
    2       16    -823.65651   0.13788      9.2889     15.41        20.04
    3       19    -819.73368   0.08917      1.4433      3.76         6.65
    4       20    -819.01204   0.01704
─────────────────────────────────────────────────────────────────────────
maximum                                   max     5% critical  1% critical
  rank     parms      LL      eigenvalue  statistic    value        value
    0        4    -864.33932               68.9035     27.07        32.24
    1       11    -829.88757   0.55969     12.4621     20.97        25.52
    2       16    -823.65651   0.13788      7.8457     14.07        18.63
    3       19    -819.73368   0.08917      1.4433      3.76         6.65
    4       20    -819.01204   0.01704
─────────────────────────────────────────────────────────────────────────
```

Johansen test for co-integration

Granger causality test

vargranger

Granger causality Wald tests

Equation	Excluded	chi2	df	Prob > chi2
currentaccountgdp	budgetbalancegdp	8.2088	1	0.004
currentaccountgdp	interestrateofg~d	.07305	1	0.787
currentaccountgdp	realexchangerat~x	10.958	1	0.001
currentaccountgdp	ALL	13.235	3	0.004
budgetbalancegdp	currentaccountgdp	.14941	1	0.699
budgetbalancegdp	interestrateofg~d	.37155	1	0.542
budgetbalancegdp	realexchangerat~x	.00075	1	0.978
budgetbalancegdp	ALL	.53011	3	0.912
interestrateofg~d	currentaccountgdp	30.851	1	0.000
interestrateofg~d	budgetbalancegdp	.01423	1	0.905
interestrateofg~d	realexchangerat~x	1.0609	1	0.303
interestrateofg~d	ALL	33.045	3	0.000
realexchangerat~x	currentaccountgdp	6.9e-05	1	0.993
realexchangerat~x	budgetbalancegdp	2.9108	1	0.088
realexchangerat~x	interestrateofg~d	.6538	1	0.419
realexchangerat~x	ALL	3.8411	3	0.279

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Influence of Cost Strategy on Firm Performance

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Abstract

In today's complex and dynamic environment firm competitiveness is inevitable. This means therefore, that for better positioning and to remain ahead of rivals, firms can pursue suitable strategies especially being a cost leader. Empirical studies show that cost strategies influence competitiveness and growth of a firm (Tehrani, 2003). This study sought to determine the influence of cost strategy on the performance of manufacturing firms in Kenya. According to Porter (1995) firms that pursue cost leadership can achieve better competitive advantage leading to improved performance. Additionally, he asserts that firms are able to defend their market since lower cost can enable them earn better returns. Firms that adopt cost strategy, therefore, endeavor to lower cost in terms of production in the industry. The study utilized Porter's (1980) framework with the foundation of Dynamic capability theory by David Teece & Gary Pisano in 1994 and stakeholders theory(Harrison, Bosse & Phillips, 2010) and goal setting theory by Locke & Latham (2006). The study adopted cross sectional descriptive survey, guided by positivist philosophy. This is because the study intended to observe a phenomenon and report it as it is. The study aimed to study all large manufacturers in Kenya. Data was collected using a structured questionnaire. Through use of percentages, mean scores and standard deviation the data was described. Regression analysis was used to test the hypothesis. The study found that cost strategy had a significant influence on the performance of manufacturing firms in Kenya.

Keywords: Cost Strategy, Customer, Manufacturing Industry in Kenya

Introduction

Cost Strategy on Firm Performance

Cost strategy is a vital strategy to any firm regardless of size or sector while developing its foundation to attaining competitive advantage. Porter (1985) asserts that those firms that are able to lead in costs need to control their expenditure tightly and refrain from incurring too many expenses when producing and selling their products. The foundation of this study is dynamic capability by Teece (2012) and stakeholders' theories and goal setting theories. When an organization chooses cost leadership as strategy it's able to achieve a significant advantage in performance (Power & Hahn, 2004). Similar results were found by Allen and Helms (2004) that cost leadership related to better performance of firm. Dee and David (1984) acknowledged that, overall being a cost leader assisted the firm to achieve the maximum return on assets. Empirical evidence infers that cost leadership significantly influence performance of manufacturing firms in Kenya. Manufacturing firms should,

therefore, deepen on the way they engage into more cost effective methods of running their businesses. From this discussion cost leadership can significantly influence the performance of firms.

Research Methodology

This study adopted positivistic philosophy because it was seeking to establish gaps through hypothesis then deducing from what the researcher can observe. It also entailed collection of data and finally making comparisons with theories that guided the research. The research design adopted was a cross-sectional descriptive survey. According to Saunders et al., (2009) positivism, allows researchers to detach themselves from any possible interpretation that affects empirically investigated results following structured methods that enable reproduction of the investigation. The study population included all large manufacturing firms' in Kenya. According to KAM directory (2015) a large manufacturer is one that employed more than hundred employees, medium manufacturer employed up to 100 with a turnover of KSh.500M and over. The sub sectors in the manufacturing industry include: timber wood and furniture food and beverages, motor vehicles and accessories, chemical and allied, building, mining and construction, paper and board, pharmaceutical and medical equipment sector plastics and rubber, leather and footwear, timber and wood, furniture, textiles and apparels and fresh produce energy and finally electrical and electronics. 300 firms then fitted the description of a large manufacturer. The study stratified the manufacturing firms of the 13 sub-sectors. This was good since it enabled the study to represent the total population and key sub-sets of the population. Saunders et al. (2009) assert that this technique provides a better assessment across strata reducing standard error while providing some control over variance. Sampling was through randomly choosing the firms allowing equal representation of firms. Kate (2006) formulae were adopted choosing 139 organizations to be studied. A structured questionnaire covering all the research variables was used. It had been established on the previous study foundations. The questionnaire was administered through drop and pick. Cronbach's alpha 0.5 and above were considered ideal for reliability test and where alpha was less than 0.5 was not unacceptable which was in line with (George & Mallery, 2003). Face validity was addressed by involving experts (Saunders et al., 2007). Discriminant validity was confirmed through factor analysis.

There was a pretest of the questionnaire involving five manufacturing firms that were not considered in the final analysis. Graphical methods for linearity testing was utilized by plotting standardized residuals and standardized of the dependent variable in an expectation to show whether a random pattern exists if non, linearity lacked. Normality testing was through probability-probability (p-p plots) and Shapiro-Wilk and Kolmogorov-Smirnov tests and a visual inspection of data plots to determine normality graphically. Data was therefore assumed to be normal when the histogram appeared symmetrical represented by bell-shaped curve, with maximum points in the middle and reduced occurrences to the extremes. Multicollinearity was through VIF (Variance Inflation Factor). The VIF values were not to go beyond 10 and the tolerance values should be higher than 0.10. Correlation analysis and Chi square test were used to establish the independence of association.

Descriptive Data and Results

A total of 72 questionnaires were analyzed representing 52% of the manufacturing firms sampled this similar to Munyoki (2007) who had a response rate of 51% and Machuki (2011) had a response rate of 36%. According to Nachmias and Nachmias (2004) rarely does survey research go above 50% and there was a suggestion that a response rate above 50% being very satisfactory. The study adopted alpha coefficient cut of value of 0.70 and above to measure reliability. All variables had alpha coefficient of above 0.7 hence were considered reliable. All conditions of validity were met. Multicollinearity test was undertaken and there was an indication that all VIF values were within acceptable levels which varied from 1.369 to 1.521. Construct validity was done through factor analysis. All validity conditions were met. Heteroscedasticity was through Levene's test and there was an indication of homogeneity from the results since all the P-values of Levene's test for homogeneity of variances exceeded 0.05.

The influence cost strategy on firm performance

The study determined independently the influence cost strategy on firm performance. This was determined by getting the composite index of cost strategy and performance constructs and applied simple linear regression analysis to determine their significance levels. Consequently, the following sub hypothesis was tested. **H$_1$:** Cost strategy significantly influences the performance of large manufacturing firms in Kenya. The results were as presented in Table 5.1.

Table 5.1: Cost Strategy and Firm Performance

Model Summary										
					Change Statistics					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.563	.317	.308	5.78642	.317	32.541	1	70	.000	1.913

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1089.546	1	1089.546	32.541	.000
	Residual	2343.787	70	33.483		
	Total	3433.333	71			

Coefficients						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	7.663	5.337		1.436	.156
	CS_Cost	1.528	.268	.563	5.704	.000

Source: Primary Data (2019)

The study found a relatively strong relationship between cost strategy and firm performance (R= 0.563). Coefficient of determination (R^2 =0.317) indicates that cost strategy explains 31.7% of the variation in firm performance. Also, the overall model is significant (F=32.541, p<0.05). The individual influence of cost strategy significant relationship is further revealed by the t-value in the coefficient table (β=1.528, t=5.704, p<0.05). This, therefore, depicts that cost strategy is key in determining firm performance in manufacturing firms in Kenya and thus the hypothesis that cost strategy positively influences firm performance was supported. Based on the outcomes of the results of the regression analysis as presented in Table 5.1, the model became; Y= 1.528 X$_1$

Where Y was firm performance and X$_1$ **is** cost strategy. This implies that a unit change in cost strategy results in 1.528 changes in the firm performance of manufacturing firms in Kenya. This implies that the cost strategy significantly influences the performance of large manufacturing firms in Kenya.

The results in this study are consistent with studies previously investigating the impact of cost strategy on firm performance. Porter (2008) can be able to perform a myriad of activities to enable them to deliver products and services quicker, economically than the rivals. Firms that adopt pure cost strategies can end up achieving better returns on investment. Power and Hahn (2004) asserted that cost leadership provided a substantial performance advantage. Similar positive results by Allen and Hems (2006) established that being a cost leader improved performance. Contrary results by Bush and Sinclair (1992) when conducting a study in the hardwood lumber industry revealed that overall cost leadership was not adequate in a mature industry and added that only the firms that combined both cost leadership and differentiation strategy that succeeded. Large Manufacturing firms in Kenya can, therefore, utilize different tactics to achieve leadership in cost. Others ways could include training firm employees on the product and service quality.

Summary, Conclusion and Recommendations

Competition is what is seen to keep firms and also industries to keep goin on. To ensure survial the results of this study show that cost strategies had a significant impact on the performance of manufacturing firms in

Kenya.   Results indicate that cost strategy therefore is a unique strategy that can lead to the improved firm performance of firms.   These strategies are usually skill based and may involve strategic thinking, being innovative even when executing involving critically thinking and also positioning. According to Porter (1980) a firm can choose to perform various chain of activities to lower their cost than rivals.The study confirms that cost strategy can position firms better and can lead to firms attain superior performance than rivals. Depending on the capabilities of a firm, a firm can figure and reconfigure their abilities to respond to the need of the market which can eventually determine firm success. Manufacturing firms are recommended to adopt cost leadership strategy so that their performance can improve. Policy makers can formulate policies enabling the firms attain competitiveness owing the importance of the sector in Kenya or removing hindrances that make the industry not compete well. To enable manufacturing firms survive the current turbulence, its advisable in practice to pursue cost related strategies to mitigate the changes from the eniviroment.

Limitations of the Study

This scholarly work was a cross sectional study and therefore a further examination to understand the existence of causal reasons or if causality occurred amongst variables is necessary.

Suggestions of the Study

The population of the study was drawn from large manufacturers registered by KAM directory (2015) in Kenya. To generalize the findings, therefore, there is need to consider all sizes of firms and from other developed countries with contextual dissimilarities.

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ASIAN INSTITUTE OF RESEARCH
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Emancipation of Workers' and Management Thoughts for Leveraging Performance in the Public Sector

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Abstract

The study aimed at examining the role of Job Security in influencing workers' Performance in the Public Sector. Data were gathered through survey questionnaire from sample of 60 workers at Tandahimba district Council Head quarter in Tanzania. Sampling strategies used were stratified and simple random sampling. Data were analysed quantitatively through descriptive statistics-compared means, ANOVA, t-test, Kruskal-Wallis test and Factors analysis. Findings indicate that, significant differences exist between workers and their demographic characteristics towards job performance and job security; moreover, they also account for a portion of their performance problems. Persistence of performance problems in the public sector has been attributed to Governance factors like proficiency problems of line-managers. Behaviour factors of workers like poor attitude towards the employer, public funds and properties. Economic factors like workers' over-dependence on the government. The study recommends people in management levels in the public sector of Tanzania to embark on proper strategic management practices as all best practices for managing workers and their performance have already been laid down; the issue is how to use them strategically for better outcomes of workers and the government excellence. Helping Public workers to understand that, they are expected to be more patriotic in serving the public interest, act in due diligence in protecting public properties and funds, continue insisting public workers on the role of self-values and integrity in public service as it will help them couple with complex work conditions.

Keywords: Workers, Job Performance, Job Security, Public Sector, Tanzania

1. An overview

Governments all over the world are struggling to achieve their set strategic plans objectives like technological advancement that would have helped them accomplish parts of their set goals, the bad thing is, they have rarely been concerned with workers' problems that would have resolved critical issues of unsatisfactory performance. If one goes deeper into understanding workers' performance problems you will realize that, they are taken as HR concerns only rather than leaders or operations managers (Risher and Wilder, 2018). Workers' performance has been deterred by many critical factors and among them is Job security which is necessary for influencing performance. It is vital for the management of any organization to known how best to secure their workers' jobs to leveraging performance. Persistent excellences in job performance depend on how the organization handles matters associated with job security and performances of their esteemed workers (Lucky et al., 2013; Ahmed et al., 2016). Workers in any organization should work under favourable environment which can assist to get job

security together with enhanced performance. Organizations which have clear work policy for securing workers from vulnerable work issues are in better position to motivate workers towards increased performance because workers have no stress and fear (Gupta, 2016; Jimenez and Didona 2017), stress and fear among workers and management members are associated with problems of not meeting closing date, underestimating budget, evade decisions making, hiding problems, los of moral and not being resourceful to the organization (Haenisch, 2012), these problems are found with public workers of which are attributed by ways people are brought up and the leadership systems. Job security has positive aspect of workers' career growth which ultimately fosters performance. Of course, the problem of job security right now is faced by both private and public sectors due to changes taking place within the government. Job security has greater impact also on workers' behaviour towards the job and management, never the less, job security signifies employer's commitment to workers and vice versa is true (Ahmed et al., 2016). Absence of job security means the absence of good management practices and the presence of job security means, the employer is ready to invest to its workers for excelling towards achieving its strategic goals (Moon, 2001).

It has been noted that, there has been an unsatisfactory performance of public workers for some time despite then efforts undertaken. Current changes in the public sector demand performance culture, good values and integrity. Despite the changes and effort taken by the current government, still, some unsatisfactory performance persists silently among workers in various areas which now calls for the emancipation of public workers and management thoughts with regards to job security in relation to job performance. Emancipation is highly needed as it is not well understood as to why people employed in public sector are not motivated to perform at optimal levels despite of guaranteed job security. Of course, job security alone is not enough to guarantee workers' performance. Job security is believed to be the gratification attained by workers from their work which in turn bestows all the effort for their organization excellence (Baker & Abou-Ismail, 1993), you may ask yourself a question; if the attained gratification is due to job security, then, why they do not perform? Or why they have poor attitude towards public properties and funds? This is an indicator that, some workers have problems. The government has shouted over the problem of unsatisfactory performance but still the problem does exist silently. Yes, there is contradictory information with regard to how job security and workers' performance are related (Ojedokun, 2008).

1.1 Study Objective and Hypotheses

To find out the difference of age, gender, marital statuses and education with job performance in public sector

1.1.1 Hypotheses covering the study

H_{01}:=Governance factors have no relationship with workers' performance
H_{02}:=Economic factors have no association with workers' performance
H_{03}:=Behaviour factors have no association with workers' performance
H_{04}:=Demographic factors of (ages, gender and marital statuses) have no association with workers' performance and job security
H_{05}:=Public sector workers' education has no association with their performance and job security

1.2 Expectations of the study

It is expected to assist management in various government institutions and parastatals that, job security alone is not enough to motivate workers towards optimal performance; rather, there are critical factors like leadership and good management practices like those advanced in Deming's 14 points and Kaizen that could help tackle performance problems in the public sector, but also, it will help workers open up their minds by having positive attitudes towards the government, its properties and funds.

2. Literature Review

2.1 Performance problems and Work Security

It is essential for management to know the status of balance between workers' success and organization success. If there is an imbalance of the two we expect performance to be low and hence poor output. Organizations have to keep in mind that, workers are individuals with their own set of demands and have certain goals to be fulfilled for reaching peaks of their career ladder. If workers do not find any career growth, his/her feeling towards performance will drop significantly. Job performance is the yield expected from a worker that is associated with the overall strategic goals of the organization (Cascio, 2006). Evidence shows that, the major problems of poor performance are accounted by poor administration, unexpected pitiable management practices like organization injustice, inappropriate performance evaluation process, conflicting management interests, working culture problems like failure to associate management strategies and the prevailing culture and the nature of the workforce in operations, leadership problems which are critical for satisfactory performance, fear in making decisions, political inclusion in public service provision (Sverke, et al., 2006; Katzenbach et al., 2012), economic problems, venality acts, unhealthy work life-balance, no counselling on workers' life, presence of gossiping or making decisions based on grapevine, despising lower level workers, personal family issues, underutilisation of Deming's 14 points in workers management and other poor human resource practices that ultimately upshot for poor performance in public sector (Walton, 1986; Longenecker and leffakis, 2002; St. Charles County Business Record, 2005; Haenisch, 2012). Workers' output that is due to performance is accounted by gratification derived from various job factors and one of it is job security, so, worker's output signifies his/her attitude towards the organization is working for (Imran et al., 2015). Work security is a status quo of worker's mind that, the job status will persist for quite a time (Jandaghi et al., 2011). Organizations which have good status of job security with good policy and clear rules and regulations have more chance to retain workers than those with low level of job security (Simon, 2011; Khan, 2014).

Designing work conditions responsive to external variations, gratifying workers, sustaining performance culture and evolving administrations system has become a challenge to many governments and has accounted for major performance problems. It is certainly true that, if you assess the working culture in most of public sector's offices are not good for leveraging workers' performance. Neither no managers or operations workers are concerned with performance culture; this is possibly due to how they are brought up from their families or the learning channels went through.   The absence of hard working culture in public sector is costing the government enormously by placing a huge burden to recruitment secretariat in finding best performers. Presence of outstanding culture would have shaped workers attitudes towards hard working (Hai Li et al., 2011). This phenomenon has even brought problems not only to performance output but even in the area of attitude towards public funds and properties. It can be seen that, most people appointed to different posts in public sector have been replaced from their post and even several boards from various governmental parastatals and institutions been dissolved due to integrity, values and performance problems. Questions may be raised up concerning performance of public workers in relation to working culture, but possibly there is an untapped answer as Abdullah, et al., (2013) says, the problem of poor performance has been looked by many practitioners from a narrow angle and they have forgotten important factors that may account to other performance problems which may be personal characters mismatch with post or the organization culture or team members or practices (Hough & Connelly, 2013).

2.2 Differentiating workers

Individuals do not only differ in their mental and physical make up, rather, they also differ in their psychological aspects. Each individual is unique and has unique contribution, therefore, management have to deal with each individual distinctly to get their best contribution. It is very difficult for employers to understand the difference of their workers under normal circumstances; exception comes if they take into account of workers' attitude towards the job. This is so because; workers may have similar technical skills but differs in behaviour skills (Albino, 2018). Individual attitude is based on favourable or unfavourable assessment towards an idea or the object (Blackwell et al., 2001; Garc´ıa-Santill´an et al., 2012). Favorable workers' attitude would lead to positive response to changes undertaken while unfavourable attitudes lead to the opposite (Gupta, 2016). Workers have to be tuned to survive even in adverse circumstances, living in mental state of readiness to constant changes; bad lack, managers have failed to build organizational capability to help their workers couple with adverse circumstances. Leadership has a great role in leveraging workers' performance by taking into account of their

personality factor. Poor organizations may complain about workers' performance but smart organization may start by looking at the fit between workers and the leadership because it has a serious influence towards workers' performance as behavior elicited by leaders regardless of the position will make supervisee behave or do the same (Longenecker and Leffakis, 2002; Khan et al., 2014).

2.3 Demographic factors in association with job security and performance

Demographic characteristics of workers determine their performance and attitude towards job security over their work lifetime, aging variation has great influence on work performance abilities on task demands (Darwin, 2014; Timar, 2014). Job security is also associated to worker's age, workers with small age do not put much consideration on job security as they can find jobs easily as compared to the aged people who are no longer mobile and therefor, they consider job security positively (Salladarr'e et al., 2010). Gender is also believed to impact workers' performance but will also vary with the nature of the task at hand (Jimoh, 2008; Stone et al., 2016), other studies found no association of gender with job security while others have found, females are more prone to job security than men due to family matters like handling children, men are more mobile (Hakim, 1996). Job performance also varies with Marital statuses, some studies show that, married people have good job performance as compared to unmarried one and other studies got the opposite of the facts (Khurshid, Qasmi and Ashuraf, 2012; Lekha and Magesh, 2016) and some found no difference of marital statuses on job performance (Salladarr'e et al., 2010; Omori and Bassey, 2019), as well as no association of marital statuses and job security (Salladarr'e et al., 2010). Moreover, workers' education assists in acquiring various job proficiencies that helps workers perform their job duties as opposed to the one who does not have relevant education (Thomas and Feldman, 2009), but it is not guaranteed for educated workers to always be good performers (Frese, 2002). Salladarr'e et al., (2010) found no association of workers' education and job security as they do not see it as a motivational factor when looking for jobs, what is important is payment, those with tertiary levels of education have positive feelings towards job security but is been destructed by entrance of educated workers over time (Salladarr'e et al., 2010).

2.4 Economic condition of the Country in relation to Job Security

The country's economic status has a great role in fostering workers' wellbeing in public sector as it was noticed before; leadership is a critical factor in fostering performance in all sectors of the country. Better economic wellbeing of the country is also translated from good workers' performance and to good workers' welfares like good financial and nonfinancial rewards including job security (Noraishah et al., 2017). Unhealthy economy makes public workers lose confidence and therefore, is translated in terms of workers' healthy challenges, poor performance, Job insecurity, bribery and political challenges (Sverke, et al., 2006; Şenol, 2014; Shah et al., 2015; Awadh et al., 2015).

2.5 Motivation and workers' performance

Motivation is the energy that triggers a person to act in manner that can be favourable or unfavourable. It can also be referred as the intensity, persistence and direction of the efforts put forth in achieving organizational goals (Armstrong, 2006). Job performance can be achieved by means of pushing, directing and persuading workers. It is surprising nowadays, public workers only put in minimum effort towards job performance since they have no public interest, and the only purpose of doing job is to serve the basic needs of their families. A question that people need to think of is why public workers have lower interest and motives in rendering good service, caring of public properties and funds? The answer can be that, management responsible for supervising the daily operations have underutilised good management practices, nevertheless, leadership proficiency in this area is also deficient. Workers' motivation is mainly determined by work settings, firm's management procedures and personality traits of workers (Cardy, 2004; Nzuve and Mwangi, 2015). Motivating workers towards job performance is an art but also demands the science side for better outcomes. Each individual in the working place is unique and therefore calls for unique motivation mechanisms.

2.6 Theories guiding workers' motivation

2.6.1 Herzberg theory

Herzberg has identified two factors motivating workers; motivators and hygiene factors. For hygiene factors, a worker to feel that he/she is secured with the job need to have good working condition, good salary, good organization policies and management excellence. Absence of these factors will result to job insecurity; the second factor is motivators need and involves things like accomplishment, challenging job, growth, acknowledgment and responsibilities. This theory emphasises as to why people need to work hard and why work in that organization (Gibson, 2000; Huling, 2003).

2.6.2 Equity theory

There are treatment problems to workers arising from a number of factors; this theory put forward the idea of fairness and unfair practices by management. Equitable treatment of workers will make them be motivated for good performance, if they are treated inequitably they will become de-motivated and their working moral will diminish and tarnish out their performance effort. This theory urge management to pay attention to equitable treatment of their workers for best performance and output, workers are suffering much from inequitable treatment from their supervisors that is why, some of them are exhausted and have low performance because, when they compare their effort and effort of others used in relation to job output and rewards or treatment they find no relation and in turn discourages them (Beardwell, 2001).

2.6.3 Vroom's Expectancy Theory:

This theory argues that, workers are looking forward to see that, behaving in a certain way will ultimately result to valued outcomes. Workers have the tendency of asking themselves can I do it? This question originates from workers career development, if they find they cannot do it due to lack of knowledge and skills they may complain, but the immediate results is poor performance that influences low output, they may ask themselves again what will I get for doing it? This is the reward factor that drives performance (Nzuve and Njambi, 2015); any behaviour related to performance elicited by workers have to be rewarded instantly as the longer it takes to reward workers for their performance the higher the meaningless it becomes as a motivational factor for performance, sustainability of the working or performance culture has been hampered much by reward time factor in public sector. Nevertheless, how much a worker values the reward also matters, the more the rewards are valued the higher the satisfaction that creates superfluous effort and ending up obtaining organizational objectives (Anwar et al., 2011). Management is insisted that, timely and realistic performance enticements helps in energizing workers' behaviour and the way workers are regarded by an organization and the way they regard and act towards it will determine its achievements (Dexit, 2002).

2.6.4 McGregor Participation Theory

This theory has two outlooks concerning people with regards to work, which is theory X and Y. Theory X believes that, people have low determination, don't like work, escape obligations, and need closer supervision. People working with public sector vary in terms of behaviour, personalities, working culture, attitude towards public service and so on. These differences account to large portion of public sector workers falling under theory X; that is why, performance problems still exist. Moreover, more effort, creativity and other necessary mechanism from managements are needed for emancipating workers' thoughts towards job performance. Theory Y believes that, people are in demand of accountability, can work out for self-directions, and prefers working. However, a worker may share both characteristics of theory Y and X (Rao, 2010), surely, workers falling under this category are few and not easy to find many of them in one working place.
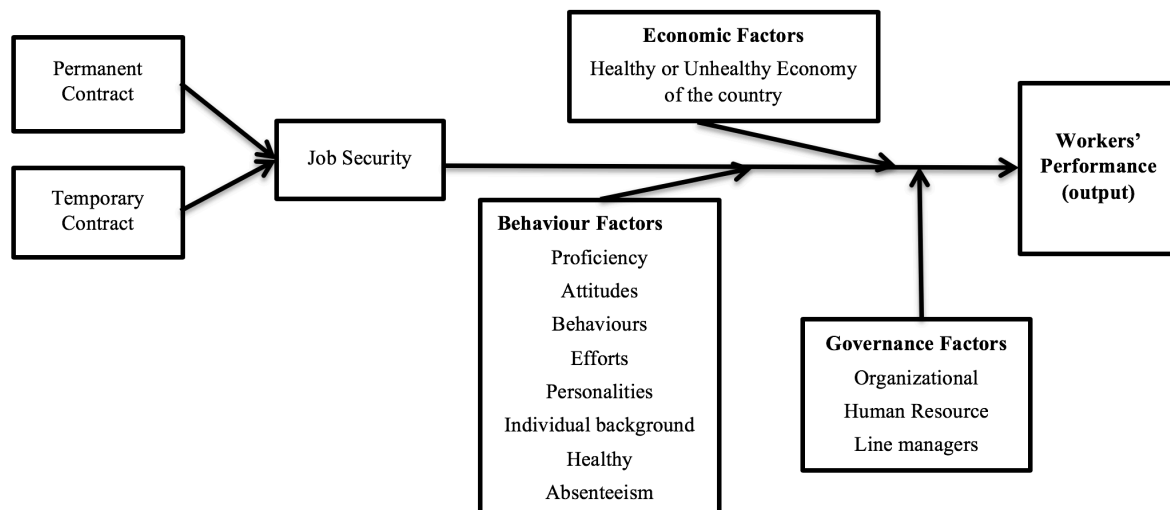
Figure 1: Theoretical structure of the study

3. Methodology

3.1 Research design

A survey was deployed for this case and sampling frame involved two groups, heads of departments and normal workers in operations drawn from a population of 73 workers at Tandahimba district council head quarter. Robbins (2008) says, population is composed of two groups namely target population and the accessible population. "Sample" can be defined as part of objects or anything drawn from big group for studying and testing it to acquire information required (Robbins, 2008). Size of the sample was found by Yamane's formula of 1967 as,

$$n=N/[1+N(e)^2] \tag{1}$$

Where n=sample size, N=population of the study e=estimated margin error of sample (95% confidence level or 5% precision level was assumed).
n=62/73(100)=84.93% of the respondent.

Table 3.1 Populationa distribution and Sampling strategy

Category	Number of Workers	84.93% of the respondents	Adjusted Sample Size	Sampling Strategy
Heads of Departments	6	5.07	5	Random
Operational Workers	67	56.90	57	Random
Total	73	61.97	62	

3.2 Sampling and data collection technique

Stratified and random sampling strategies were used in gathering of data. Primary data were gathered through questionnaire designed in five likert scale point while secondary data were obtained from journals and books. Questionnaire's internal consistence was examined by Cronbach's Alpha and had a value of .845 from 13 items which is high and allows for further analysis (Cronbach, 1951; Taber, 2018).

4. Data examination and study arguments

Sarantakos (1998) says, data analysis allows the researcher to bring data together, assessing them and drawing conclusions from facts findings. Gathered data were examined in six steps put forward by Creswell (2005), such steps include organizing, interpretation, explore and doing data coding, explaining findings by creating models,

doing presentation and report findings and finally interpreting the meaning in order to make general understanding.

Table 4.1 Respondents' information

Age Group	*Frequency*	*percentage*		Education Level	*Frequency*	*Percept*
18-20	10	16.1				
21-30	16	25.8		Tertiary Education	22	35.5
31-40	15	24.2		Vocational Training	11	17.7
41-50	16	25.8		Colleges	15	24.2
51 above	5	8.1		University	14	22.6
Total	62	100		Total	62	100
Gender				Marital Statuses		
Male	40	64.5		Single	22	35.5
Female	21	33.9		Married	37	59.7
				Widow	3	4.8
Total	62	100		Total	62	100

Table 4.2 Correlations

		Job Performance	Governance factors	Economic factors	Behavior factors
Job Performance	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	62			
Governance factors	Pearson Correlation	.989**	1		
	Sig. (2-tailed)	.000			
	N	62	62		
Economic factors	Pearson Correlation	.970**	.979**	1	
	Sig. (2-tailed)	.000	.000		
	N	62	62	62	
Behavior factors	Pearson Correlation	.959**	.946**	.920**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	62	62	62	

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4.2 shows independent and dependent variables are highly correlated and statistically significant at 0.01 level of significance, KMO results is .718 of sample acceptability of three variables and the significant of the Bartlett's Test of Sphericity 0.000 which is acceptable (Kaiser, 1974; Field, 2005). The score of four items in the correlation table is .686 from Cronbach Alpha test which is reasonable (Taber, 2018). Thus, Factor Analysis can be carried out.

Table 4.3 Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.897	96.558	96.558	2.897	96.558	96.558
2	.086	2.858	99.416			
3	.018	.584	100.000			

Extraction Method: Principal Component Analysis.

One factor was generated from 3 variables and it explains about 96.558% of the total variance of workers' job performance in public sector.

Table 4.4 Rotated Component Matrix[a]

	Component
	1
Governance factors	.992
Economic factors	.984
Behavior factors	.972

Extraction Method: Principal Component Analysis.

a. 1 component was extracted covering values higher than .5, small values were supressed.

Table 4.5 Model Summaryb

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.985[a]	.969	.969	1.19465	.969	1899.437	1	60	.000	1.806

a. Predictors: (Constant), Job Security

b. Dependent Variable: Job Performance

R score in table 4.5 is 0.985 which denotes the existence of strong association of dependent and independent variables as it is very near to one. R Square value is 0.969=96.9%, meaning that, Job performance is described by 96.9% of Job security. The other 3.1% of the dependent variable is described by factors not included in this case. Durbin-Watson of Job performance is 1.806 falling between the significant values of $1.5<d<2.5$, hence, no first order linear autocorrelation of this case data.

Table 4.6 ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2710.837	1	2710.837	1899.437	.000[b]
	Residual	85.631	60	1.427		
	Total	2796.468	61			

a. Dependent Variable: Job Performance

b. Predictors: (Constant), Job Security

ANOVA output in table 4.6 shows the statistical significance of the multiple linear regression model (F=1899.437, p<0.01). So, this model is statistically significant.

Table 4.7 Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.739	.303		2.439	.018		
	Governance factors	1.489	.028	.989	52.553	.000	1.000	1.000
	Economic factors	1.095	.033	.974	33.376	.000	1.000	1.000
	Behavior factors	.161	.038	.220	4.262	.000	.104	9.575

a. Dependent Variable: Job Performance

Table 4.7 relates $t_{arithmetic}$ found in Table with t_{table} under this case, the variable governance factors, economic factors and behaviour factors associates with Job performance due to fact that $t_{arithmetic} > t_{table}$. Multiple linear regression model equation is given as:-job performance=.739+1.489(Governance factors)+1.095(Economic factors)+.161(Behaviour factors)+ε. Multicollinearity issue in the model was not found as the tolerance values ranges between .104-1.000 higher than 0.10, VIF value ranges between 1.00-9.575 which is less than 10. Thus, the H_{01}, H_{02} and H_{03} are rejected and the alternative hypotheses are accepted.

Table 4.8 Correlations

		Job Performance	Age	Gender	Education level	Marital statuses
Job Performance	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	62				
Age	Pearson Correlation	.918**	1			
	Sig. (2-tailed)	.000				
	N	62	62			
Gender	Pearson Correlation	.390**	.368**	1		
	Sig. (2-tailed)	.002	.003			
	N	62	62	62		
Education level	Pearson Correlation	.913**	.944**	.299*	1	
	Sig. (2-tailed)	.000	.000	.018		
	N	62	62	62	62	
Marital statuses	Pearson Correlation	.773**	.839**	.393**	.859**	1
	Sig. (2-tailed)	.000	.000	.002	.000	
	N	62	62	62	62	62

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

In table 4.8 most of variables are correlated at .01 level of significant and one variable is significant at .05. So, the variables confirm that, they associate with job performance. The score of four items in the correlation table is .686 from Cronbach Alpha test which is also reasonable (Taber, 2018), while the KMO of the four factors is .728 which is adequate for factor analysis process (Kaiser, 1974; Field, 2005).

Table 4.9 Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.954	73.838	73.838	2.954	73.838	73.838
2	.817	20.421	94.259			
3	.179	4.472	98.730			
4	.051	1.270	100.000			

Extraction Method: Principal Component Analysis.

One factor was generated from 4 variables and it explains about 73.838% of total variance of workers' job performance in public sector.

Table 4.10 Component Matrix[a]

	Component
	1
Age	.957
Education level	.951
Marital statuses	.932
Gender	.514

Extraction Method: Principal Component Analysis.

a.1 components was extracted covering values higher than .5, small values were supressed.

Table 4.11 Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.818[a]	.670	.664	3.92328	.670	121.682	1	60	.000	1.687

a. Predictors: (Constant), Demographic Factors
b. Dependent Variable: Job Performance

R score from table 4.11 is 0.818 which signifies there been a strong association of independent and dependent variable and it is near to one. R Square value is 0.670=67%, indicating that, Job performance is described by 67% of demographic factors. The other 33% of dependent variable is described by factors not included in this case. Durbin-Watson of Job performance is 1.687 which falls between the significant values of $1.5<d<2.5$, hence, no first order linear autocorrelation of this case data.

Table 4.12 ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1872.940	1	1872.940	121.682	.000[b]
	Residual	923.528	60	15.392		
	Total	2796.468	61			

a. Dependent Variable: Job Performance
b. Predictors: (Constant), Demographic Factors

ANOVA output in table 4.12 shows the statistical significance of the multiple linear regression model (F=121.940, p<0.01). So, this model is statistically significant.

Table 4.13 Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	3.883	1.065		3.645	.001		
	Age	5.108	.284	.918	17.975	.000	1.000	1.000
	Gender	.268	.134	.106	1.997	.051	.793	1.262
	Education level	4.386	.254	.913	17.281	.000	1.000	1.000
	Marital statuses	-1.762	1.161	-.146	-1.518	.135	.240	4.169

Table 4.13 relates $t_{arithmetic}$ found in Table with t_{table} under this case, the variable age and education level influences Job performance because $t_{arithmetic} > t_{table}$. The multiple linear regression equation is given as:-job performance=3.883+5.108(age) +4.386(education level) +ε. Gender variable has no significant influence towards job performance as it's (β =.268, t=1.997, p>.05), while the variable marital statuses have negative influence towards job performance and statistically not significant, its values are (β =-1.762, t=-1.518, p>.05). Multicollinearity issue in the model was not found as the tolerance values ranges between .240-1.00 which is more than .10, VIF value ranges between1.000 - 4.169 which is less than 10.

The significant difference of demographic characteristics with regard to job performance and job security was tested for normality due to difference in nature of data distribution, data with more than two categories and bared normal distribution were tested by ANOVA, this test assists in knowing which group differs from other groups as compared to Kruskal-Wallis test (Sagepub, 2017; Ostertagora et al., 2017). Data falling in more than three categories and did not bare normal distribution nature were tested by Kruskal–Wallis for justification purposes, this technique provides information about the difference of the groups but, it does not say which group differs from other group, moreover, it is very possible to get two different outcomes from the test, one being significant and the other not being significant, under such conditions, Shapiro-Wilk results are encouraged due to its reliability (Ezspss, 2020). T-test was used for groups falling under two categories.

Table 4.14 Descriptive Statistics for job performance

Education Level	N	Mean	Std. Deviation	Minimum	Maximum
Tertiary education	10	11.04165	.014434	11.00	16.50
Vocational training	11	13.4545	1.57249	12.00	17.00
College	15	19.8000	1.78085	17.00	22.00
University	14	27.7857	2.32639	23.00	31.00
Total	62	17.3710	6.77080	11.00	31.00

Table 4.15 ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2656.067	4	664.017	269.577	.000
Within Groups	140.401	57	2.463		
Total	2796.468	61			

Table 4.15 has significant score of .000 which is small than the required alpha .05, thus, the null H05 is rejected because there were significant differences between groups, F (4, 57)=269.577, p<.00. Job performance for workers who have attained University or College education differed significantly with those who have Tertiary education and Vocational training.

Table 4.16 Kruskal-Wallis test statistics

Kruskal-Wallis	Job performance			Job Security		
	df	Chi-square	Sig.	df	Chi-square	Sig.
Marital Statues	2	46.857	.000	2	45.809	.000
Kruskal-Wallis	Job performance			Job Security		
	df	Chi-square	Sig.	df	Chi-square	Sig.
Education	4	58.497	.000	4	59.125	.000

Justifying the significance difference between Workers' marital statuses and education with Job performance and job security, the Kruskal-Wallis test was deployed as from table 4.16 where the difference of marital statuses with job performance is (p=.000< 0.05) and with job security is (p=.000<0.05 so, the null H04 is not accepted. Similarly, the difference of education with Job performance and job security was found, the impact of education on job performance (p=.000< 0.05) and education on job security (p=.000< 0.05) therefore, the null H05 is not accepted respectively. Similar results on marital statuses are found in table 4.17 and 4.18 below. Results from table 4.14-4.16 are supported by Salladarr'e et al., 2010 and Omari & bassey, 2019 on the influence of marital statuses on job performance. The association of workers' education and job security together with job performance is supported by Frese, 2002; Thomas and Feldman, 2009; and Salladarr'e et al., 2010.

Table 4.17 Descriptive statistics for job performance

Marital Statuses	N	Mean	Std. Deviation	Minimum	Maximum
Single	22	11.0455	.21320	11.00	12.00
Married	37	20.0541	5.57248	12.00	29.00
Widow	3	30.6667	.57735	30.00	31.00
Total	62	17.3710	6.77080	11.00	31.00

Table 4.18 ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1676.955	2	838.477	44.189	.000
Within Groups	1119.513	59	18.975		
Total	2796.468	61			

Table 4.18 has significant score of .000 small than the required alpha .05, thus, the null hypothesis H04 is rejected because significant differences exist, marital statuses, F (2, 59)=44.189, p<.00. Workers' Job performance differs significantly with their marital statuses as seen also from table 4.16. The difference is of course controversial with this regard (Salladarr'e et al., 2010).

Table 4.19 Group Statistics

	Respondents' gender	N	Mean	Std. Deviation	Std. Error Mean
Job Security	Male	40	9.1250	1.41761	.22414
	Female	21	20.9524	2.37647	.51859
Job Performance	Male	40	12.9500	2.78227	.43992
	Female	21	25.1905	3.66905	.80065

Table 4.20 Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference		Lower	Upper
Job Security	Equal variances assumed	20.220	.000	-24.373	59	.000	-11.82738		-12.79841	-10.85635
	Equal variances not assumed			-20.935	27.675	.000	-11.82738		-12.98525	-10.66951
Job performance	Equal variances assumed	6.738	.012	-14.599	59	.000	-12.24048		-13.91818	-10.56277
	Equal variances not assumed			-13.399	32.385	.000	-12.24048		-14.10044	-10.38051

For associating workers' gender in hand with job performance and job security, t-test was deployed for processing as in table 4.19 and 4.20. A significant variance of score between the two groups of gender does exist, t $(27.675)=-20.935$, $p<.05$, two-tailed with Male (M=9.1250, SD=1.41761) having different score with Female (M=20.9524, SD=2.37647). The level of variances in the mean (mean difference=-11.82738, 95% CI: -12.98525 to -10.66951) was lesser (eta squared=.05). Hence, the null H_{04} can be rejected as workers' gender has significant difference of attitude towards job security. Similarly, the significance of variance of gender and job performance has a score of .012, the relevant scores of significance. (2-tailed) under t-test for equality of mean is (0.000) lesser than 0.05, indicating that, the H_{04} there is no association of workers' gender and job performance can be rejected as significant difference of score between the two groups of gender does exist with regard to job performance, t $(32.385)=-13.399$, $p<.05$, two-tailed with Male (M=12.9500, SD=2.78227) having different score with Female (M=25.1905, SD=3.66905). The level of variances in the mean (mean difference=-12.24048, 95% CI:-14.10044 to -10.38051) was lesser (eta squared=.05). The facts of gender in association with job performance and job security are supported by Hakim, 1999, Jimoh, 2008 and Stone et al., 2016 as explained in the literature.

Table 4.21 Kruskal-Wallis test statistics

Kruskal-Wallis	Job performance			Job Security		
	df	Chi-square	Sig.	df	Chi-square	Sig.
Age	4	57.141	.000	4	58.396	.000

Kruskal-Wallis test was deployed to justify the existance of significant difference among workers' age levels with job performance and job security. Table 4.21 gives the significant difference of age on work performance as (p=.000<0.05) and that of age with job security as (p=.000<0.05). Thus, the null H_{04} is not accepted. The facts of the difference of workers' age levels in relation to job performance and job security are supported by Darwin, 2014 and Timar, 2014.

Table 4.22 Descriptives Statistics for job performance

Age Groups	N	Mean	Std. Deviation	Minimum	Maximum
18-20	10	11.0000	.00000	11.00	11.00
21-30	16	11.3125	.47871	11.00	12.00
31-40	15	16.4667	2.41622	13.00	20.00
41-50	16	24.3125	2.98259	21.00	29.00
51	5	30.0000	1.00000	29.00	31.00
Total	62	17.3710	6.77080	11.00	31.00

Table 4.23 ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2573.859	4	643.465	164.762	.000
Within Groups	222.608	57	3.905		
Total	2796.468	61			

Table 4.22 has significant score of .000 small than the required alpha .05, thus, the null H_{04} is rejected because significant differences exist between age levels with Job Performance, F $(4, 57)=164.762$, $p<.00$. Workers' Job performance differs significantly with their age levels.

5. Ending Remarks from the study

Working for unsatisfactory performance in public sector is vexing and costly in terms of time and other resources, despite the presence of job security in public sector as a determining factor of job performance, persisting performance problems are still there and are attributed by a number of factors like absence of

performance culture and low incentives as Bloom & Van Reenen (2011) insist that, workers should be rewarded for performance culture bared, also, performance problems are not addressed properly and timely; some studies found workers with performance problems been shifted (Gallo, 2014) or managers hiding performance problems of their workers to higher authority for relations purposes (Guffey and Helms, 2001) which has been the case to. Bloom & Van Reenen, (2011) argued that, developing countries have the problem of embracing underperformers without punishing them. Inappropriate work behaviours like prioritising work time for gossiping, unhealthy work-life balance, inappropriate managerial practices accompanied by fear of making decisions or making decision basing on grapevine, personality misfit with jobs as well as between workers and leaders due to recruitment and selection problems. Line managers are found to have subjective assessment of workers' performance and consistent deleterious feedback from performance appraisal as Brown and Benson (2003) says, consistent negative feedback to your workers kills their work moral; also, overloading problems have resulted to poor output. All these problems account for public sector workers' negative attitudes towards public funds, properties, and performance problems.

5.1 Recommendations

Management should invest in building workers' positive attitude towards public interest for them to render excellent service. But also, line managers have to be objective in performance assessment, stop hiding performance problems and ought to offer constructive feedback to their workers.
To embark on regular trainings and development programs as well as yearly assessment of managers by workers and consultants from private sectors to share best managerial practices in matters related to performances like the use of Deming's 14 points and implementations of Kaizen techniques.

Hiring talented people is not the ultimate solution to performance problems; rather, management should work for best mechanisms that will raise and sustain performance culture. In hand with that, management should promote realistic and timely budget for regular performance incentives as current changes in management practices demands the working culture be reconsidered as an important ingredient of success by portraying new values and new working culture that is associated with new public sector management strategies and people with proper traits as Riordan (2015) says, performance culture in public sector is highly influenced by politics rather than market influence.

Work on reminding workers on the role of self-values, integrity and the sort of output expected from them, discourage gossiping acts and line-managers making decisions basing on grapevine as well as counselling workers on work-life balance and act in due diligent in protecting public properties and funds as workers have negative attitude towards these stuffs.

Breaking gaps between managers and workers to build good relationship between them, Tamkin et al., (2003) argue managers to employ good expertise to enhance work behaviour and stand for timely career development, studies insist management to account for proper development of its human capital to foster workers capabilities (Mutegi and Ombui, 2016).

Avoid hiring on self-interest. It has been a knocking problem in public sector giving room for siding top performers and attracting underperformers.

Avoid keeping management people whose tenure has lapsed in the same place as they bring difficulties for new managers to deal with their performance problem and they may also have due influence to new manager's decision and those who were his/her subordinates.

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Determinant of Stock Price Manufacturing Company: Evidence From Indonesia

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Abstract
One of the objectives of financial management is to maximize the value of the company. For companies that have been listed on the stock exchange, this goal can be achieved by maximizing the value of the relevant market price. The purpose of this study is to find the right model to analyze the effect of Debt to Equity Ratio (DER), Earning per share (EPS), Price to Book Value (PBV), and Return on Equity (ROE) on the stock prices of manufacturing companies included in the sector the food and beverage sub-sector of the consumer goods industry that is listed on the Indonesia Stock Exchange. Research data include the financial data for the period 2012-2018. The estimation method used is the panel data regression. The analysis shows that the most appropriate model in this research is the Random Effect Model. Variables that affect stock prices based on the model are earnings per share and price to book value.

Keywords: Stock Price, EPS, PBV, ROE, Panel Regression

1. Introduction

The large number of investments in the capital market has resulted in an increasing number of investors switching from the banking sector to the capital market sector. In supporting the economy, the capital market has an important role, because the capital market can connect those who need funds with those who have excess funds. In addition, the capital market can encourage the creation of efficient fund allocations, because with the capital market, those who have excess funds (investors) can choose alternative investments that provide the most optimal return (Tandelilin, 2007).

One of the basic concepts in financial management is that the goal to be achieved by financial management is to maximize the value of the company. For companies that have gone public, this goal can be achieved by maximizing the value of the relevant market price. According to Brigham and Houston (2010) stock prices determine shareholder wealth. Maximizing shareholder wealth translates to maximizing the company's share price. The stock price at a certain time will depend on the cash flow that is expected to be received in the future by the "average" investor if the investor buys the stock.

By investing in shares, investors expect to obtain profits on both dividends and capital gains, because of the

appreciation of the shares. Appreciation in stock prices occurs because market valuations are carried out using either micro or macro fundamental factors and also other technical factors (Faried, 2008). Fundamental factors can be seen from several ratios including Debt to Equity Ratio (DER), Earning per share (EPS), Price to Book Value (PBV), Return on Equity (ROE). Financial ratios can describe financial performance and can explain some of the strengths and weaknesses of a company's finances. Financial ratios include profitability ratios namely EPS and ROE, solvency or leverage ratios namely DER and market ratios or company values, namely PBV. Although theoretically, the company's financial performance has an effect on stock prices, empirically some previous empirical studies have shown inconsistent results. This motivated us to conduct further study.

Research that discusses stock prices by using macroeconomic variables includes Narayan, Narayan and Singh (2014), which examine the determinants of stock prices for major Indian banks using panel data modeling techniques. Their work is novel because, for the first time in the literature on Indian banking, they used a panel Granger causality test that reveals the direction and sign of causality. They found evidence of panel co-integration among stock prices, economic activity, interest rates, and exchange rates for thirteen banks. Our results suggest that while economic activity and currency depreciation contribute to a rise in share prices, an increase in the interest rate reduces bank share prices. Moreover, only economic activity Granger-causes stock prices in the long run. Other studies use financial ratios, in general, to measure company performance to analyze stock prices. Puspitaningtyas (2017) analyzed the effect of the financial performance of the stock price. At the 0.05 significant level, the results showed that only market valuation variables that significantly influence stock prices. Meanwhile, the variable liquidity, profitability, and growth have no effect on stock prices. These results indicate that the share price reflects the market valuation of the company's shares. Handayani, Muharam, Mawardi and Robiyanto (2018), which analyze the influence of return on equity, debt to equity ratio, sales growth, firm size, cash ratio, and dividend payout ratio to stock price volatility companies listed on the Indonesia Stock Exchange in the period 2011-2015. The data analysis technique used is the regression model panel it is then adjusted again by using GARCH (Generalized Autoregressive Conditional Heteroscedasticity). The results of panel data regression analysis showed that the company's stock price volatility in the research samples can be explained up to 4.84% by ROE, CR, DER, DPR, company size and sales growth while the remaining 95.16% is explained by other variables outside the research. Only sales growth has significant positive effect on stock price volatility.

The purpose of this study is to find the right model to analyze the effect of Debt to Equity Ratio (DER), Earning per share (EPS), Price to Book Value (PBV), and Return on Equity (ROE) on the stock prices of manufacturing companies included in the sector the food and beverage sub-sector of the consumer goods industry that is listed on the Indonesia Stock Exchange. This study chose the food and beverage industry sector for several reasons. Based on a press release from the Ministry of Industry of Indonesia (2019), it is explained that the food and beverage industry is one of the manufacturing sectors that is a mainstay in making a major contribution to national economic growth. The performance achievements so far have been consistently positive, starting from its role in increasing productivity, investment, exports and employment. The Ministry of Industry noted, throughout 2018, the food and beverage industry could grow by 7.91 percent or exceed the national economic growth at 5.17 percent. In fact, the growth of large and medium manufacturing industry production in quarter IV-2018 increased by 3.90 percent (y-on-y) compared to quarter IV-2017, one of the reasons is the increase in beverage industry production, which reached 23.44 percent.

2. Literature Review and Similar Research Studies

Earning per Share (EPS) is the first important component that must be considered in an analysis of a company's financial performance. Company EPS information shows the size of the company's net profit that is ready to be distributed to the company's shareholders. This ratio shows how much profit (return) is obtained by investors per share for the owner. Other profitability ratios are ROE, which is a measure of a company's ability to generate corporate returns or the effectiveness of the company in generating profits by utilizing shareholders' equity owned by the company. The higher the value of ROE shows the more efficient does the company uses its own capital to generate profits (Brigham, 2010)

The following is a description of similar research studies on the factors that influence stock prices. Research conducted by Yanti, Nurazi and Zulkarnain (2012) in 5 companies recommended by PT. E-trading Securities shows that EPS, PBV and ROE affect stock prices. Only the DER variable has no effect on stock prices. Amanda and Wahyu (2013) conducted a fundamental analysis and systematic risk on the share prices of 6 banks listed in LQ45. The results showed that ROA and ROE had no effect on stock prices. DER and BETA have a negative effect on stock prices, while EPS and PER affect stock prices. Dewi, and Suaryana (2013) analyzed companies in the food and beverage sub-sector listed on the Indonesia Stock Exchange in 2009-2011. This study found that EPS and PBV influenced the stock price.

Syamsurijal, and Agus (2014) analyzed the factors that influenced the company's stock prices in the transportation services industry sector listed on the Indonesia Stock Exchange in the 2009-2012 period. The results showed that DER, TATO, and ROE had an effect on stock prices, while CR and EPS had no effect on stock prices. Pratama and Erawati (2014) analyzed the stock prices of manufacturing companies in the 2008-2011 period. The results found that CR, DER and EPS affect stock prices. Al Masum (2014) analyzes dividend policy, retention ratio, ROE, stock dividends, cash dividends on stock prices. The results showed that ROE and EPS affect stock prices, while dividends and earnings after tax, negatively affect stock prices. In this research, retention ratio has no effect on stock prices. Noor and Scrimgeour (2014) analyzing and comparing 5 ratios from each of the sub-groups namely accounting based financial measure and market based financial measure, we find that price to earnings (P2E), Tobin Q (TQ), market to book (M2B) and cash flow return on investment (CFROI) from market based financial measures can better explain variance in stock prices.

Research conducted by Tumandung, Murni and Baramuli (2017) shows that partially Current Ratio and Total Asset Turnover variables have no effect on stock prices, while ROE and DER variables affect stock prices in companies in the food and beverage industry subsector. Egam, Ilat and Pangerapan (2017) analyzed the effect of ROA, ROE, NPM and EPS on the stock prices of companies incorporated in the LQ45 on the Indonesia Stock Exchange in the 2013-2015 period. The results showed that the variable ROA and ROE has no effect on stock prices. NPM has a negative effect on stock prices, EPS has a positive effect on stock prices. Azhari, Rahayu and Zahroh (2016) analyzed the effect of ROE, DER, TATO and PER on stock prices on property and real estate companies on the IDX. The results showed that ROE and PER has an influence on stock prices, DER and TATO had no effect on stock prices. Suselo, Djazuli and Indrawati (2015) found that ROA, PBV, EPS, PER and the sensitivity of interest rate have a significant positive effect on stock prices. The research aims to investigate the influence of fundamental and macroeconomic variables on stock prices in the LQ45 during the period 2010 to 2013. The population in this research is 30 companies in the LQ45. The analysis method of the research uses linear multiple regression. ROE, the sensitivity of the exchange rate and the sensitivity of inflation have significant negative effect on stock prices. DER has no significant effect on stock prices. Puspitaningtyas (2017) analyzed the effect of the financial performance of the stock price. Financial performance is measured using the variables of liquidity, profitability, growth, and market valuation. The population of this study is a non-banking company registered in the Indonesia Stock Exchange and incorporated in LQ45 in the period 2011- 2016. Sampling was done by using the purposive technique. Furthermore, the data were analyzed using multiple linear regression methods. At the 0.05 significance level, the results showed that only market valuation variables that significantly influence stock prices. Meanwhile, the variable liquidity, profitability, and growth have no effect on stock prices. These results indicate that the stock price reflects the market valuation of the company's shares.

Handayani, Muharam, Mawardi and Robiyanto (2018) analyze the influence of return on equity, debt to equity ratio, sales growth, firm size, cash ratio, and dividend payout ratio to stock price volatility companies listed on the Indonesia Stock Exchange in the period 2011-2015. The companies in this study are all from the manufacturing industries listed in Indonesia Stock Exchange (IDX) in the period 2011 to 2015. It obtained eight company samples with technique purposive sampling method. The data analysis technique used at that time is the regression model panel. It was adjusted again by using GARCH (Generalized Autoregressive Conditional Heteroscedasticity). The results showed that the volatility of the stock price doesn't have an affect on ARCH-GARCH therein. The results showed that the company's stock price volatility in the research samples can be explained by 4.84% by ROE, CR, DER, DPR, company size and sales growth while the remaining 95.16% explained by other variables outside the research study. Only sales growth has significant positive effect on stock

price volatility. Hung, Ha and Binh (2018) analyzed the impact of accounting information on financial statements to the stock price of energy enterprises listed on Vietnam's stock market. By using the OLS regression model and quantile regression model, the author studies the influence of factors such as return on assets (ROA), capital structure (LV), enterprise size, current ratio, and accounts receivable turnover to stock prices. Data from this study were collected from 44 energy enterprises during 2006-2016. The results show that ROA, enterprise size, current ratio, and accounts receivable turnover are positively correlated with the stock price, with an explanation level of 48.47%. Capital structure (LV) does not affect stock prices. Based on the research results, the authors propose some recommendations for investors and enterprises and suggest other research directions as well as adding new factors to the stock price. Dang, Tran, and Nguyen (2018) investigated the impact of financial information on stock prices of listed firms on Vietnam Stock Exchange. Data were collected from 273 large listed firms over the period 2006 to 2016. By using the multiple regressions, the relationship between determinants including earnings per share, book value, cash flow from operating activities, firm size and stock prices is investigated. The results show that four determinants have positive relationships with stock prices with an explanation level of 48.1%. The impact of financial information on stock prices has been getting stronger and stronger in the years of 2015 and 2016 with the explanation levels above 60%.

Mondal, and Imran (2019) analyze the factors influence in determining the share price of some companies listed in Dhaka Stock Exchange. The study also analyzed, the influence of liquidity, leverage, profitability, growth, size of the firm and dividend rate on market price per common share. The study reveals some qualitative factors namely, company goodwill; market sentiments; company announcements; AGM; unexpected circumstances; analysts' report; technical influence; print and electronic media; hype; change in government policy; international situation; political turmoil as well as some quantitative factors like, dividend; market capital; price/earnings ratio; EPS; net income; return on investment; retained earnings; merger; stock split; margin loan; demand & supply of stock; inflation; interest rates and exchange rates that affect the stock price. This study also finds that price earnings ratio; stock price rumor; demand for the share; changes in government policies; economic conditions are the most influential internal; external; economic; political; and environmental factors respectively regarding stock price.

3. Research Method

This study uses secondary data, namely variable stock prices, DER, EPS, PBV and ROE in 2012-2018. The data source used in this study was obtained from the annual financial statements of companies manufacturing food and beverage industry sectors listed on the Indonesia Stock Exchange (IDX) during the 2012-2018 period. The population included 14 manufacturing companies listed in the food and beverage industry sector that are listed on the Indonesia Stock Exchange during the period 2012-2018. The research sample was taken adopting a purposive sampling method with the aim of getting a sample that was consistent with the research objectives. The criteria for the companies that are included in this study are (1) food and beverage companies listed on the Indonesia Stock Exchange during the 2012-2018 period; (2) food and beverage companies that have published complete annual reports for the 2012-2018 period; (3) food and beverage companies that have the necessary data so that they can be used in research; (4) companies issuing financial statements as of December 31, 2012-2018. Based on these criteria, a sample of 11 companies was listed on the Indonesia Stock Exchange in 2012-2018. The list of companies that have become the study sample is as shown in Table 1 below.

Table 1. Company List

No	Kode Saham	Nama Emiten
1	AISA	PT. Tiga Pilar Sejahtera Food, TBK
2	CEKA	PT. Wilmar Cahaya Indonesia, Tbk
3	DLTA	PT. Delta Djakarta, Tbk
4	ICBP	PT. Indofood CBP Sukses Makmur, Tbk
5	INDF	PT. Indofood Sukses Makmur, Tbk
6	MLBI	PT. Multi Bintang Indonesia, Tbk
7	MYOR	PT. Mayora Indah, Tbk
8	PSDN	PT. Prashida Aneka Niaga, Tbk
9	ROTI	PT Nippon Indosari Corporindo, Tbk

| 10 | SKLT | PT. Sekar Laut, Tbk |
| 11 | ULTJ | PT. Ultrajaya Milk Industry and Trading Company, Tbk |

Panel data regression analysis was performed to analyze the data. The procedure followed for analysis is described in the following Figure 1.
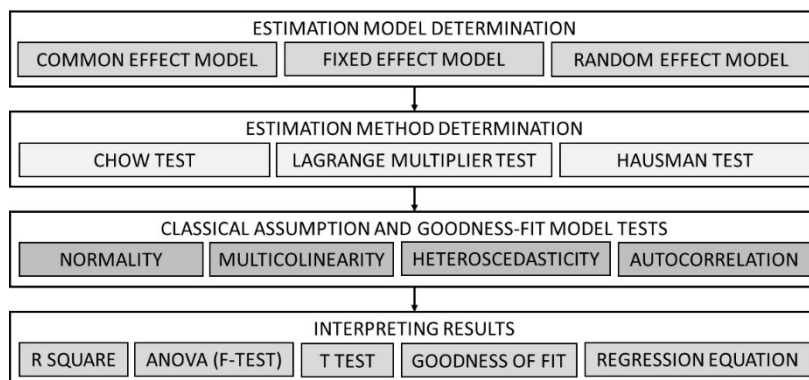

Figure 1. Panel Data Regression Analysis Procedures (Adapted from Zulfikar, 2018)

The first step of panel data regression analysis is to generate to three possible effect model such as common effect, fixed effect and random effect models. The following step is to perform the Chow Test to determine the most appropriated effect model between common effect model and fixed effect model. If fixed effect model is selected as the appropriate one, the Hausman test should then be performed to determine whether fixed effect model or random effect model is the most appropriate model. If, otherwise common effect model is selected. The Langrange Multiplier Test must be performed to determine the most appropriate effect model i.e. between random effect model and common effect model. The next step is to perform the classical assumption test, which includes normality, multicollinearity, heteroscedasticity and autocorrelation to verify the validity of the classical linear regression model or CLRM. The last step is to interpret the resulting effect model i.e. common effect model, fixed effect model or random effect model.

4. Result and Discussion

The first stage of the analysis is a descriptive analysis including minimum, maximum, average values, standard deviations and coefficient of variation. This analysis illustrates data from all variables used in this study, namely stock prices, debt to equity ratio, earnings per share, price to book value, and return on equity. The following table provides the results of descriptive analysis of research variables (stock price, debt to equity ratio, earning per share, price to book value and return on equity), which include minimum and maximum values, mean, and standard deviation.

Table. 1. Descriptive Statistical Analysis

Variables	Min	Max	Mean	Standard deviation	Coefficient of Variation (%)
Stock price	122	1200000	58579.40	215131.4	36.72
Debt to equity ratio	0.17000	3.03	0.965714	0.546836	56.62
Earning per share	-171.4700	55587.51	2326.411	8393.754	36.08
Price to book value	0.16000	47.27000	5.978182	9.631244	16.11
Return on Equity	-24.8700	1190.000	15.13830	135.7109	89.65

Referring to their related coefficient of variance (see Table 1), it is revealed that all variables under study are substantially varied. The values of the coefficients are relatively high which spread from 16.11 percent (price to book value) to 89.65 percent (return on equity). This indicates that financial performance (i.e. debt to equity ratio, earnings per share, return on equity and price to book value) and stock price of food and beverages firms are considerably varied.

The following is a description of these variables during the study period, 2012 to 2018. This section presents a descriptive analysis of data for 11 companies, that are included in our study sample.
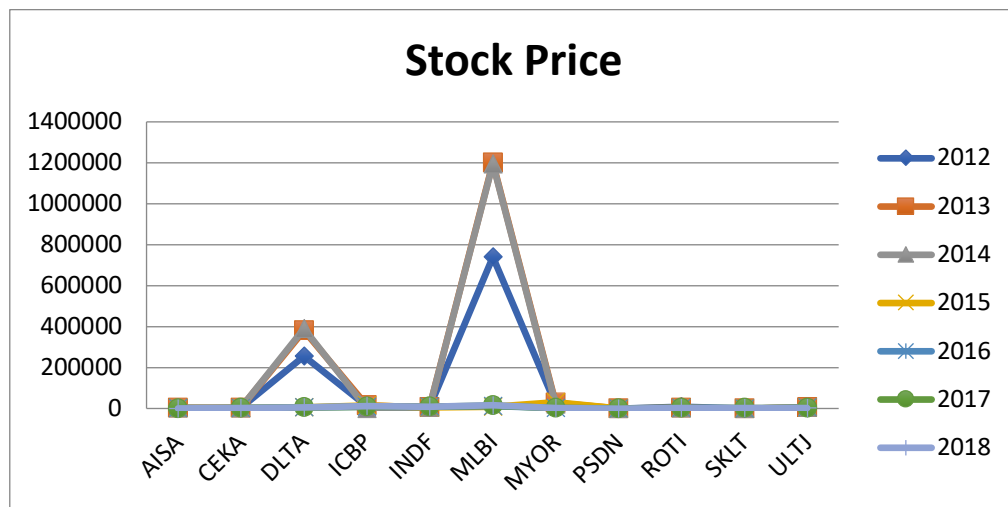

Figure 2. The Growth of Stock Price in period 2012-2018

In Figure 2, it appears that there is a sharp or extreme fluctuation in stock prices in companies with MLBI codes. The sharply rising share price occurred in 2013. The highest stock price (MLBI) occurred in 2014, while the lowest (ICBP) occurred in 2014. During the study period, the company receiving the highest stock price (Rp. 120000) had the code MLBI, while that with the lowest (Rp.12) was ICBP. ICBP's share price continued to rise until it reached its highest value in 2015 i.e. Rp. 13475. By 2018, ICBP's share price decreased to 10450. In 2018, the highest stock price, was by a company with code MLBI (Rp. 16000). The following is an explanation related to fluctuations in the company's stock price, which is the sample of this study.

Based on the Indonesian economic report (Bank Indonesia, 2014), in general Indonesia was successfully passed through the rating in 2014 with stronger macroeconomic stability performance and a healthier economic adjustment process. The exchange rate of the rupiah in 2014 depreciated against the United States dollar (US), but recorded an appreciation of the currencies of other major trading partners. The depreciation of the rupiah against the US dollar occurred in the fourth quarter of 2014 due to the strong appreciation of the US dollar against almost all major world currencies. During the research period, 2013, 2014 and 2015 were the years with sharp fluctuations in the prices of food and beverage sector shares.
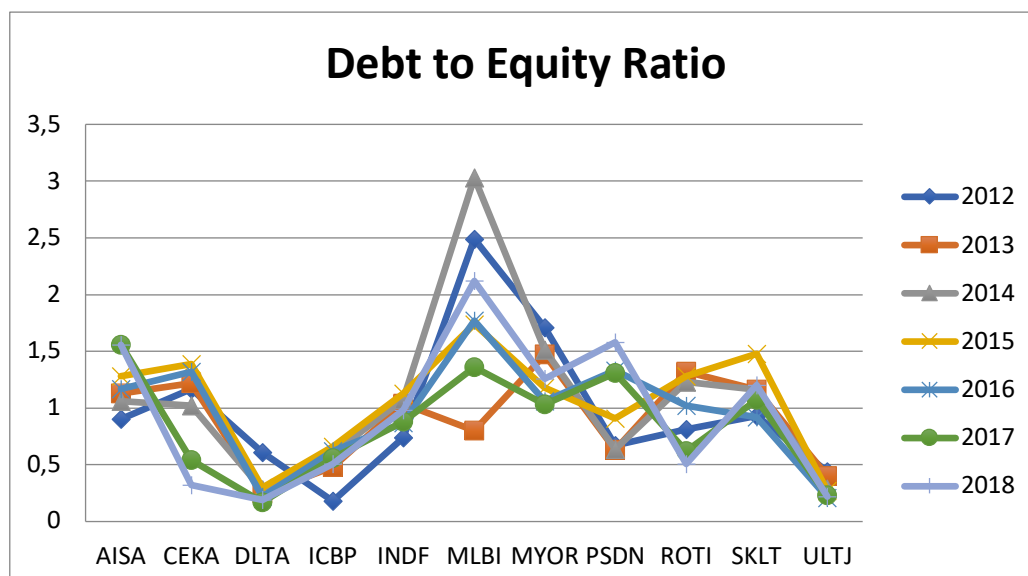

Figure 3. The Growth of Debt to Equity Ratio in Period 2012-2018

The growth of debt to equity ratio is shown in Figure 3. DER fluctuations occur quite sharply or extreme in companies with MLBI codes. Debt to equity ratio that increased sharply occurred in 2014, from the previous 0.8 (2013) to 3.03 (2014). During the study period, the company receiving the highest DER (3.03) had the code MLBI occurred in 2014, while the lowest (0.21) had the code ULTJ occurring in 2016. Debt to equity ratio shows the comparison between debt and equity. If the value of this ratio is large, it means the company is financed by the debtors, not from its own financial source. This ratio is one indicator for investors to analyze the company's health condition. Investors will invest their capital in companies that have relatively small DERs.

Explanation of the conditions experienced by companies with the MLBI code in 2014 is based on the annual report published as follows. MLBI's performance is influenced by government regulations that require the separation of alcoholic and non-alcoholic beverages processing at the Tangerang factory. As a result, sales of non-alcoholic beverages declined in line with the cessation of Bintang Zero and Green Sands production for approximately 5 months (between April-August 2014). Operating profit, increased 2.7% to Rp1,146 billion. The growth of operating profit was significantly affected by the devaluation of the Rupiah, which resulted in an increase in the cost of raw materials and packaging materials using US dollars and Euros. In August 2014, MLBI completed construction of our third production facility in Indonesia - an alcohol-free beverage processing facility in Sampang Agung, East Java. This sophisticated beverage processing facility costed an investment of Rp. 210 billion. (PT. Multi Bintang Indonesia, TBK, 2014). The next discussion is the growth of EPS Ratio in the period 2012-2018 is illustrated in Figure 4.
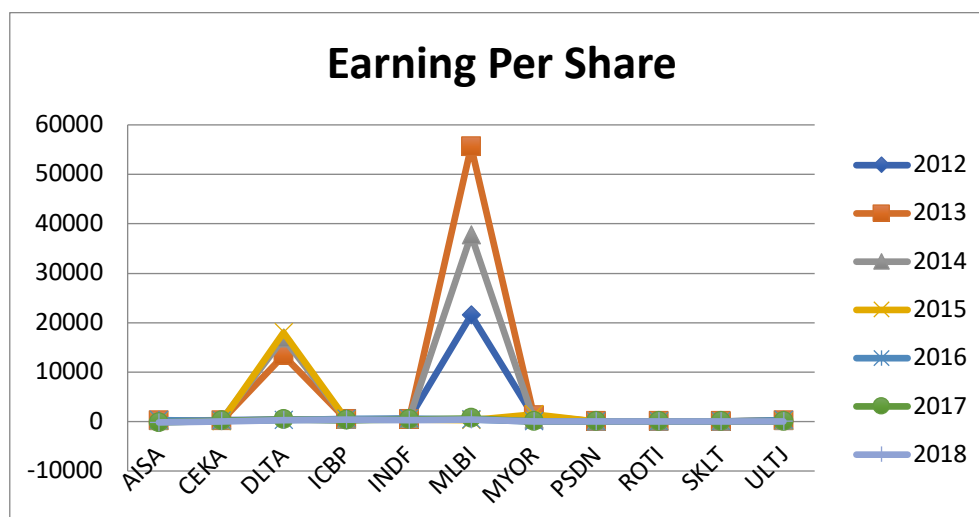

Figure 4. The Growth of Earning Per Share in Periode 2012-2018

The growth of earnings per share is shown in Figure 4. In the EPS ratio there was also a sharp or extreme increase in companies with the MLBI code. Earning per share which increased sharply occurred in 2013. The highest EPS (MLBI) occurred in 2013, while the lowest (AISA) occurred in 2017. During the study period, the company receiving the highest EPS (Rp. 55587) had the code MLBI, while that with the lowest (Rp. -171.47) was AISA. A description of the conditions experienced by company with the AISA code is as follows. In 2018 AISA has not been able to submit its financial statements, this is due to AISA's management change. Conditions under the leadership of the new management stated that they have not been able to submit financial reports since the first quarter of last year. This is because there are obstacles to the transition from old management to new management that are currently considered not proper (Wareza, 2019).
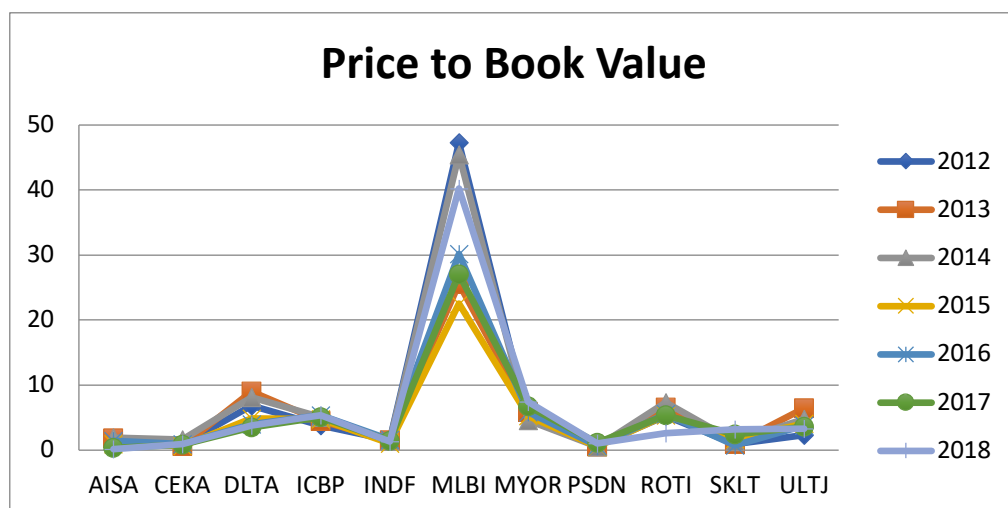
Figure 5. The growth of PBV in the period 2012-2018

The price to book value growth can be seen in Figure 5. During the study period, companies with the MLBI code, again had the highest PBV value of 47.27 in 2012. The lowest PBV, obtained by company with the PSDN code with a value of 0.52 in 2013. Price to Book Value is a measure that functions to see whether shares in a company can be expensive or cheap. Stocks that have large PBV ratios can be said to have high valuations (overvalued) while stocks that have PBV below 1 have low valuations (undervalued). Based on the 2013 Annual Report, companies with PSDN codes are companies engaged in agribusiness. The situation and condition of Indonesia's national economy throughout 2013 experienced a slowdown, namely Indonesia's economic growth was below 6%. This condition affects the company's performance, which is a decrease in sales volume, causing as a domino effect from the situation and condition of the global economy, which is plagued by uncertain climate. Under these conditions, the company is still able to make a net profit. The global economy at that time experienced a slowdown. A number of countries in the world that have been the main suppliers of agricultural and processed export commodities are also experiencing difficulties which are the company's concern. Prices of some commodities fell in 2013, for example, rubber and coffee. The International Coffee Organization (ICO) concluded that in 2013 coffee prices fell to their lowest point.

Panel Data Regression Analysis

Details of the resulting estimation models which include common effect, and fixed effect model are displayed in the following tables below, followed by their related regression equations:

Table 2. Common Effect Model

Variables	Coefficient	Probability
Debt to Equity Ratio	-4541.775	0.6437
Earning Per Share	21.56383	0.0000
Price to Book Value	3557.406	0.0027
Return of Equity	-3.089984	0.9569
R-squared 0.905		
Adjusted R-squared 0.901		

Stock price = -4541.775DER + 21.564 EPS +3557.406 PBV -3.089ROE   (1)

Table 3. Fixed Effect Model

Variables	Coefficient	Probability
Constant	-92881.84	0.0000
Debt to Equity Ratio	50178.56	0.1193
Earning Per Share	21.87814	0.0000

Price to Book Value	8664.340	0.0117
Return of Equity	20.38105	0.7439

R-squared	0.911
Adjusted R-squared	0.907

Stock price = -92881.84 + 50178.56DER+ 21.878EPS + 8664.340PBV + 20.381ROE   (2)

After estimating with common effects and fixed effects, the next process is to conduct a Chow test for the selection of the most appropriate model in this study. Chow test results are as follows:

Table 4. The Chow Test Results

Effects Test	Statistics	df[1]	Probability
Cross-section F	1.431109	(10,62)	0.1881
Cross-section Chi Square	15.991663	10	0.0999

[1]degree of freedom.

The Chow Test results indicate that the common effect model is preferred for comparing with the fixed effect model, which is p value> 0.05. Thus the corresponding regression equation is equation no (1).

Table 5. Random Effect Model

Variables	Coefficient	Probability
Constant	-37563.86	0.0167
Debt to Equity Ratio	28431.79	0.0855
Earning Per Share	21.82374	0.0000
Price to Book Value	2960.001	0.0093
Return of Equity	14.52279	0.7891

R-squared	0.911
Adjusted R-squared	0.907

The next step is the estimation with the random effect model, and the results are shown in Table 5. The equations obtained with the estimation of the random effect model are as follows:

Stock price = -37563.86 + 28431.79DER+ 21.8237EPS + 2960.00PBV + 14.5228ROE   (3)

After estimation with random effects, the next step is to determine a model that is more suitable between the common effect model and the random effect model. To determine whether the random effect model is better than the common effect model the Lagrange Multiplier (LM) test is used. This random effect significance test was developed by Breusch-Pagan. The Breusch-Pagan method is based on the residual value of the OLS method, where the LM statistical value is calculated according to the formula:

$$LM = \frac{nT}{2(T-1)} \left[\frac{\sum_{i=1}^{n} (T \bar{e}_i)^2}{\sum_{i=1}^{n} \sum_{t=1}^{T} \bar{e}_{it}^2} - 1 \right]$$

If the calculated LM value is greater than the critical value of the chi squares distribution table with a degree of freedom of 5% which is 5.999, it can be concluded that the right model is a random effect. LM tests can also be done with the help of Eviews software, which has a Breusch Pagan Random Effect LM Test feature/menu. In the 'both' column the probability value is 0.0105, smaller than 0.05. Based on these results it can be concluded that the most appropriate model is the random effect model.

Before estimating panel data regression, the research data was tested using the classic assumption test, namely normality, heteroscedasticity, multicollinearity, and autocorrelation. Normality test results obtained Jarque Bera probability value of 0.45900, that when greater than a significant value of 0.05, it can be concluded that the data

are normally distributed. White test is performed to ensure data is free from heteroscedasticity. The test results show that the data has been freed from the problem of heteroscedasticity, this is indicated in the value of obs * R-squared is 12.24 and the probability value is 0.205 (greater than 0.05). It can be concluded that there is no heteroscedasticity. Test is also to find out whether or not multicollinearity is also performed by calculating the correlation coefficient between independent variables. The calculation results show that between variables have a large enough coefficient of 0.79, it is assumed that there is a linear relationship between the research variables. Although there is multi-collinearity, it still produces a BLUE estimator, because the BLUE estimator does not assume that there is no correlation between independent variables. (Widarjono, 2007). The Durbin-Watson Test (D-W) is one of the most widely used tests to determine whether there is autocorrelation. The test results show a value of 1,917, which means that the value is between 1.54 and 2.46 so that no autocorrelation occurs.

Impact of DER, EPS, PBV and ROE on Stock Prices: Random Effect Model

The magnitude, direction and the significance of effects on debt to equity ratio, earning per share, price to book value and return on equity on stock price are presented in Table 6. The relationships amongst these variables are in a random manner, which are determined by the results of the Lagrangian Multiplier Test where random effect model is selected as the appropriate model.

Table 7. Random Effect Model

Variables	Coefficient	Standard Error	t-statistic	Probability
Constant	-37563.86	15333.52	-2.449787	0.0167
DER	28431.79	16308.15	1.743410	0.0855
EPS	21.82374	1.081339	20.18214	0.0000
PBV	2960.001	1106.779	2.674429	0.0093
ROE	14.52279	54.09152	0.268486	0.7891
R-squared	0.911950		Mean dependent variable	58579.40
Adjusted R-squared	0.907058		S.D. dependent variable	215131.4
Standard Error of regression	0.91		Sum squared residuals	3.10E+11
F-statistic	186.4287		Durbin-Watson statistics	1.917205
Probability (F-statistic)	000.00			

The resulting equation of regression is as follows

Stock price = -37563.86 + 28431.79DER+ 21.8237EPS + 2960.00PBV + 14.5228ROE   (3)

Where DER is debt to equity ratio, EPS is earning per share, PBV is price to book value, and ROE is return on equity.

Stock price is affected significantly by two measures of financial performance i.e. earnings per share and price to book value in same magnitudes, direction and level of significance-indicated by the value of probability F-statisctic of much less than 0.05 (p<0.005). The same direction of the effect of earning per share and price to book value on stock price is recognized which indicates that when the earning per share and price to book value of companies is higher, then the stock price of the companies in food and beverages consumption goods industry sector is also higher.

The value of intercept (constant) of the random effect model can be interpreted as follows: when the value of the four observed independent variables, i.e. debt to equity ratio, earning per share, price to book value and return on equity, are assumed to be zero, the value of stock price of food and beverages companies equals to 37563.86 across individual food and beverages company as well as across time periods of the study, i.e. year.

Earnings per share and the price to book value are able to explain the variability of stock price of manufacturing companies in the food and beverage consumer goods industry sector by 91.19 percent-indicated by the value of

R-squared or coefficient of determination. In other words, stock price is affected by these variables representing the company's fundamentals. Fundamental analysis is carried out in order to read the prospects of the issuer. Some ratios that are generally used for stock fundamental analysis to choose the right stock are earnings per share, price to book value, return on equity, and price earnings ratio.

Dang et.al.(2018) investigated the impact of financial information on stock prices of listed firms on Vietnam Stock Exchange. The results show that earning per share have positive relationships with stock prices. The finding of the present study is in line with Dang et.al.(2018), Mondal and Imran (2019) and also Suselo et.al.(2015). In general, the stability of the earnings per share ratio can illustrate the stability of profitability. Earnings per share that increase from year to year will be a consideration for investors to choose these shares (Utari, 2016).

The result of this study is showed that the price to book value affects stock price. This result in line with Dang, Tran and Nguyen (2018) who collected data from 273 listed firms and the results also support Suselo et.al.(2015) who investigated companies listed in LQ45. Stocks with low PBV compared to the average of other companies in similar industries are usually in demand by investors because the low PBV can be an indicator to look for cheap or undervalued stocks. Conversely, high PBV is likely to be triggered by market prices that are too high and this require further analysis (Utari, 2016).

5. Conclusion

The results of the study recognize that the stock price of food and beverage consumption goods industry sector companies in Indonesia is significantly affected by earning per share and price to book value. The random effect model is determined as the most appropriate model in analyzing the effect of the stock price of manufacturing companies in the food and beverage consumer goods industry sector.

The implications resulting from the study findings are: investors should better consider fundamental analysis (fundamental valuation) while making stock choices, namely through the company's financial performance, specifically the ratio that describes the company's earnings growth (earnings per share) and the value of the company's equity (price to book value).

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Too Much of a Good Thing: The Tipping Point of Employee Voice

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Abstract

Extant voice research suggests that voice has a positive effect on organizations, which indicates that an unlimited amount of resources should be devoted to increasing employee voice. However, resources that can enable and facilitate voice - such as managerial attention and focus - can be costly to organizations. Given that there is a cost to increasing employee voice, the benefit of employee voice may not continuously justify the cost. From an interdisciplinary perspective using the Radner-Shepp-Shiryaev mathematical framework in finance, we find that employee voice is beneficial for an organization up to a point. Specifically, we find that employee voice, despite having a myriad of positive outcomes for organizations, reaches a tipping point where the cost of voice to the organization may outweigh its benefits. After this tipping point is reached, organizations do not benefit from investing to increase employee voice. The mere presence of employee voice, without regard to how much, may not be sufficient for enhanced organizational performance. Implications for this work are discussed.

Keywords: Employee Voice, Profit Maximization, Interdisciplinary Work, Liability of Voice

"We've got 25,000 people at Apple. About 10,000 of them are in the stores. And my job is to work with sort of the top 100 people, that's what I do. That doesn't mean they're all vice presidents. Some of them are just key individual contributors. So when a good idea comes, you know, part of my job is to move it around, just see what different people think, get people talking about it, argue with people about it, get ideas moving among that group of 100 people, get different people together to explore different aspects of it quietly, and, you know - just explore things."
– Steve Jobs

"Silence is a source of great strength." — Lao Tzu

INTRODUCTION

The global economy continues its rapid transition into a "knowledge economy," where knowledge can ultimately generate economic values (Drucker, 1969). With the knowledge economy becoming the more dominate economy, information shared by employees becomes more crucial to organizational success. Organizations are becoming increasingly reliant on employee input to implement effective strategies and processes. In particular, employee voice, or the discretionary and voluntary expression of information up the hierarchy that intends to improve

organizational processes or functions but may challenge the status quo (Detert & Burris, 2007) is tantamount to organizational performance. Extant literature finds that employee voice can lead to positive organizational outcomes such as innovation (Morrison & Phelps, 1999), organizational and team learning (Edmondson, 1999; Milliken & Lam, 2009; Morrison, Wheeler-Smith, & Kamdar, 2011) and sustained adaptability (Bartlett & Ghoshal, 1994).

EMPLOYEE VOICE REQUIRES ORGANIZATIONAL RESOURCES

While researchers have consistently shown employee voice to bring positive organizational outcomes that are crucial for sustained success, speaking up is a phenomenon that is fraught with risk and fear for many employees. Employees often find it difficult to speak up to their managers or up the hierarchy because it is viewed as risky (Ashford, Rothbard, Piderit, & Dutton, 1998; Morrison & Milliken, 2000, 2003). Employees may view speaking up to involve image risk, or the potential that their positive image may be questioned by others (Ashford et al., 1998; Dutton, Ashford, O'Neill, & Lawrence, 2001). For example, employees may perceive that if they speak up, they may be labeled as a troublemaker or a "problem" team member. Lack of psychological safety is also another deterrent to employee voice (Detert & Burris, 2007; Edmondson, 1999). When employees perceive that engaging in employee voice can incur personal harm, employees are less likely to speak up. A psychologically unsafe climate at either the organizational or group level can hinder employee voice (Morrison et al., 2011). Thus, while employee voice can lead to multiple positive organizational outcomes, employees may fail to speak up because of perceived risk and fear and the lack of a voice-conducive organizational or team climate.

Employees express voluntary input that can improve organizational functioning when they perceive the benefits of speaking up to outweigh its costs. That is, employees speak up when they perceive the voice calculus to lean toward benefits over risks. In order for employee voice to remain abundant, organizations may strategically reduce perception of risk associated with voice or increase benefits, or both. To facilitate more employee voice, however, organizational resources are likely necessary to affect change. For example, an organization can develop a psychologically safe climate where employees perceive an environment where taking the risk to speak up against the status quo will not result in interpersonal harm. Developing a psychologically safe climate can reduce the employee's perception of risk to speak up and lead to more employee voice within an organization. Developing or changing an organizational climate and moving toward a work place conducive to employee voice likely require significant resources. For example, managerial training or organizational programs and plans are possibly necessary to help create or enhance a climate of psychological safety.

Organizational resources can also come in the form of managerial attention and focus. Certain leadership behaviors have been demonstrated to enable more employee voice (Burris, 2011; McClean, Burris, & Detert, 2012). For example, managerial openness, or a manager's willingness and demonstration of openness to its subordinates' input and ideas, can lead to an increase in employee voice (Detert & Burris, 2007). Managerial openness is a behavioral phenomenon; managers who *say* they have an "open door" policy does not necessarily equate to *demonstrating* openness to their subordinates. Expression of managerial openness requires time and effort on the part of the manager. That is, active exhibition of managerial openness requires a certain amount of attention and focus from the manager.

Another study showed that voice leads to increased effectiveness when they are targeted at the focal leader of the unit, or the person who has the authority to make decisions and take action (Detert, Burris, Harrison, & Martin, 2013). When voice is directed at coworkers who have little power to change or make decisions, such as peers or those outside of one's focal unit, the unit's effectiveness decreased. In order for voice to be processed and a unit's effectiveness to be higher, the leader of the focal unit who can take action and make decisions are focused and paying attention to the employee's voice. This behavior from the manager necessitates time and attention and may divert the manager from other managerial duties. The managerial focus, attention and time are the cost of the unit's increased effectiveness that stems from the employees speaking up the hierarchy.

THE TIPPING POINT OF EMPLOYEE VOICE

Because of the high level of risk and fear associated with speaking up by employees, many organizations have not yet reached an optimal level of employee voice due to employee silence (Bashshur & Oc, 2014). Thus, many organizations can become better at enabling and facilitating voice. To enhance voice within an organization, there is a often a cost to the firm. When employee voice freely percolates in an organization and remains abundant, significant organizational resources are likely to have been utilized to set up the appropriate organizational context conducive to voice and to reduce employees' perception of risk and fear associated with speaking up. How much resources, then, should organizations spend on facilitating and increasing the amount of voice? Extant voice research suggests that voice has a positive effect on organizations, which indicates that an unlimited amount of resources should be devoted to increasing employee voice. However, resources such as managerial attention and focus can be costly to organizations. Given that there is a cost to increasing and facilitating employee voice, the benefit of employee voice may not continuously justify the cost.

Because resources are necessary to enable and facilitate employee voice, there may be a saturation point where the amount of employee voice is no longer optimal. In other words, the assumption within most voice literature that employee voice is linearly positive for an organizational should be examined. For organizations that have a low level of employee voice, it may be prudent to utilize resources to increase voice. As voice increases and organizations reap the benefits of voice, it may not be necessary to further utilize resources to enable and facilitate more employee voice. There may be a tipping point, or a "dark side" of employee voice, where organizations are better off cutting back on employee voice. This tipping point is where the cost of employee voice begins to outweigh the benefits. When organizations continue to expend resources to increase voice, it can lead to a suboptimal level of voice. This suboptimal level of voice can, over time, result in decreased organizational performance and ineffectiveness. We hypothesize the following:

> Hypothesis 1: Employee voice and firm profits have a curvilinear relationship such that at a certain point the gains of firm profits decrease with additional voice.

> Hypothesis 2a: There is an optimal level of voice where firm profits are maximized.

> Hypothesis 2b: There are suboptimal levels of voice where there is either too little or too much voice and firm profits are not maximized.

METHOD

Using an interdisciplinary perspective, we use a finance model - the Radner-Shepp-Shiryaev mathematical framework - to analyze employee voice in organizations. This framework has been used to model risk-taking behavior (Sheth, Shepp & Palmon, 2011), infighting within firms (Sheth, 2012), hiring & firing (Shepp & Shiryaev, 1996), debt management within organizations (Guo, 2002), managerial behavior under financial distress (Sheth et al. (2011), and the optimal dividend policy for a firm (Radner & Shepp, 1996).

We apply this framework to examine the problem of voice optimization because speaking up, especially novel ideas and suggestions, is a risky behavior. This framework has been used to model optimization in organizations. We are utilizing this framework here to model optimization in voice in the organization. In this way, we combine the fields of mathematical finance and organizational behavior.

Using this framework, we test the above hypotheses by exploring the optimal amount of employee voice in a firm that is needed to maximize profits. We utilize profits as the organizational outcome of employee voice. We have two variables in our model, x (cash reserves) and u (voice), which we have modeled as a Brownian motion. We use a numerical technique described in Sheth, Shepp & Palmon (2011) to model firm profit maximization. We find that the hypotheses are robust to our analysis - the details of which can be found in the appendix. It should be noted that though our results are for a specific set of parameters that might work for a subset of organizations, our broad conclusion does not change when we change the parameters.

RESULTS

Voice research consistently indicates a relationship between employee voice and positive organizational outcomes without examining a voice "ceiling" where employee voice does not lead to optimized outcomes for the firm. Our results support the notion that voice does not linearly correlate with positive firm profits. That is, there is a tipping point of employee voice that can lead to organizational ineffectiveness (see Figure 1).

In Figure 1 below, we see a three-dimensional function. We have voice (u) and cash reserves (x) on the two of the three dimensions, and we have V(x,u) the value function which is the result of profit-maximization on the third dimension. As can be seen, maximal profits increase with voice; that is, V(x,u) increases in u -- but only up to a point. After this point, maximal profits do not increase. In other words, it is no longer needed to generate more voice to increase profits. In the figure below, we use a set of parameters (shown below) to come up with specific numbers, but the results hold in all cases.

In Figure 2, we take the average across each value function in cash, V(x), for each level of voice. We use this average to calculate the optimal level of voice for this particular firm. As can be seen, the maximum profits for this particular firm are at a voice level of 4.675. Note that each firm has its own set of parameters customized to its operations and its unique characteristics.

In Figure 3, we create an entire schematic based on the level of voice or cash the firm has. For instance, the red dot shown in the figure indicates that the firm needs to increase its level of voice and move into the blue zone, where it will function at a voice level that will allow the firm to generate profits and distribute them to owners.

Parameters: $\mu = 0.2$; $\sigma = 0.45$; $r = 0.05$; $k_{+} = 1.85$; $k_{-} = 0.001$; $\xi = 2.1171$; $\eta = 0.0011999$; and $\alpha = 0$
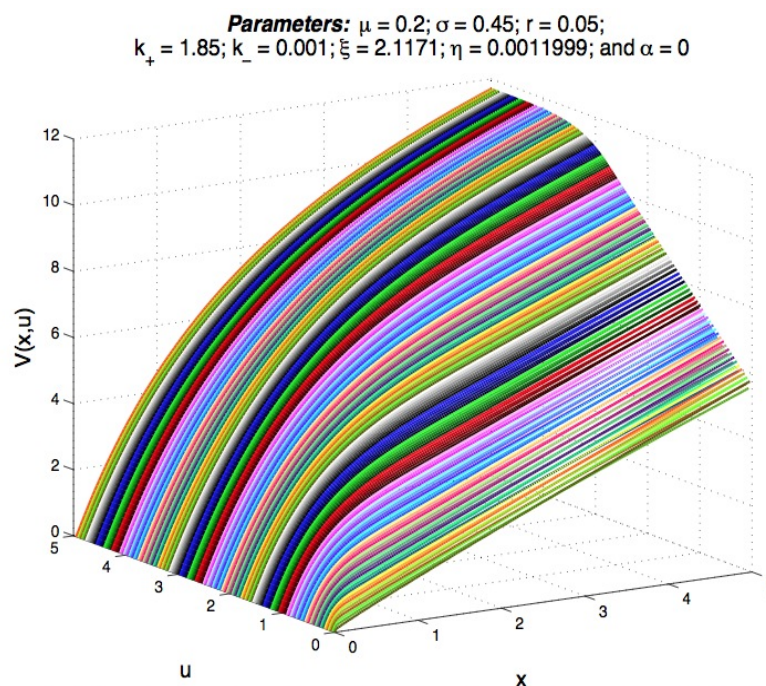
Figure 1: The value function, $V(x, u)$ showing the solution to the dividend maximization problem (u is voice, and x is the cash in the firm). Notice that the value function consistently increases as voice increases, though once we hit a certain point, the gain to the firms cash from additional voice decreases. With the set of parameters shown above, profits increase until $u = 4.675$. This is the optimal amount of voice that should be within this firm, for this particular set of parameters.

Parameters: $\mu = 0.2$; $\sigma = 0.45$; $r = 0.05$;
$k_+ = 1.85$; $k_- = 0.001$; $\xi = 2.1171$; $\eta = 0.0011999$; and $\alpha = 0$

Figure 2: This figure shows the value function increasing up to a point as voice increases, but it reaches its maximum value ($V(x, u) = 7.662$) when voice, $u = 4.675$. This is the optimal amount of voice that should be generated for a firm with this set of parameters.

Parameters: $\mu = 0.2$; $\sigma = 0.45$; $r = 0.05$;
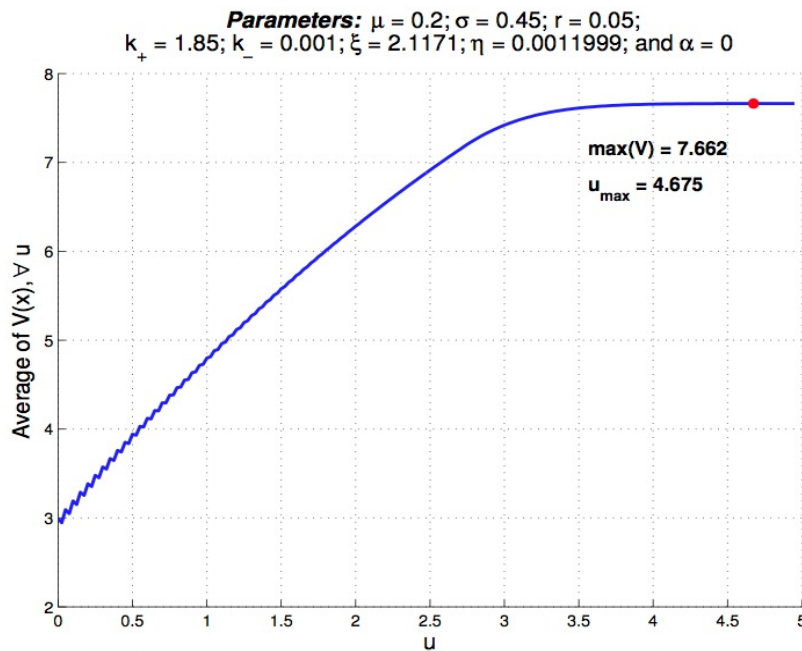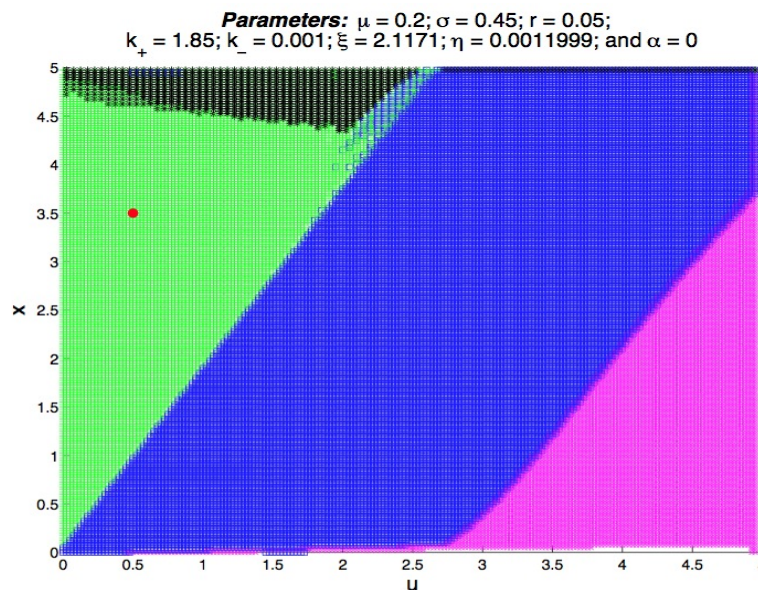$k_+ = 1.85$; $k_- = 0.001$; $\xi = 2.1171$; $\eta = 0.0011999$; and $\alpha = 0$

Figure 3: This figure shows the optimal operating policy at each level of voice, and at each level of the firms cash. For instance, the red dot is placed at when the voice level is at 0.5, but the cash level is at 3.5. Since this falls in the green zone, this indicates that the company should spend to increase voice, and move into the blue zone where it is optimal to operate. Companies that are in the blue zone are at their optimal level of voice. Their revenues will increase with normal operations, and move them up to where $x = 5$, and this will allow them to pay out profits to the owners.

DISCUSSION

Our results show that there is an optimal and two suboptimal levels of employee voice. The optimal level is where organizations can best maximize their profits given the cost of enabling and facilitating voice. At the optimal level, organizations are receiving a sufficient amount of employee voice to maximize firm profits. At this level, organizations are spending the appropriate amount of resources to generate a favorable level of employee input. There are two suboptimal levels of voice where there is either too little or too much voice and firm profits are not maximized. At the level where there is too little voice, profits are not yet fully maximized and an increase of

employee voice can further raise profits. This is an organization where employees are not sufficiently speaking up and the organization is not receiving the employee input it needs to be optimally effective. Such organizations should devote more resources to increase voice within the organization in order to maximize firm performance. For example, organizations that have a low level of employee voice can spend resources to increase creativity by installing an idea generation system where employees can speak up about risky, innovative ideas.

Interestingly, there is a point at which an increase in employee voice no longer augments profits. At this level, there is too *much* voice and firms devoting more resources to increasing voice fail to reap additional benefits of employee voice. In other words, there is a "ceiling" to the benefits of employee voice. Organizations that have reached the tipping point of voice can further spend resources to increase voice but firm profits do not increase correspondingly. These organizations already have employees that are speaking up the hierarchy; spending more resources to increase voice becomes a liability for the firm. Organizations that are in this level of suboptimal voice can reduce the amount of resources utilized to enable voice. In this situation, a reduction in the amount of voice can *increase* firm profits.

Our study intends to contribute to the voice literature in several ways. First, extant literature assumes employee voice to have a positive, linear effect with some organizational outcomes, including performance. But employee voice can have a curvilinear effect on firm profits. There is a tipping point to the benefits of employee voice and the benefits do not accrue indefinitely. Further, while the cost of employee voice continues to accrue, the benefits of having employee input do not. Over time, it can lead to organizational ineffectiveness. For example, too much managerial attention and focus toward employee input can take away from more immediate, urgent tasks. Substantial threats from the external environment may be missed by managers, whose attention has been occupied by dealing with employees' input.

Second, our results indicate that organizations should not only consider ways to increase or decrease employee voice, but they should strategically plan the optimal level of voice to maximize profits. An appropriate allocation of resources to enable and facilitate the optimal amount of voice requires deliberate planning and thought. It is important to note that employee voice leads to a myriad of positive outcomes, including those that are crucial for sustained organizational performance. Many organizations linger in the suboptimal range of too little voice and can benefit with an increase of employee input. However, voice should be viewed as a generally positive phenomenon that incurs costs as well as benefits. Firms are better served to proactively assess current levels of voice *and* to determine an optimal level that can maximize organizational performance. That is, organizations should set a strategic goal to reach a level of voice where it can best maximize profits given the cost of voice. Blindly increasing voice without considering an optimal level may harm organizational performance and effectiveness and incur unnecessary costs.

LIMITATIONS OF STUDY

This study utilizes a mathematical framework and thus exists only theoretically. While the framework demonstrates the optimal and suboptimal levels of voice, real-world data can further strengthen our findings. For future studies, we plan to explore empirical data and test "real world" firms by using archival data to analyze employee voice patterns and organizational performance.

APPENDIX

We start with a simple stochastic model that includes a cost to both encouraging employee voice, as well as discouraging it:

$$dX_t = U_t(\mu dt + \sigma dW_t) - k_- d_- U_t + k_+ d_+ U_t - dZ_t$$

Here, X_t are the company's cash reserves, U_t represents the level of voice generated within a specific company. This is multiplicative as we start with the assumption that generating greater voice within a firm will result in

greater cash, and therefore, greater profits to the firm. Additionally, Z_t are the profits taken out[1]. W_t is a standard Brownian or Wiener process, and k_- and k_+ are the costs of encouraging idea generation, and discouraging it, respectively, and finally, the (μ, σ) pairs represent risk-return characteristics of the current investment. This investment could, with equal likelihood, be a project of some sort (e.g., manufacturing, expansion, etc.) or a portfolio of financial securities, if the firm is a financial one.

The objective is to maximize the expected discounted dividends (or profits for a privately-owned firm), dZ_t over the life of the firm:

$$V(x) = \sup_{Z_t, U_t} E_{x,u} \int_0^\infty e^{-rt} dZ_t \ \ where \ x = X_0 \ and \ u = U_0$$

Mathematical tractability makes this problem difficult to solve in closed form, and to overcome this, we devise a numerical technique to solve this problem, along the lines of Sheth, et al. (2011). In testing this technique to solve problems with known solutions, we get errors that are in the range of 10^{-4} to 10^{-6} and we are confident of the results of using this technique to solve the problem under consideration here.

Note that this is a ``1.5-state'' problem, since while X_t is stochastic, U_t is not. As a result, we approach this by solving for a stochastic X_t, $\forall \ U_t$. Thus, we have separate dividend policies for each level of voice and cash.

We start by creating a process Y_t, such that:

$$Y_t = \bar{V}(X_t, U_t)e^{-rt} + \int_0^t e^{-rs} dZ_s$$

This process represents the future and past discounted dividends, and $\bar{V}$ is a guess to the true value function such that $EdY_t \leq 0$, i.e., the process is expectation-decreasing (a supermartingale). In order to proceed, we use the following lemma from Shepp and Shiryaev (1996):

Lemma 1

Suppose that $\bar{V}(x,u) \geq 0$ is such that for any choice of U_t or Z_t, the process is expectation-decreasing. Then $V \leq \bar{V}$.

Proof

Note that $EY_0 \leq EY_\infty$, $but \ EY_0 = \bar{V}(x,u) \ and \ EY_\infty = E\int_0^\infty e^{-rs} dZ_s$. Since this holds for every of U_t and Z_t, it shows that $V(x,u) \leq \bar{V}(x,u)$.

Lemma 1 shows that $V \leq \bar{V}$. Since our guess is an upper-bound in the optimal solution to the problem of maximizing dividends, the true solution will be the smallest upper-bound. Thus, if we minimize our guess, we will get the true solution and to do this, we use linear programming.

Before we do this, we must find the conditions under which the process Y_t is a supermartingale. To that end, we must first find dY.

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[1] For a publically traded company, these could be interpreted as dividends.

$$dY_t = d\overline{V}e^{-rt} + d\left(\int_0^t e^{-rs}dZ_s\right)$$
$$= d\overline{V}e^{-rt} - re^{-rt}\overline{V}dt + e^{-rt}dZ_t$$

We apply $d\overline{V} = \frac{\partial \overline{V}}{\partial X_t}dX_t + \frac{1}{2}\frac{\partial^2 \overline{V}}{\partial X^2}(dX_t)^2 + \frac{\partial \overline{V}}{\partial U_t}dU_t$ (Itô's Lemma) to get $d\overline{V}$.

And since:

$$dX_t = U_t(\mu dt + \sigma dW_t) - k_-d_-U_t - k_+d_+U_t - dZ_t$$
$$(dX_t^2)^2 = \sigma^2 U_t^2 dt$$
$$E\left(\overline{V}_X U_t \sigma dW_t\right) = 0$$

We get that:

$$EdY_t = e^{-rt}\{(1 - \overline{V}_X)dZ_t + (\overline{V}_U - k_+\overline{V}_X)d_+U_t + (-\overline{V}_U - k_-\overline{V}_X)d_-U_t$$
$$+ (-r\overline{V} + \mu U_t\overline{V}_X + \frac{\sigma^2}{2}U_t^2\overline{V}_{XX})dt\}$$

where $\overline{V} = \overline{V}(X_t, U_t)$; $\overline{V}_X = \frac{\partial \overline{V}}{\partial X}$; $\overline{V}_{XX} = \frac{\partial^2 \overline{V}}{\partial X^2}$; and $\overline{V}_U = \frac{\partial \overline{V}}{\partial U}$.

So to have $E_{x,u}dY_t \le 0$, we need that:

1. $M\overline{V}(x, u) = 1 - \overline{V}_x \le 0$

2. $H\overline{V}(x, u) = \overline{V}_u - k_+\overline{V}_x \le 0$

3. $F\overline{V}(x, u) = -\overline{V}_u - k_-\overline{V}_x \le 0$

4. $L\overline{V}(x, u) = -r\overline{V} + \mu u\overline{V}_x + \frac{\sigma^2}{2}u^2\overline{V}_{xx} \le 0$

Once the above constraints are fulfilled, we get a such that (by Lemma 1). And by minimizing the , we get the optimal solution. To do this, we use linear programming and solve the following minimization problem:

$$\min \overline{V}$$

subject to

$$M\overline{V}(x, u) : 1 - \overline{V}_x \le 0$$
$$H\overline{V}(x, u) : \overline{V}_u - k_+\overline{V}_x \le 0$$
$$F\overline{V}(x, u) : -\overline{V}_u - k_-\overline{V}_x \le 0$$
$$L\overline{V}(x, u) : -r\overline{V} + \mu u\overline{V}_x + \frac{\sigma^2}{2}u^2\overline{V}_{xx} \le 0$$

We refer to the constraints above as the behavioral constraints. When the *M*, *H*, *F* and *L* constraints are strictly equal to zero, it is optimal for the manager to, respectively, take profits, encourage voice, discourage voice, and operate the firm using the investment set.

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The Impact of Liquidity, Leverage, and Total Size on Banks' Profitability: Evidence from Nepalese Commercial Banks

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Abstract
This paper examined the impact of liquidity, leverage, and total assets size of the bank on profitability. This study employed bank scope data of all 28 commercial banks operating in Nepal during the period of 2010/11 – 2016/17. Altogether, the168 observations were used in the study. Three ordinary-least-squares models were applied to analyze the impact of liquidity, leverage, and the total size on the bank's profitability. The first regression model reveals that the higher loan to deposit ratio (low level of liquidity) was observed to have the negative effect on the bank's *ROA*, *ROE*, and *NIM*; however, *ROE* and *NIM* were statistically insignificant. The result of the second regression model shows that higher equity to assets ratio (lower leverage) positively affected two profitability measures, *ROA* and *NIM*, and was statistically significant—but was negatively related to *ROE* and statistically insignificant. The result of the final regression model reveals that the higher bank size appeared favorable to the Nepalese commercial banks and was found to have positive effects on all three profitability measures: *ROA*, *ROE*, and *NIM*. The results of the study could help bankers and policymakers to take an effective action in order to improve banks' profitability.

Keywords: Liquidity, Leverage, Bank Size, Profitability

1. Introduction

Nepalese banking sector plays a crucial role in the economy because of its dominant position in the financial system. Most transfers of funds between the surplus unit and deficit unit take place through the banking channel because other forms of financial intermediation are not well developed (Nepal Rastra Bank [NRB], 2018). Commercial banks (CBs) are the financial institutions that channel funds from surplus units to deficit units. Now, commercial banks hold around 70 percent shares of the total financial system in Nepal (NRB, 2019). It is a plausible fact that the role of banking sectors is much more about bank-dominated economy than about the market-dominated economy in order to obtain the economic objective of the nation, and Nepal is no exception. In a bank-dominated economy, on the one hand, the failure of financial institutions is likely to put a huge impact on the overall financial system; on the other hand, it could have domino effects on the healthier financial

institutions. For a sound financial system, therefore, commercial banks need to earn sufficient profit—at least in the long-run. As a financial intermediary, the bank eliminates the mismatches between the firm and savers by performing four types of intermediation: size intermediation, maturity intermediation, risk intermediation, and information intermediation (Kolb & Rodriguez, 1996). There are two contrasting hypotheses regarding the performance of commercial banks. First, the traditional structure-conduct-performance (SAP) hypothesis asserts that high market concentration (low level of competition) leads to higher profitability. The Nepal government brought the merger and acquisition program in 2007. The main objective of this program is to make an able, efficient, healthy, and competitive business environment by reducing the number of financial institutions in the financial system and by increasing the capital base of the banks. It also builds public confidence and provides a modern facility by enhancing the financial, human, and technical capacity of the banking system (Merger and Acquisition by Law, 2011). This merger program reduces the number of banks, and increases their capital base and total size. If the traditional SAP hypothesis is true, the merger program increases the bank's profitability. This fact can be explained by the possibility that a fewer number of banks can make a larger profit by charging a higher interest rate on loans and advances and pay low interest to depositors; this may be possible through collusion. Merger and acquisition programs can bring synergic effects. Synergistic effects can arise from four sources: (1) operating economises, which result from economises in management, marketing, production, or distribution; (2) financial economises through lower transactions costs (3) differential efficiency through the better use of weaker firm's assets by more efficient firm's management, and (4) increased market power through the reduction in the number of commercial banks. Socially desirable are the operating and financial economises that increase managerial efficiency; nonetheless, the mergers that reduce competition are socially undesirable and often illegal (Brigham & Houston, 2013). However, the efficiency hypothesis argues that the performance of individual banks depends on bank efficiency, not on the market structure. When a bank is able to produce a menu of service products at a relatively reasonable lower cost than the major competitors, the bank can maximize profits and increase its size and market shares (Samad, 2008). Therefore, these two-variable equity to total assets ratio (leverage ratio) and total assets size are important in explaining the performance of financial institutions. A positive impact of capitalization on bank profitability is expected for the following reasons: First, the funding cost can be reduced for the banks with higher capital levels because a higher capital ratio indicates that the banks have higher creditworthiness. Second, the bank with higher capital levels is more likely to engage in prudent lending, which could increase bank profitability. Third, capital plays an important role in absorbing the risk arising from higher risk assets such as loans; the interest revenue generated from loans fosters bank profitability. Finally, the banks with higher capital levels need to borrow less, thereby reducing the cost and further increase profitability (Tan, 2016). However, relatively higher total assets can decrease the bank's profitability due to diseconomies of scale, higher administrative procedures, and excessive overhead expenses (Ahamed, 2017). Similarly, higher equity to assets ratio decreases the bank's risk and profitability. The traditional risk-return hypothesis argues that lower risk provides a lower rate of returns.

Liquidity is an important determinant of bank performance. A lower level of liquidity (higher loan to deposit ratio) is likely to increase the banks' profitability because traditional bank business is mainly concerned with the loan business, and it generates interest income to the commercial banks. But the high volume of loan to deposit ratio can create a liquidity risk and larger non-performing loans to the commercial banks, eventually leading to lower profitability to the commercial banks. In this paper, therefore, we have attempted to establish the relationship of liquidity, leverage, and total assets size with profitability measures—*ROA*, *ROE*, and *NIM*—in the context of Nepalese banking sectors.

The rest of the study has been presented in this way: Section 2 overviews the literature review and hypothesis development; Section 3 is associated with variables selection and research methods; Section 4 presents empirical results and discussion; Section 5 ends with the conclusion, implications, and limitations of the study.

2.   Literature Review and Hypotheses Development

2.1 Liquidity and bank profitability

Liquidity is often considered one of the important determinants of the bank's profitability. The loan to deposit ratio (*LTDR*), a measure of liquidity, can affect banks' profitability. A higher value of this ratio indicates lower liquidity, and vice versa. There are conflicting facts regarding the relationship between the loan to deposit ratio and banks' profitability. On the other side, *LTDR* is expected to be positively related to profitability measures—such as *ROA*, *ROE*, and *NIM*—because the main sources of income come from the loan assets. A higher volume of deposit collection—and lending it to quality assets—therefore, generate more interest income to the commercial banks. Larger volumes of liquid assets (holding a larger volume of cash or near cash assets) reduce the bank's ability to generate interest income (Tan, 2017). This argument is in line with the empirical findings of prior researchers (Karimzadeh & Akhtar, 2013; Sufian & Kamarudin, 2012).

However, there may be a negative relationship between *LTDR* and profitability measures—such as *ROA*, *ROE*, and *NIM*—because high volume of loans can create the larger non-performing loans and results in lower profit to the commercial banks if the banks do not have a good risk monitoring and management system. During the crisis period, moreover, financial institutions should increase their liquidity holding in order to reduce their risk through costly sources, which leads to the decrease in bank's profitability (Sufian & Kamarudin, 2012). Poor level of liquidity (higher level *LTDR*) represents poor liquidity management that increases the bankruptcy cost and reduces bank's profitability. This argument is consistent with the empirical findings of some previous researchers (Ahmed, Koh, & Shaharuddin, 2016). The third line of empirical evidence shows either a positive or a negative insignificant relationship between liquidity and bank profitability. For example, a research conducted by Almaqtari, Al-Homaidi, Tabash, and Faharan (2018) showed a positive but statistically insignificant effect of liquidity on *ROA* and *ROE*. Similarly, a study by Adolopo, Lloydking, Western, & Tauringana (2018) found a liquidity to be negatively related to *ROA* and to be positively related to *NIM*, albeit statistically insignificant; Paolucci (2016) conducted a study and found a positive, but statistically insignificant, relationship of liquidity with *ROA*, *ROE*, and *NIM*. Tan's (2017) study found liquidity to have an insignificant negative relationship with *ROA* but an insignificant positive relationship with *NIM*.

Though there are two conflicting arguments and empirical evidence, higher loan to deposit ratio gives higher interest income to the commercial banks. In this research, therefore, the following hypothesis was set:

H₁: The loan to deposit ratio has a positive relationship with the bank's profitability measures: *ROA*, *ROE*, and *NIM*.

2.2 Leverage and bank profitability

Bank capital is considered to be an important determinant of the bank's profitability. The bank's equity capital to total assets ratio is a direct measure of financial leverage that can influence profitability measures, such as *ROA*, *ROE*, and *NIM*. The high equity capital to total assets ratio implies low financial leverage. There are conflicting arguments and empirical evidence as regards the relationship between the equity capital to total assets ratio and banks' profitability. On the one extreme, there could be a positive relationship between equity to total assets ratio and profitability measures. The high equity capital has a positive impact on the bank's profitability because it reduces the funding cost (Paolucci, 2016), increases banks' creditworthiness (Tan, 2017), lowers the needs for external funding, and increases safety for depositors during unstable macroeconomic condition (Sufin & Kamrudin, 2012). It helps to grab more business opportunities by investing in various securities and portfolios of risky assets and has more time, and flexibility, to deal with problems arising from expected losses, thereby eventually leading to earning higher profits (Athanasoglou, Brissimis, & Delis, 2008; Sinha & Shrama, 2016). Equity as sources of funds, more expensive than deposits increased equity, may increase cost capital of the bank, which needs to establish a higher margin; the mounting pressure on banks to reduce costs encourages them to engage in riskier income generating activities for the larger profitability (Messai, Gallali, & Jouini, 2015). In general, banks with higher capital ratios are considered safer. The conventional risk-return hypothesis would thus imply a negative relationship between the equity to assets ratio and bank profitability. However, a lower risk should increase a bank's creditworthiness and reduce the funding cost. Furthermore, banks with higher equity to asset ratio normally have reduced external funding needs, putting a positive effect on their profitability (Dietrich & Wanzenried, 2014). The higher capital requirements help to maintain discipline, to increase

supervision and monitoring activities, and to increase bank efficiency along with profitability. The banks with higher capital ratios have higher loan-loss reserves, are more efficient, and more profitable. Higher capital with an appropriate institutional environment can drive the investment strategies of larger banks towards more careful lending activities, prudent risk management, and better supervision. This results in a better alignment of interests between bank owners and depositors, reducing agency costs and ameliorates bank performance (Bitar, Saad & Benlemlin, 2016). Shareholders will have a greater incentive to monitor management performance and ensure that the bank is efficient. Specifically, holding buffers capital makes bank owners and bank managers more prudent with regard to their investment choices. Higher capital ratios can align the interests of bank shareholders with depositors—thereby mitigating agency problems, ultimately decreasing costs, and improving efficiency (Bitar, Pukthuanthong, & Walker, 2018). The signaling hypothesis suggests that management might be willing to convey information to the market about its future prospects and capacity to generate profits, which leads to increase bank's profitability (Saona, 2016).   This argument is in congruence with the empirical findings of prior researchers (Ahamed, 2017; Athanasoglou, Brissimis, & Delis, 2008; Paolucci, 2016; Sufin & Habibullah, 2009; Sufin & Kamrudin, 2012; Tan, 2017; Trad, Trabelsi, & Goux, 2017).

On the other hand, there could be a negative relationship between equity to total assets ratio and profitability measures, such as *ROA*, *ROE*, and *NIM*. When capital ratio increases substantially, banks do not take advantage of debt-for-financing future growth option and the firm value erodes. The traditional view of bank profitability suggests that excessively high capitalization is associated with both a decline in risk of equity and tax subsidy provided by interest deductibility on debt. Therefore, a bank with a high capital to assets ratio might suggest that it is operating with overcautious policies. Highly conservative management might not benefit from market opportunities, triggering lower profitability (Saona, 2016). According to trade-off theory, the greater use of debt, or less equity capital, in the financial statement poses greater interest expenses and raises the probability that the bank will be unable to meet its financial duties; consequently, the decling rate of return to new incoming shareholders and saver units will reduce the bank's profitability and increase the probability of bankruptcy (Saona, 2016). This argument is in line with the empirical findings of these researchers (Saona, 2016; Ahamad, Koh, & Shaharuddin, 2016).

Some empirical evidences that reported no relationship between capital ratio and banks' profitability are in line with the empirical findings of the previous researchers (Bhattarai, 2016; Patria, Capraru & Ihnatov, 2015). Dietrich and Wanzenried (2014) found a similar result in low-and-middle countries. They argued that a high capital adequacy ratio may reduce the risk of the banks, but at the same time they would not benefit from the leverage effect.

Though there are two conflicting arguments and empirical evidence, it can be expected that the high equity capital ratio reduces the bank's funding cost and increases creditworthiness, and public confidence, in the overall banking system. Thus, the following hypothesis was proposed in this research:

H2: There is a positive relationship between leverage and bank's profitability measures: *ROA*, *ROE*, and *NIM*.

2.3 Bank size and profitability

Bank size is also regarded as one of the important determinants of the bank's profitability, but the bank's total assets represent only on-balance sheet activities and ignore off-balancee sheet activities. After the liberalization policy adopted by the Nepal government in the early 1990s, this industry is facing major changes in recent years. In 2007, Nepal Rastra bank brought merger and acquisition policies to build public confidence in the overall banking system. Owing to the fierce competition, the financial institutions find many of the old ways of doing business no longer profitable; the financial services and products they have been offering to the public are not saleable in the market. Many financial intermediaries found that they were no longer able to acquire funds with their traditional financial instruments and that they would soon be out of business without these funds. To survive in the new economic environment, financial institutions have to run research and development programs in order to develop new products and services that will meet customer needs and that will be profitable (Miskin & Eakins, 2012). The research and development require huge capital investment in high-technology-based fixed

assets. The question may arise as to whether banks are able to make a larger profit as a result of an increase in the bank's size or total assets. There are distinct arguments and empirical evidences on the relationship between bank size and profitability. First, Larger banks could benefit from economies of scale and greater diversification, which reduces risk and cost, and increases banks' profitability (Sinha & Shrama, 2015; Tan, 2017). Dietrich & Wanzenried (2014) argued that larger banks, as compared to smaller banks, are likely to have both economies of scale (increased operational efficiency) and economies of scope (higher degree of product and loan diversification) advantages. Thus, the expectation is a positive effect of size on bank profitability. Sinha & Shrama's (2015) empirical findings showed a positive, and statistically significant, relationship with *ROA*— suggesting that larger banks operate at a more efficient level than smaller banks and exploit all economies of scale to reap the higher benefit (Sinha & Shrama, 2015). Larger banks may have better opportunities for income diversification because they can reach out to new markets and reduce income volatility (Ahamed, 2017).

Second, it is argued that large banks could have more serious asymmetric information problems and that the increase in the cost of monitoring the lending activities could reduce bank profitability (Tan, 2017). Other scholars argued that extremely large banks would exhibit a negative relationship between size and profitability due to bureaucratic and other size-related reasons. Accordingly, the overall effect needs to be investigated empirically (Dietrich & Wanzenried, 2014). Larger banks may also suffer from diseconomies of scale due to agency costs, nitty gritty of administrative procedures, and excessive overhead expenses (Ahamed, 2017). A large size could have negative impact on bank profitability: The large size is difficult to manage, it needs greater efforts, and the resultant increase in the cost is likely to reduce bank profitability (Fang, Lau, Lu, Tan & Zhang, 2019). The coefficient of bank size was found to be negative and significant, suggesting a negative impact of bank size on *ROA*, *NIM*, and *PBT*: The small banks are easier to manage, and bank managers can concentrate on a smaller number of businesses—thereby leading to higher profitability (Tan, 2016).

Albeit two contradictory arguments and empirical evidences, NRB has implemented a merger and acquisition program since 2007; It has increased the size of banks and reduced the number of commercial banks. The structure-conduct-performance hypothesis explains that a few numbers of banks can earn more profit through collusion. In this research, therefore, the following hypothesis was proposed:

H_3: There is a positive relationship between size and bank's profitability measures: *ROA*, *ROE*, and *NIM*.

3. Variables Selection and Research Methods

3.1 Variable Selection

3.1.1 Dependent variable: The aim of the study was to examine the impact of bank size, leverage, and liquidity on banks' profitability. This study considered the three dependent variables: *ROA*, *ROE*, and *NIM*. The first measure of profitability, *ROA*, is measured by dividing net income by total assets of the bank; most of the authors were found using this method to measure the banks' performance (for example, Adolopo, Lloydking, Western, & Tauringana, 2018; Almaqrari & Al-Homaidi, 2018; Athanasoglou, Brissimis, & Delis, 2008; Paolucci, 2016; Sinha & Sharma, 2015; Tan, 2017). The second measure of the dependent variable, *ROE*, is measured by dividing net income by total equity of the bank—a tool that was found to be widely used by various authors to measure the banks' performance (for example, Almaqrari & Al-Homaidi, 2018; Paolucci, 2016). Finally, the third measure of the dependent variable, *NIM*, divides net interest income by total assets of the bank: It is also a widely used tool to measure the banks' performance (for example, Adolopo, Lloydking, Western, & Tauringana, 2018; Paolucci, 2016; Sufian & Kamarudin, 2012).

3.1.1 Independent variables: Three predictor variables were used in the study. The first was the liquidity measured by the dividing total loan by total deposits—a widely used tool to measure the banks' liquidity (for example, Adolopo, Lloydking, Western, & Tauringana, 2018; Ahmad, Koh, & Shaharuddin, 2016). A higher value of the loan to deposit ratio indicates lower liquidity, and vice versa. The second independent variable, the leverage measured by dividing equity capital by total assets, is also a widely used tool to measure the banks' leverage. Higher equity capital to total asset ratio indicates that the bank has lower leverage and lower risk—a

tool widely used to measure the banks' leverage position and its impact on banks' profitability (for example, Athanasoglou, Brissimis, & Delis, 2008; Paolucci, 2016; Sinha, & Sharma, 2015; Sufian & Kamarudin, 2012; Tan, 2017). Finally, the third independent variable was the bank size measured by taking the natural logarithm of total assets—another tool widely used to measure the banks' liquidity and the impact of assets size on bank's profitability (for example, Adolopo, Lloydking, Western, & Tauringana, 2018; Almaqrari & Al-Homaidi, 2018; Athanasoglou, Brissimis, & Delis, 2008; Paolucci, 2016; Tan, 2017).

3.2 Research Methods

All twenty-eight commercial banks, operating now in Nepal, were considered as a target-population size and taken for the study. The study covered the period from 2011/12 to 2016/17. This empirical study was based on time-series balanced panel data collected from the review of the bank supervision report, 2017, published by the central bank of Nepal (i.e., Nepal Rastra Bank). The collected time-series data were analyzed, using descriptive statistics, Pearson correlation coefficient, and multiple regression models. Therefore, this research employed a descriptive and explanatory research design. The mean, standard deviation, maximum, and minimum value were used to describe the characteristics of data from 2011/12 to 2016/17. The correlation matrix was used to examine the relationship between a response variable and predictor variables. The correlation matrix helps to identify the multicollinearity problem: A common rule of thumb is that correlations among the independent variables between -0.7 to 0.7 do not cause difficulties (Lind, Marchal, & Wathen, 2006). In addition, the multicollinearity problem was detected, based on *VIF*—a problem that arises if VIF is greater than five (Titko, Skvarciany, & Jureviciene, 2015). Durbin Watson test was conducted to check the autocorrelation problem in the time series data. Finally, the collected data were analyzed by using the Statistical Package for Social Sciences (SPSS).

Multiple regression models

To examine the relationship between the dependent variable and independent variables, the following three multiple regression models were tested:

Model 1: $ROA = \alpha + \beta_1 (LTDR) + \beta_2 (ETAR) + \beta_3 (LNTA) + \in_{ij}$
Model 2: $ROE = \alpha + \beta_1 (LTDR) + \beta_2 (ETAR) + \beta_3 (LNTA) + \in_{ij}$
Model 3: $NIM = \alpha + \beta_1 (LTDR) + \beta_2 (ETAR) + \beta_3 (LNTA) + \in_{ij}$

Where *ROA* = Return on Assets, *ROE* = Return on Equity, *NIM* = Net Interest Margin, *LTDR* = Loan to Deposit Ratio, *ETAR* = Equity to Asset Ratio, *LNTA* = Natural Log of Total Assets, α = Constant Term, and $\in_{ij}$ = Error term

4. Empirical Results and Discussion

4.1. Summary of descriptive statistics and correlation matrix

Table 1 reports a summary of the descriptive statistics of three response variables: *ROA*, *ROE*, and *NIM*; three predictor variables—liquidity, capital fund ratio, and bank size—were used in the study. The results reveal that the average net interest margin of Nepalese commercial banks became much higher than that of return on assets, implying that Nepalese banks were found to be involved in traditional loan business and to earn very low amount from asset diversification. The average *ROE* of Nepalese commercial banks was much higher than that of *ROA* and *NIM*—suggesting that they benefited from leverage effects. The standard deviation of *ROE* indicates much more volatility among the response variables. Similarly, the standard deviation of *LNTA* also indicates much more volatility among the explanatory variables.

Table 1 Descriptive statistics of response and predictors variables

Variables	*N*	Minimum	Maximum	Mean	*SD*
ROA	168	-.0344	.0401	.0149	.0082
ROE	168	-.5594	1.0291	.1608	.1331
NIM	168	.0172	.0576	.0315	.0077
Loan to deposit ratio (*LTDR*)	168	.4832	.9565	.7726	.0933

Equity to assets ratio (*ETAR*)	168	.0120	.2045	.1019	.0306
Ln Total assets (LN*TA*)	168	8.6401	12.0642	10.7653	.6348

Table 2 presents the correlation matrix of response and predictor variables. Both *ETAR* and *LNTA* became positively correlated with *ROA* and statistically significant at 5% and 1% level, respectively. But *ROA* was negatively correlated with *LTDR* and statistically insignificant. Similarly, ROE was positively correlated with *LNTA* and statistically significant at 1% level, but negatively correlated with *LTDR* and *ETAR* and statistically significant at 1% level. *NIM* was negatively correlated with *LTDR* and statistically insignificant—but positively correlated with LN*TA* and statistically significant at 1% level. However, the relationship between *NIM* and *ETAR* was positive and statistically insignificant.

Table 2 Correlation matrix of response and predictor variables

Variables	*ROA*	*ROE*	*NIM*	*LTDR*	*ETAR*	LN*TA*
ROA	1	.651**	.412**	-.096	.168*	.477**
		(.000)	(0.000)	(.221)	(.031)	(.000)
ROE	.651**	1	.194*	-.390**	-.358**	.477**
	(0.000)		(0.012)	(.000)	(.000)	(.000)
NIM	.412**	.194*	1	-.011	.115	.325**
	(0.000)	(.012)		(.888)	(.142)	(.000)
LTDR	-.096	-.390**	-.011	1	.615**	-.229**
	(.221)	(.000)	(.142)		(.000)	(.002)
ETAR	.168*	-.358**	.115	.615**	1	-.238**
	(.031)	(.000)	(.142)	(.000)		(.002)
LN*TA*	.477**	.477**	.325**	-.229**	-.238**	1
	(.000)	(.000)	(.000)	(.003)	(.002)	

Note: *Correlation is significant at the 0.01 level (2-tailed), **Correlation is significant at the 0.05 level (2-tailed).

The above correlation matrix reveals that all the correlation coefficients, among the response and predictor variables, less than 0.7 implies no evidence of multicollinearity problem among independent variables.

4.2. Regression results

This study focused mainly on regression results. Tables 3, 4, and 5 show the results of regression analysis. Table 3 reports the results related to *ROA*; Tables 4 and 5 report the results related to *ROE* and *NIM*.

Table 3 reports the effects of liquidity, capital ratio, and size of banks on bank *ROA*. The value of R^2 (.35) reveals that the overall explanatory power of the regression model was fair with—indicating that 35 percent of the variation in bank *ROA* was explained by the variation in the independent variables. The *p*-value of *F*-statistics clearly indicates that this regression model is a good fit. Besides, the variance inflation factor (*VIF*) of all the variables, less than 5 (Titko, Skvarciany, & Jureviciene, 2015), indicates the non-presence of the multicollinearity problem. In Table 3, the regression coefficient of loan to deposit ratio (β_1 = -0.022, p <.01) indicates that a higher loan to deposit ratio resulted in the lower *ROA* to the Nepalese commercial banks. This result is in line with the findings of prior researchers (Adolopo, Lloydking, & Tauringgana, 2018; Asmed, Koh, & Shaharudin, 2016; Tarraze, 2015), but contradicts the findings of some other researchers (Pradhan, 2016; Tan, 2016; Tan, 2017). The result of this regression coefficient was supported by these facts: Relatively high levels of loan to deposit ratio (lower liquidity) produced negative *ROA* and reduced liquid funds in order to grab market opportunities, eventually lowering the bank's profitability. Even though the liquidity deficit can be fulfilled either borrowing from a short-term money market or selling short-term marketable securities, the Nepalese commercial banks should have sufficient liquidity to prevent the bank from descending into insolvency. The regression coefficient of equity to total assets ratio (β_2 = .119, $p.$ < .01) indicates that a higher *ETAR* ratio resulted in the higher *ROA* to the banks. This result is consistent with the findings of some prior researchers (Ahtanasoglou, Brissimis, & Delis, 2008; Paoluchhi, 2016; Sinha & Sharma, 2015; Sufin & Habibullah, 2009; Sufin & Kamarudin, 2012) but is in contrast with the findings of some other researchers (Asmed, Koh, &

Shaharudin, 2016). The result of the study was supported by this evidence: A higher *ETAR* reduced bank risk. The regression coefficient of bank size ((β_3 = .007, $p.$ < .01) indicates that a higher *LNTA* resulted in the higher ROA to the banks—the result that is in line with the findings of the previous researchers (Almaqtari, Al-Homaidi, Tobash, & Faharan, 2018; Paoluchhi, 2016; Adolopo, Lloydking, & Tauringgana, 2018, Bhattrai, 2016) and in contrast with the findings of others (Fang, Lau, Tan & Zhang, 2019; Tan, 2016). The result of the study was supported by this evidence: A higher bank size increased both bank's assets and capital funds, which might be beneficial to geographical expansion and to the development of new service products. The banks also benefited from economies of scale and economies of scope.

Table 3 Multiple regression equation of *ROA* on all predictor variables

Variables	Coefficient	*t*-statistics	*P*-value	*VIF*
Intercept	-.053[*]	-4.847	.000	
Loan to deposit ratio	-.022[*]	-3.090	.002	1.629
Equity to total asset ratio	.119[*]	5.504	.000	1.635
LN total assets	.007[*]	7.988	.000	1.072
F-statistics	28.883*	R^2	.35	
P-value	.000			

Note: [*]Statistical significance at the 1% level, [**]Statistical significance at the 5% level,

Table 4 reports the effects of liquidity, capital ratio, and size of banks on bank ROE. The value of R^2, .321, reveals that the overall explanatory power of the regression model appeared fair—indicating that 32.1 percent of the variation in bank *ROA* was explained by the variation in the independent variables. The *p*-value of *F*-statistics clearly indicates that this regression model was a good fit. Moreover, the variance inflation factor (*VIF*) of all the variables—less than 5 (Titko, Skvarciany, & Jureviciene, 2015)—indicates the non-presence of the multicollinearity problem. In Table 4, the regression coefficient of *LTDR* (β_1 = -.315, p <.01) indicates that a higher *LTDR* led to the lower *ROE* to the Nepalese commercial banks. The regression coefficient of *ETAR* (β_2 = -.557) indicates that a higher E*TAR* ratio resulted in the lower *ROE*, but it was statistically insignificant to the Nepalese commercial banks—the result that was supported by the fact that a higher *ETAR* reduced bank risk and increased the benefit of leverage. The regression coefficient of bank size ((β_3 = .083, $p.$ < .01) indicates that a higher *LNTA* resulted in the higher *ROE* to the banks: The result of the study was supported by the evidence that a higher bank size increased both bank's assets and capital funds that might be beneficial to geographical expansion and to the development of new service products. The banks also benefited from economies of scale and economies of scope.

Table 4 Multiple regression equation of *ROE* on all predictor variables

Variables	Coefficient	*t*-statistics	*P*-value	*VIF*
Intercept	-.435[**]	-2.37	.019	
Loan to deposit ratio	-.315[*]	-2.665	.008	1.629
Equity to total asset ratio	-.557	-1.543	.125	1.635
LN total assets	.083[*]	5.885	.000	1.072
F-statistics	25.361[*]	R^2	.321	
P-value	.000			

Note: [*]Statistical significance at the 1% level, [**]Statistical significance at the 5% level,

Table 5 reports the effects of liquidity, capital ratio, and size of banks on bank *NIM*. The value of R^2 (.149) reveals that the overall explanatory power of the regression model was fair, indicating that 14.9 percent of the variation in bank NIM was explained by the variation in the independent variables. The *p*-value of *F*-statistics clearly indicates that this regression model was a good fit. Furthermore, the variance inflation factor (*VIF*) of all the variables, less than 5 (Titko, Skvarciany, & Jureviciene, 2015) indicates the non-presence of the multicollinearity problem. In Table 5, the regression coefficient of *LTDR* (β_1 = -0.007) indicates that a higher loan to deposit ratio lowered *NIM*, but it became statistically insignificant to the Nepalese commercial banks: This result is in contrast with the findings of some prior researchers (Paolucci, 2016; Tan, 2017). The result of

this regression coefficient was supported by the fact that relatively high levels of *LTDR* (lower liquidity) produced negative *NIM* and decreased liquid funds in order to grab market opportunities, which eventually led to lower the bank's *NIM*. Even though the liquidity deficit can be fulfilled either by borrowing from a short-term money market or by selling short-term marketable securities, the Nepalese commercial banks should have sufficient liquidity to prevent the bank from plunging into insolvency. The regression coefficient of *ETAR* (β_2 = .064, *p.* < .01) indicates that a higher ETAR ratio resulted in the higher *NIM* to the banks. This result is in line with the findings of these researchers (Adolopo, Lloydking, & Tauringgana, 2018) and in contrast with the findings of some others (Sufin & Kamarudin, 2012). The result of the study was explained by the evidence that a higher ETAR reduced bank risk and increased the benefit of leverage. The regression coefficient of LN*TA* ((β_3 = .004, *p.* < .01) indicates that a higher LN*TA* brought about the higher *NIM* to the banks. This result is consistent with the findings of the prior researchers (Adolopo, Lloydking, & Tauringgana, 2018; Paolucci, 2016) but in contrast with the findings of this researcher (Tan, 2017). The result of the study was explained by the fact that a higher bank size increased both bank's assets and capital funds for the traditional loan business, thereby eventually leading to increase bank's interest income and boosting the *NIM*.

Table 5 Multiple regression equation of NIM on all predictor variables

Variables	Coefficient	*t*-statistics	*P*-value	*VIF*
Intercept	-.017	-1.482	.140	
Loan to deposit ratio	-.007	-.890	.375	1.629
Equity to total asset ratio	.064[*]	2.718	.007	1.635
LN total assets	.004[*]	4.866	.000	1.072
F-statistics	9.401[*]	*R*^{2}	.149	
P-value	.000			

Note: [*]Statistical significance at the 1% level, [**]Statistical significance at the 5% level,

5.   Conclusion, Implication, and Limitations of the Study

The purpose of this study was to examine the impact of liquidity, leverage, and total bank size on the bank's profitability. Most of the research conducted in this area has included the US, European countries, Latin American countries, and African countries. In the Nepalese context, as per our own knowledge, very few studies were conducted in this field. The empirical studies conducted by various researchers reveal the contradictory results that affected banks' performance. Therefore, the main aim of the study was to examine the impact of liquidity, leverage, and total size on bank performance. This study employed three ordinary least squares regression models to explain the cause-and-effect relationship between response and predictor variables. The first regression model, which incorporated *ROA* as the dependent variable, was statistically significant (*F* = 28.883, < .01)—suggesting that the regression model was best fitted. Similarly, the second regression model, which incorporateed *ROE* as the dependent variable, was statistically significant (*F* = 25.361, < .01), suggests that the regression model seemed best fitted. Finally, the third regression model, which included *NIM* as the dependent variable, was statistically significant (*F* = 9.401, < .01)—suggesting that the regression model appeared best fitted. The first regression equation reveals that the higher loan to deposit ratio (low level of liquidity) negatively affected on bank's *ROA*, *ROE*, and *NIM*—but *ROE* and *NIM* were not statistically significant. The result of the second regression equation reveals that higher equity to assets ratio (lower leverage) positively affected two profitability measures (*ROA* and *NIM*) and statistically significant—but negatively related to *ROE* and statistically insignificant. The result of the final regression model reveals that the higher bank size was favorable to the Nepalese commercial banks and had a positive effect on all three profitability measures: *ROA*, *ROE*, and *NIM*. This finding could help bankers and policymakers to take an effective action to improve banks' profitability and stability. This study covered only three independent variables—such as liquidity, leverage, and bank size—to show the impact on bank's profitability; therefore, further research needs to be done by including other industry specific factors and macroeconomic variables in the Nepalese context.

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The Relationship between Emotional Intelligence and Leadership in Business Management of Greek Pharmaceutical Companies

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Abstract
This research purpose has to do with a theoretical communication model, having as main participants of the research,supervisors, middle and senior managers, working for Greek pharmaceutical companies to derive & comment the following data: The recognition and administration of Emotional Intelligence that incorporates self-awareness, self-management, social management and social awareness among the participants, The recognition and administration of Emotional Intelligence traits i.e. self-awareness, self-management, social management and social awareness among the participants that express communication abilities & leadership effectiveness to a large extent among genders, males and females, The recognition and administration of Emotional Intelligence traits that express communication abilities & leadership effectiveness to a large extent among ages' groups, The recognition and administration of Emotional Intelligence traits that express communication abilities & leadership effectiveness to a large extent among ages' groups. In practice, the aim of this research will lead to the development of the above

mentioned theoretical communication model which incorporates the existence & use of all Emotional Intelligence traits in the pharmaceutical sector as valuable contributors in leadership effectiveness, decision making processes. Based on the abovementioned reasons, a specific questionnaire was formulated and distributed to 250 specialized pharmaceutical professionals after having been adapted accordingly always based on existing data of Pharmaceutical Market in Greece; in order to guide us to relevant conclusions about importance of Emotional Intelligence for the Greek pharmaceutical companies. Another aspect of the answers for that set of questions addressed to senior or middle level managers might lead at the same time to the assessment of emotional intelligence value in the context of communication with other members of the team & also subordinates. Therefore, we believe that this specific study will be an additional tool available for pharmaceutical companies' executives since it focuses on the usefulness and application of Emotional Intelligence incorporated in the communication model of leadership effectiveness, decision making processes that are associated with profitability and generally professional progress.

Keywords: Emotional Intelligence (EI), Pharmaceutical Companies, Leadership Effectiveness, Decision Making Process.

Introduction

Emotional Intelligence (EI) used to be an almost new academic concept that was analyzed by Salovey and Mayer (1990) in their so-called study of Emotional Intelligence. Salovey and Mayer (1990) expressed the meaning of EI after defining the meanings of emotions and intelligence separately. A hierarchical model of EI was also given, which incorporated four different traits i.e., understanding and presentation of one's emotions, understanding and presentation of others' emotions and consequently the regulation of them and utilization of this emotional data in thinking and inspiring others (Salovey and Mayer, 1990). Later on, Goleman (1995) dealt with this topic in his excellent book called "Emotional Intelligence" which caused interest to the worldwide audience. He really expressed emotion as an "impulse to act, the instant plans for handling life that evaluation has instilled in us" (Goleman, 1995). Goleman was characterized as the first writer who connected EI with successful leadership in business administration and approved that EI was the principal data of differentiation between the great leaders and average leaders (Goleman 2006). Despite the existence of numerous traits and elements of the leadership behavior, a prominent focus has been made to the characteristic of Emotional Intelligence (EI), which has to do with the capacity of an individual to feel and attend to one's own emotions and those of others (Mayer, 1999). As a matter of fact, EI in the workplace has driven a lot of attention over the past decade (Tofighi *et al.*, 2015).

Based on researchers' aspect, leadership together with organizational achievement are importantly improved by EI level increase (Jordan and Troth, 2011). In fact, leaders with high EI score can focus on emotions so as to strengthen their organizations' performance (Hernon and Rossiter, 2006). The establishment of future leaders by exploiting the existence of EI may be fulfilled through personality/behavioral preference models such as Myers-Briggs Type Indicator® (MBTI®) and DiSC® (Higgs,2001). EI becomes almost easy to be calculated with standardized and validated assessments, and it is generally thought that EI may be grown by using training and effort (Goleman, 1995). Emotionally Intelligent leaders very soon obtain positive and encouraging attitude in their professional relationships (Glasser, 1998). They can also make others feel that they are necessary and valuable within the corporate bodies. These leaders can be characterized as sensitive and perceptive; they know that life is strongly governed by emotions. As a result, they manage employees in a more different way than those leaders that are less sensitive.

Therefore, it is not by luck that EI has been stated as an important factor of workplace performance, with job satisfaction and organizational success to be incorporated in it (Carmeli *et al.*, 2009; Law *et al.*, 2008).EI mainly increases the performance of a leader (Cherniss and Goleman, 2001). A leader who is discerned by a high level of EI affects more positively team members within organization than a leader marked by a low level of EI (Cherniss, 2003). In a great number of organizations, top level managerial people promote EI not only as the most important element of organizational success, but also as an appropriate component of the company's managing process (Feather, 2009). Feather argues: "A vital portion of the development of leaders in achieving success is to develop and enhance their level of emotional intelligence."

Moreover, Humphrey (2002) said that researchers are strongly interested in the fact that leaders who can better recognize the emotional situation their subordinates are in and also motivate more positive emotional state in the groups they manage, become far more effective than others. Also research managed by Sosik and Mergerian (1999) and Jones and George (1998) has also explained that connection on an emotional state with subordinates can also be important to increase levels of trust and commitment.

Besides, the EI is strongly associated to almost three traits of organizational engagement that is consisted by emotional engagement, operational engagement and established engagement. The emotional engagement promotes the encouraging emotions of intimacy and adherence to the organization. The operational engagement is also associated with the engagement level one has acquired for the company especially in the case one is occupied by fugitive trends (Shafiq *et al*., 2016). Established engagement has to do with the perception of liability to keep on working for the same organization (Meyer *et al*., 1991).

Generally, emotional engagement together with positive way of thinking can lead to a decent working life (Di Fabio *et al*., 2016).

In summary, throughout the years Emotional Intelligence is considered to be critical and a lot of researchers have tried to prove it as a particular field depending on people's characteristics. As a result, emotional intelligence plays an important role in everyday professional life (Cherniss, 2003). Additionally, it has been reported that emotional intelligence can guide to effective leadership competences in the pharmaceutical companies.

The research design

In order to attain the study's objectives, as well as to achieve Communication Model fulfilment, it had been determined to formulate a specific questionnaire to be distributed to specialized pharmaceutical professionals after having been adapted accordingly based on Greek Pharmaceutical market reality; in order to guide us to relevant conclusions about EQ's importance for the Greek pharmaceutical companies. Another aspect of the answers for that set of questions addressed to senior or middle level managers might lead to the assessment of EQ's value in the context of communication with other members of the teamwork & also subordinates.

As a result, the required questionnaire had been designed around the basis of the long form of Trait Emotional, Intelligence Questionnaire (TEIQue) version 1.50, created by Petrides (2009)-Department of Psychology/University College of London - that includes 153 items, 15 facets, four factors, and global trait of emotional intelligence and focuses on Greek Pharmaceutical Companies Professionals' Emotional Intelligence (TEIQue-GPCP).

In fact, this Greek short version (TEIQue-GPCP) adapted from the one hundred and fifty three multi-rater surveys (TEIQue, v.1.50) was fulfilled and compromised of fifty focused questions concerning the main characteristics and the essential 6 out of 17 items concerning the demographic data, in total. All fifty questions are primarily referred to as the perception of self-awareness and self-management, whereas social awareness and social management are of great interest, as well. The principal selection of questions that expressed the four above-mentioned characteristics is based on the existing models /definitions of emotional intelligence (Goleman, 1998; Bar-On, 2002), a subjective categorization of the 50 items questionnaire per 4 characteristics.

On the one hand, that specific questionnaire had already been adopted in the Greek reality (TEIQue-GPCP) whereas, on the other hand, it had been uploaded via a certain webpage and had been sent to two-hundred and fifty Middle and Senior Managers of Greek National and Multinational Pharmaceutical Companies.

Based on SFEE (Hellenic Association for Pharmaceutical Companies) empirical data in 2018, total population occupied in the Greek Pharmaceutical industry is around 25,000 people; a percentage of approximately 10% of them (i.e., 2,500 people represent the whole sample of Middle to Senior Managers). My sample of the expected responders was 10% of the previously-mentioned total sample. In practice, one hundred and fifty–six questionnaires had been collected, out of which only one hundred and fifty–five questionnaires included responses that is to say, a percentage of 62% of the expected participants (250) in the survey. Based on the above–mentioned

answers and the scale rating, we will analyze those results, so as to create the expected Communication Model through which Leadership effectiveness & Company's Performance are anticipated to be increased by the development of emotional intelligence characteristics.

The research importance

First of all, scientific data about the relationship between emotional intelligence and leadership and decision making are missing in the Greek Pharmaceutical Industry; however, the MSCEIT (Mayer *et al.*, 2003) has already been utilized in various studies because it strongly proves that emotional intelligence and leadership effectiveness are connected positively to a large extent (Kerr *et al.*, 2005; Rosete and Ciarrochi, 2005). Rosete and Ciarrochi, (2005) searched to what extent is connected emotional intelligence, personality, mental intelligence and leadership effectiveness in senior managers in Australia using the MSCEIT evaluation and the Wechsler (2012) Abbreviated Scale of Intelligence (WASI) evaluation. As a result, they confirmed that emotional intelligence high levels drive to better business profits achievements which are associated with leadership effectiveness. Kerr *et al.* (2005) searched to what extent managerial emotional intelligence and leadership effectiveness are connected by using the MSCEIT test as defined by employees' assessment. Based on their results, it seems that emotional intelligence can play a crucial role to seniors' leadership effectiveness. Another conclusion has to do with subordinates' better understanding of leadership effectiveness in case emotional intelligence levels are finalized to be higher.

As per our evaluation of previous research data/results, it is concluded the following:

- Based on Greg Megowan's (2012) article from Pepperdine University, Graduate School of Education and Psychology, he managed to run a scientific research regarding the relationship between emotional intelligence & behavior of sales managers working in bio-pharmaceutical industry; in fact, the study results proved that emotional intelligence was strongly associated with leadership effectiveness and organizational achievements. Therefore emotional intelligence high levels had managed to improve managers' behavior within Phyogen, Inc. which is a global large biotechnology company having had for revenues over $14 billion dollars in 2010 and as a result, to define directly high-level leaders existed and train better leaders for the company's sake in the future.
- Additionally, according to the 20th CEO survey conducted in 37 countries in March 2017 by Price Waterhouse Coopers (PWC), it was assumed that 79% of the interviewed CEOs found it difficult to recruit managers with leadership skills whereas 72% of them also face difficulties to employ emotional-intelligent managers, as well.

As a matter of fact, there is no known research data that investigate the correlation among emotional intelligence, leadership effectiveness and decision-making process in the pharmaceutical sector globally. It is expected that this study will help to investigate the existence of strong relationship between EI, leadership effectiveness and decision-making process among middle and senior managerial executives in the Greek pharmaceutical industry.

Therefore this research is guided to four most important characteristics which Emotional Intelligence is compromised by, that is to say self-awareness, self-management, social awareness, social management included in the short version questionnaire regarding Greek Pharmaceutical Companies Professionals' Emotional Intelligence (TEIQue-GPCP) adapted from the 153 multi-rater survey (TEIQue, v.1.50, that created by Petrides, 2009).

Objectives and Methodology

As a matter of fact, by re-examining international articles, through the recent 30 years (1988-2018), this particular research objectives can be described as follows:

- To investigate if pharmaceutical organizations are firstly familiar with emotional intelligence's valuable impact on business progress and secondly make their employees participate in competences' development procedure by running training projects, in order to increase their managers' emotional intelligence; six strategies proposed by Weisinger (1998) that play an important role for enhancing emotional intelligence.

- To learn about the ways middle and senior managers exchange information and ideas with their personnel in case they are exerted impact by emotional intelligence components & other leadership characteristics as useful tools; so as to be competent to enhance their performance and therefore organization's profitability, by using the most suitable decision making procedure and leadership performance, as proposed by Walumbwa *et al.* (2011).

In order to attain the study's objectives, as well as to achieve Communication Model fulfilment, it had been determined to formulate a specific questionnaire to be distributed to specialized pharmaceutical professionals after having been adapted and filled in by them; in order to guide us to relevant conclusions about EI importance for the Greek pharmaceutical companies. Another aspect of the answers for that set of questions addressed to senior or middle level managers might lead to the assessment of EI value in the context of communication with other members of the teamwork & also subordinates.

All fifty questions are primarily referred to the perception of self-awareness and self-management, whereas social awareness and social management are of great interest, as well. The principal selection of questions that expressed the four above-mentioned characteristics is based on the existing models /definitions of emotional intelligence (Goleman, 1998, 2001; Bradberry and Greaves, 2003; Bar-On, 2002), a subjective categorization of the 50 items questionnaire per 4 characteristics.

In practice, one hundred and fifty–six questionnaires had been collected, out of which only one hundred and fifty–five questionnaires included responses that is to say, a percentage of 62% of the expected participants (250) in the survey. Based on the above–mentioned answers and the scale rating, we will analyze those results, so as to create the expected Communication Model through which Leadership effectiveness & Company's Performance are anticipated to be increased by the development of EQ's characteristics.

Data Statistical Analysis

Aggregated results based on demographic data
In principal, we have to summarize the aggregated type of the collected answers by making use of the 50 main items and the 6 demographic data. The total number of responders, categorized by sex, is calculated to be 146 (105 male, 41 female).

Group 1: Men who are in the age range of 30-40 years old (26 persons)
The majority of them –approximately 80%-have given high scores to the questions of social awareness, that is to say, in the range of 4 to 7 grades. They seem to perceive other persons' feelings very satisfactorily. They have a lot of good qualities such as energetic, decisive persons, oriented to their goals and satisfied by their professional life but they seem to change their minds extremely easily. The majority of them –approximately 75%-have given low scores to the questions of social management, that is to say, in the range of 1 to 3 grades. They are almost unable to influence other people's feelings and decisions. They are also in difficulty of taking control of several demanding situations in their jobs. The majority of them –approximately 80%-have given low scores to the questions of self-management, meaning that, in the range of 1 to 3 grades. They can't take control of their emotions and are unable to change their behaviors/habits. In general, they can't cope with changes at work effectively since they put pleasure before business. In fact, they must be under pressure to really work hard.

Group 2: Men who are in the age range of 40-50 years old (47 persons)
The majority of them –approximately 70%-have given high scores to the questions of social awareness, that is to say, in the range of 4 to 7 grades. They seem to perceive other persons' feelings adequately satisfactorily. Almost 50% of them have given high scores to the questions of self-awareness, whereas the rest of them have given low scores to the corresponding questions. The majority of them (70%) seem not to have many good qualities but they are acceptable decision-makers and adequately satisfied by their professional life. Half of them have clear emotions, being cool and energetic negotiators while the other half change their minds easily. In fact, the percentage of men that declared their answers were untrue came up to an impressive high one percentage (87%). The majority of them –approximately 85%-have given high scores to three questions of social management. They

can influence people's emotions and opinions since they can adjust their behavior/ feelings and handle things in a cool and composed manner. Therefore, believe that things will work fine in their lives. On the other hand, 50% of them declare that can deal their colleagues effectively and know how to make them feel better when they need it. Furthermore, half of that group put other people's interests above their own.

Group 3: Men who are in the age range of 50-60 years old (17 persons)
The majority of them –approximately 80%-have given low scores to the questions of social awareness, meaning that, in the range of 1 to 3 grades. They seem not to perceive other persons' feelings very satisfactorily. They are excellent decision makers. Besides they are neither dynamic personalities, nor energetic with goals to be done and good negotiators. Finally, 75% of them declared that their answers were not absolutely true. The majority of them –approximately 90%-have given high scores to the questions of social management, that is, in the range of 4 to 7 grades. They can influence either other people's feelings or their opinions. They can express their disagreement and solve disputes by controlling all situations of his accountability. They are cool and able to make others feel better, as a result people admire them. Besides they aren't concerned about how things will work in the future and put their interests above other persons' ones. The majority of them –approximately 90%-have given low scores to the questions of self-management, that is to say, in the range of 1 to 3 grades. They are unable neither to express / control their feelings nor achieve negative thoughts control. They can't also change their behavior or habits and cope with changes, in general. They can't adjust themselves to various environments. On the contrary, they are able to make their impulsiveness control and stress management assessing pros and cons during decision making process. Their jobs are their first priority.

Group 4: Men who are in the age range of 60+ years old (15 persons)
The majority of them –approximately 85%-have given low scores to the questions of social awareness, meaning that, in the range of 1 to 3 grades. They seem not to perceive other persons' feelings very satisfactorily. The majority of them –approximately 90%-have given high scores to the questions of self-awareness, that is, in the range of 4 to 7 grades. They seem to perceive their own feelings extremely, since their emotions are clear, they are self-satisfied when things are fulfilled well and they have very good qualities such as dynamic personalities and good negotiators. The majority of them –approximately 90%-have given high scores to the questions of social management, that is, in the range of 4 to 7 grades. They can influence either other people's feelings or their opinions. They can express their disagreement and solve disputes by controlling all situations of his accountability. They are cool and put others' interests above theirs, as a result people admire them. They believe that things will work well in the future and can handle people effectively. The majority of them –approximately 90%-have given high scores to the questions of self-management, meaning that, in the range of 4 to 7 grades. They are able either to express / control their feelings or achieve negative thoughts control. They can also change their behavior or habits and are motivated. They can work hard under pressure without making project planning by doing stress management, at the same time. On the contrary, they are unable to make their impulsiveness control. Their jobs are their first priority.

Group 5: Women who are in the age range of 30-40 years old (13 persons)
The majority of them –approximately 80%-have given high scores to the questions of social awareness, that is to say, in the range of 4 to 7 grades. They seem to perceive other persons' feelings very satisfactorily. They have a lot of good qualities such as, decisive and dynamic persons and satisfied by their professional life and good results they offer but they seem to change their minds easily not having clear feelings and cool mood at the percentage of 50%. Besides, 30% of them declared that they are neither good negotiators nor energetic with goals. The majority of them –approximately 70%-have given high scores to the questions of social management, that is, in the range of 4 to 7 grades. They can influence either other people's feelings or their opinions. They can express their disagreement and solve disputes although they can't control all situations of their accountability. They are cool and put others' interests above theirs. They don't believe that things will work well in the future (60%) and are unable to handle people effectively (70%). The majority of them –approximately 75%-have given high scores to the questions of self-management, that is to say, in the range of 4 to 7 grades. They can take control of their emotions and are able to change their behaviors/habits. In general, they can cope with changes at work by doing stress management and they put business before pleasure. In fact, they can really work hard without being under pressure. But it's difficult for them to make impulsiveness' and negative thoughts' control.

Group 6: Women who are in the age range of 40-50 years old (17 persons)

The majority of them –approximately 80%-have given high scores to the questions of social awareness, meaning that, in the range of 4 to 7 grades. They seem to perceive other persons' feelings very satisfactorily. The majority of them –over 80%-have given high scores to the questions of self-awareness, that is to say, in the range of 4 to 7 grades. They seem to perceive their own feelings extremely right, since their emotions are clear, they are self-satisfied when things are fulfilled well and they have very good qualities such as energetic persons with goals and good negotiators. They are fully satisfied by their professional life (100%). Besides, they are neither dynamic personalities nor good decision makers and change their minds easily (50%). Finally, 40% of them declared that their answers were not absolutely true. The majority of them –over 70%-have given high scores to the questions of social management, meaning that, in the range of 4 to 7 grades. They can influence either other people's feelings or their opinions and are able to handle people effectively. They can control all situations of their accountability. They know how to make other people feel better when they need it. But they aren't cool, they can't express their disagreement and solve disputes and put their own interests above others' ones. They don't believe that things will work well in the future (70%). The majority of them –approximately 65%-have given high scores to the questions of self-management, that is to say, in the range of 4 to 7 grades. They can take control of their emotions and are able to change their behaviors/habits and adjust to new environments.

Group 7: Women who are in the age range of 50-60 years old (10 persons)

The majority of them –approximately 60%-have given high scores to the questions of social awareness, that is, in the range of 4 to 7 grades. They seem to perceive other persons' feelings very satisfactorily. The majority of them –approximately 70%-have given high scores to the questions of self-awareness, that is to say, in the range of 4 to 7 grades. They seem to perceive their own feelings extremely right, since their emotions are clear, they are self-satisfied when things are fulfilled well and they have very good qualities such as energetic persons with goals. They are self-confident by making the right decisions. Besides they are neither good negotiators nor satisfied by their professional life (60%). They aren't dynamic personalities and change their minds easily (50%). Finally, 80% of them declared that their answers were not absolutely true. The majority of them –over 70%-have given high scores to the questions of social management, meaning that, in the range of 4 to 7 grades. They can influence either other people's feelings or their opinions and are able to handle people effectively. They are cool and they can control all situations of their accountability. They believe that things will work well in the future. But they can't express their disagreement and solve disputes and put their own interests above others' ones (50%). But they don't know how to make other people feel better when they need it. The majority of them –over 60%-have given low scores to the questions of self-management, meaning that, in the range of 1 to 3 grades. They are unable neither to express / control their feelings nor make their impulsiveness control and stress management. They can't also change their behavior or habits and aren't self-motivated so as to make project planning at all. They can't adjust themselves to various environments. On the contrary, they are able to assess pros and cons during decision making process and achieve negative thoughts control. Their jobs aren't their first priority.

Group 8: Women who are in the age range of 60+ years old (1 person)

That person (100%)-has given low scores to the questions of social awareness, that is, in the range of 1 to 3 grades. She seems not to perceive other persons' feelings very satisfactorily. That person (100%)-has given low scores to the questions of self-awareness. She seems not to perceive her own feelings, since her emotions aren't clear and she isn't self-satisfied when things are fulfilled well. Besides they are neither dynamic/energetic persons with goals nor self-confident about her decisions. But she has very good qualities such as cool personality and good negotiator. Finally, she declared that her answers were not absolutely true. That person (100%)-has given low scores to the questions of social management, that is to say, in the range of 1 to 3 grades. She can influence neither other people's feelings nor their opinions. She can't handle people effectively since she doesn't know how to make others feel better when they need it. But she can express her disagreement and solve disputes by controlling some situations of her accountability. She believes that things will work well in the future. That person (100%)-has given high scores to the questions of self-management, that is to say, in the range of 4 to 7 grades. She is able either to express / control their feelings or achieve negative thoughts and impulsiveness control. She can also change her behavior or habits and cope with changes in general. Her job is her first priority. She can adjust to

various environments, as well. On the contrary, she can't work hard under pressure or make project planning by doing stress management, at the same time.

As a matter of fact, we can depict results for every emotional intelligence element per sex and per age group as follows:
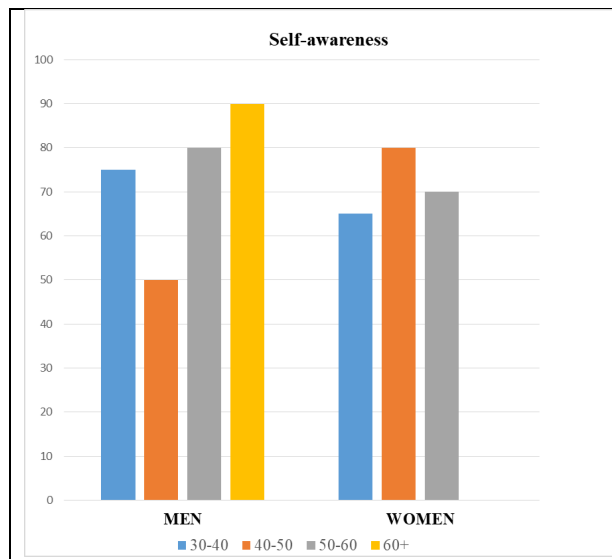
Figure 1:
Self-awareness graph scores per sex, per age group
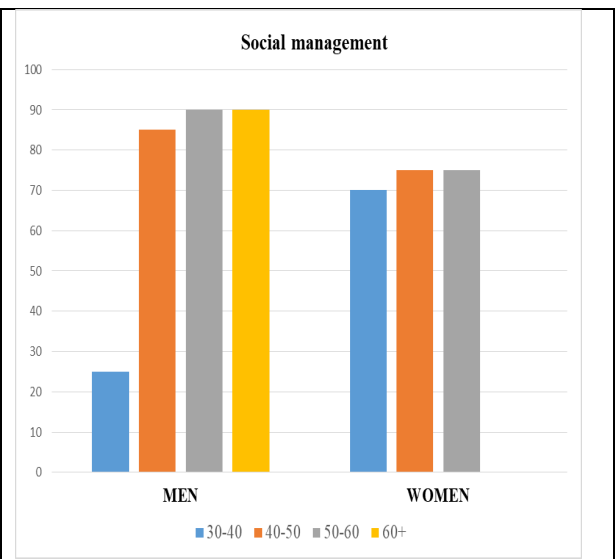
Figure 2:
Social management graph scores per sex, per age group
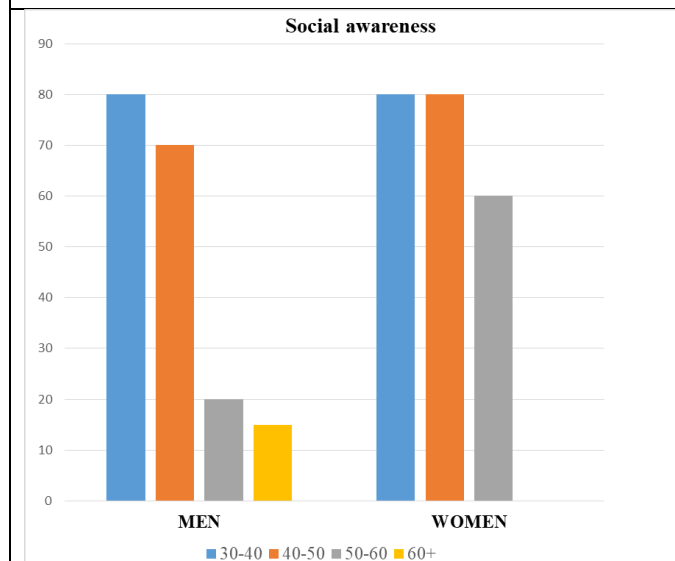
Figure 3:
Social awareness graph scores per sex, per age group
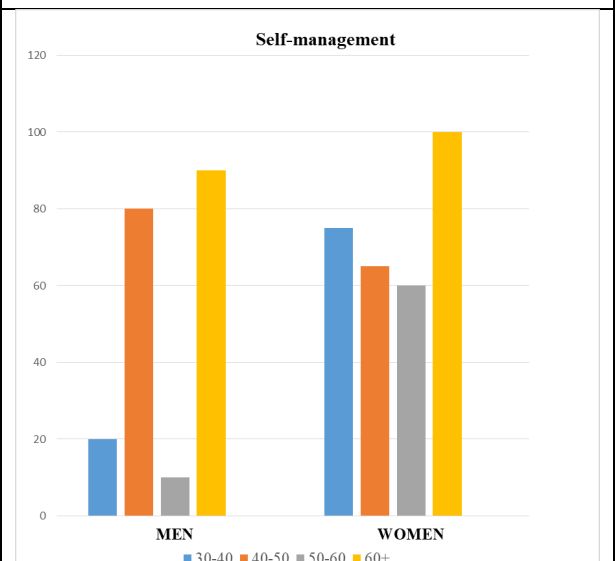
Figure 4:
Self-management graph scores per sex, per age group

Factor analysis

In order to find and explain the common factors of the above analyzed aggregated results, as a total of variables, we applied the factor analysis statistical method. As matter of fact, we can try to make all these factors to be measurable and derive the correlation among the observed variables, as well. The recommended way to do that is by means of factor analysis, an explanatory statistical technique that will help us define the structure and the correlations among the available data. More specifically, we are able to reduce the whole problem's dimensions, by trying to summarize the principal data, total selected factors' number may be smaller than the principal variables; create new variables "factors" that quantify non-measurable quantities like Emotional Intelligence;

explain data correlations for which we suppose that are exclusively due to common factors' existence created by our data. This particular analysis is based on the above mentioned 50 item questionnaire that was replied by 155 participants. Factor analysis' aim is the categorization of all related questions and the finding of all non-measurable quantities that are indicated by each factor (self-awareness, self-management, social awareness and social management). In practice, this analysis' initial aim is to find possible common factors among the total of 50 questions that have been incorporated in the given questionnaire. To be clear, all questions that are related to demographic data have to be excluded from the analysis.

The reliability of internal consistency of the measurements refers to the degree to which the questions that measure the same characteristic appear high consistency or correlation either one another or with this particular characteristic. The evaluation of this reliability is usually managed in the aid of an index or a reliability coefficient, for instance the well-known Cronbach's index α.When this index values raise up to 0.7 or 0.8 can be considered as satisfactory. The calculation of that reliability index is usually associated with the calculation of the degree of correlation of every question / variable with the total sum of all the questions/variables. For instance, in the case of questions that appear low correlation with the total correlation, we can argue that they have negative influence in the reliability of the measurements and of course we need to make corrections regarding these questions. As a result, 4 groups were created from the questionnaire based on the factor analysis and Cronbach's index α was calculated for them, as well.

Furthermore, based on the usage of the statistical package SPSS, version 24, we are able to present all the results and the consequent tables derived from the factor analysis. We can also depict the mean term for each variable in a graph as follows (Figure 5):
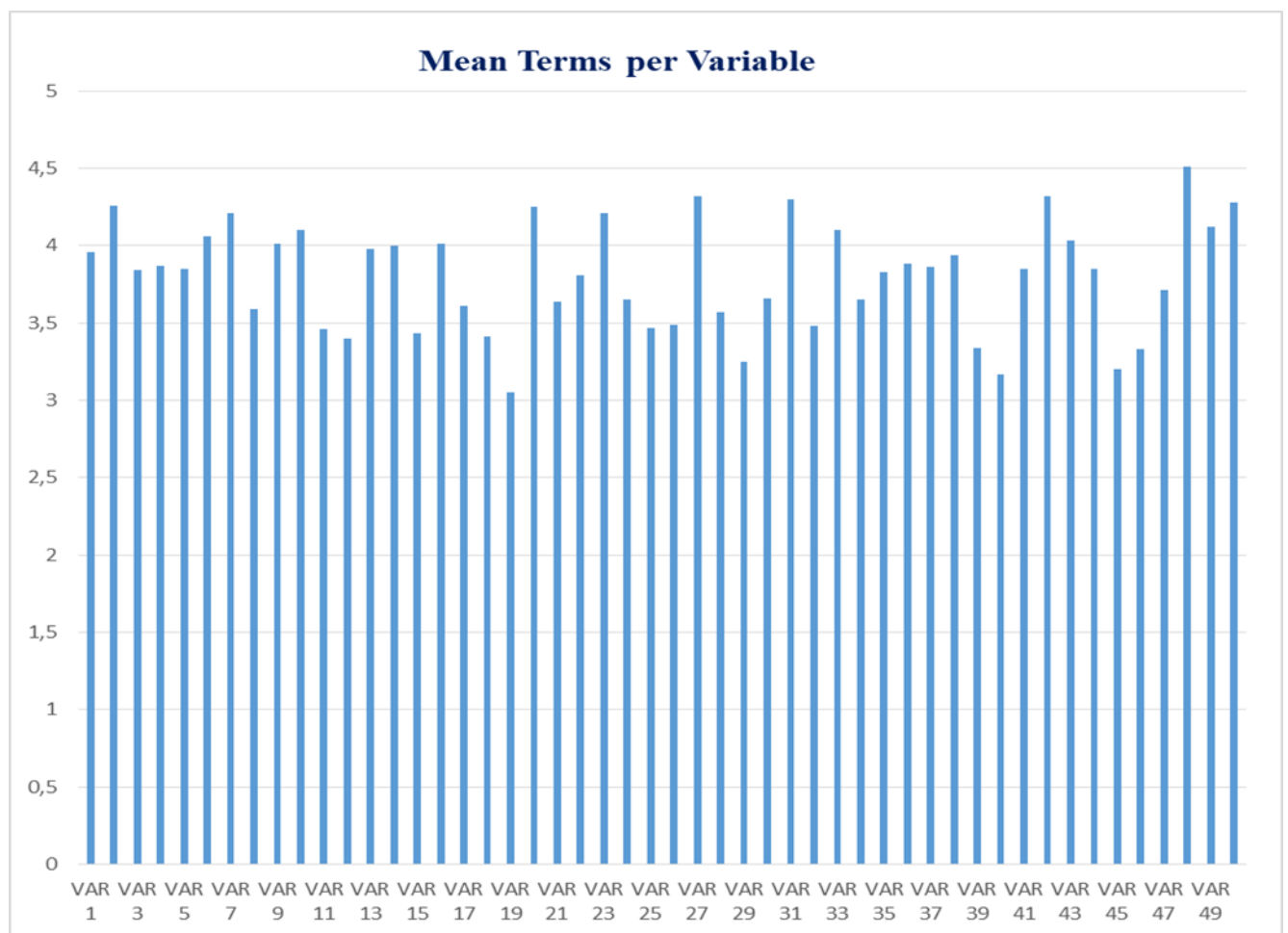
Figure 5: Mean Terms graph per variable

The correspondent conclusions can be depicted in a so-called Maslow's pyramid type shape as follows(Figure 6):
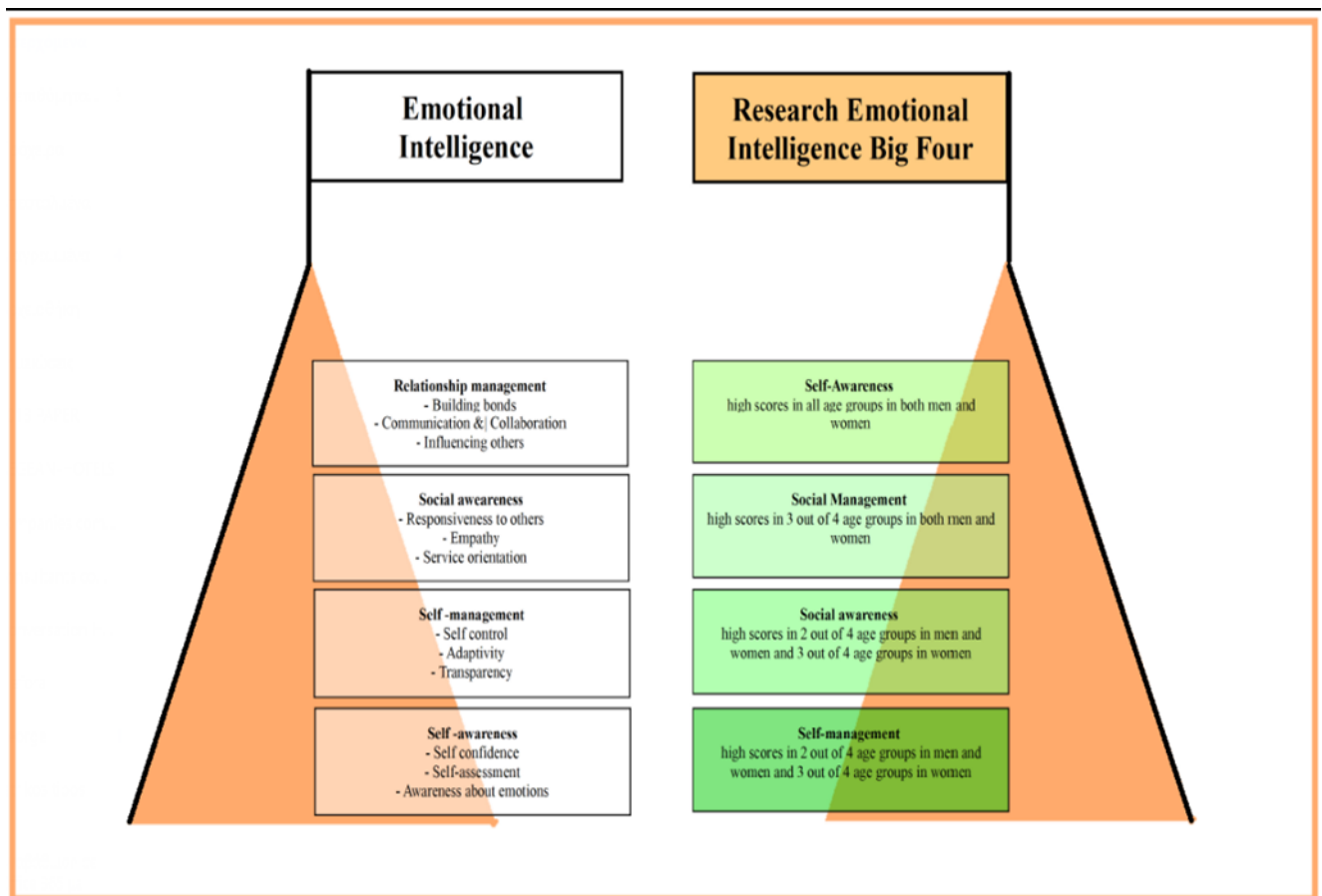
Figure 6: Theoretical communication model on emotional intelligence big four

The EI Model on the right, based on Kasapi's (2019) dissertation, can really be called as an innovation compared to the already existing model of EI as far as the present time concerned.

Conclusions

Overall and based on the objectives of the research and the needs of a specifically demanding and evolving market, the one of the Greek Pharmaceutical Products, we can sum up that present study's value-according to the results of qualitative analysis - in the following short bullets:

- Regarding Emotional Intelligence traits recognition and administration among middle & senior managers, self-awareness was assumed to be the most important factor for men and women of all ages, as well, as depicted at Figure 6 of Theoretical Communication Model on Emotional Intelligence Big Four.
- With regards to Emotional Intelligence recognition and administration among middle & senior managers, social management was assumed to be next most important factor for men and women of all ages, as well as depicted at Figure 6 of Theoretical Communication Model on Emotional Intelligence Big Four.
- Regarding Emotional Intelligence recognition and administration among middle & senior managers, social awareness was thought to be the third important factor for men and women of all ages, as well as depicted at Figure 6 of Theoretical Communication Model on Emotional Intelligence Big Four.
- With regards to Emotional Intelligence recognition and administration among middle & senior managers, self-management was expected to be the least important factor for men and women of all ages, as well as depicted at Figure 6 of Theoretical Communication Model on Emotional Intelligence Big Four.

Therefore, by examining EI traits one by one via the given questionnaire and based on gender and age respectively, we can assume that emotional intelligence appears to be an important part of employees' professional life in the everyday practice of Greek Pharmaceutical Companies, even unconsciously and without special training.

Additionally another aspect of the whole thing has to do with really low levels of middle and senior managers' self-management and regulation among genders and ages of different educational levels and marital status; this conclusion is absolutely disappointing because it may lead us to the existence of possible conditions of impulsiveness, fear, anger and various other negative emotions ; that is to say, communication abilities and leadership capacities may be decreased to a large extent or even lost. Besides, nervousness may also lead to self-control loss which implies employees' demotivation, decision making process deterioration and as a result, an overall company's profitability decrease. Moreover, we can sum up that present study's value-according to the results of quantitative analysis - in the following short bullets:

- Regarding Emotional Intelligence recognition and administration among middle & senior managers, the initial first factor analysis led to four basic groups, that is to say, self-awareness, social management, social awareness and self-management that did agree with the categorization of the qualitative aggregated results.
- Cronbach's index α showed that all three groups were reliable apart from the group of social awareness which is characterized by extremely low reliability index α (0.429).
- With regards to Emotional Intelligence recognition and administration among middle & senior managers, an additional factor analysis was realized and gave four different factors.
- Additionally, updated Cronbach's index α showed that all different four groups, that is to say, self-awareness, social management, social awareness and self-management were reliable.

Finally, putting together all qualitative and quantitative results, we can assume that emotional intelligence plays an important role among professional relations and cooperation of pharmaceutical executives even though they are not aware of its existence scientifically but only empirically. As far as managers that appear all EI traits high levels is concerned, they may also have high levels of communication abilities and leadership skills. Decision making process seems to be effective in high level EI executives, as well.

To definitely wrap-up the conclusions of the present thesis, the already proposed theoretical model may be a useful tool for the Pharmaceutical executives by being trained, let's say every six months, via EI four traits assessment and retrained again in the aid of other communication techniques as well; in the aim of improving existing questions scores to be able to develop intrapersonal and interpersonal skills with the ultimate objective to increase company's turnover and profitability.

Limitations of the Study

In fact, differences among results are due to the fact that this specific analysis is an investigational one whose results are based on the existing bibliography and the researcher's opinion mostly. As a matter of fact, this research is subjective and follows various criteria, the majority of which are empirical. Finally, that specific analysis' quality depends on the available data derived from the participants' replies.

Proposal for Further Analysis

Due to the existence of poor bibliography regarding Emotional intelligence especially in the Greek Pharmaceutical Market, it is an absolutely great challenge for any interested person to deal with a similar subject of that industry so as to broaden our knowledge through other empirical tools.

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Human Capital, Capital Stock Formation, and Economic Growth: A Panel Granger Causality Analysis

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Abstract

Fostering educational practices, increasing enrollments rate, and improving learning is a central part of most economic development strategies. Most economists from the 20th and early 21st century see the idea of increasing the public's aggregate per capita investment in human capital as a controversial topic; because the expansion of education has not guaranteed improved economic conditions in some regions. The variables used in the study include 14 Latin American countries that have been analyzed, and the results show a strong causal relationship between real gross domestic product per capita–purchasing power parity and human capital. Although the study doesn't find a direct Granger causal relationship moving from human capital to real gross domestic product per capita-purchasing power parity, there is an indirect Granger causal relationship between our variables of interest. The association can be found in the bidirectional Granger causal relationship between human capital and trade balance.

Keywords: Unit Root, Panel Cointegration, Granger Causality, Human Capital, Latin American Countries, Educational Investment, Sustainable Economic Growth

Introduction

This paper contributes to the literature on human capital, education, and Latin America studies by presenting our empirical results on the effect(s) of human capital and economic growth in Latin America grounded on Smith's (1776) learning by doing and Ricardo (1803) division of labor ideology and economic growth theory. The human capital theory focuses on health and the return on education investment as an input to economic production. In 1997, the United Nations (UN) defined human capital as productive wealth embodied in labor, skills, and knowledge (UN, 2016 and 2020). For this study, human capital is defined as education and training (formal, informal, and culture); knowledge; labor; skills (general, industry, firm, job, and task-specific); experience.

They are incorporated and called human capital because people can't be separated from the stated factors in the way they can be separated from their financial and physical capital during the production process. Education

affects the quality of labor and the level of technical progress, which in turn affects economic growth, development, and stability of a country. However, trade liberalization is often considered an essential tool for increasing a nation's productivity level. There is almost a unilateral concession among economists that a liberal and open trade policies increase trade volume to Gross Domestic Product (GDP), resulting in a more favorable trade balance (+/-) as it is evaluated based on the differences between spending on consumer or producer goods. Today, developing nations are liberalizing their economies to become attractive to foreign direct investments. This paper aims to analyze the impact of human capital on economic growth and development. The empirical analysis tries to determine the Granger Causal Relationship (GCR) between human capital and economic growth in 14 Selected Latin American Countries (LAC) by using the panel unit root test and panel cointegration analysis for the period 1950-2014.

Chronicle of Economic Growth Theory

The net impact(s) of human capital on economic growth, development, and stability has received significant attention in recent years, especially from emerging countries. But to address the underlying question of this study, there are two vital approaches to take. First, human capital is seen as an essential factor of production in the production process and second, as a production facilitator.

Smith (1776) argues that specialization, learning by doing, at all levels of the production line, can be enhanced by ensuring that each job position can be improved (production per capita and quality per unit) by reducing the job requirement. He asserted with empirical backings that the productivity of skilled workers is higher than the unskilled, and hence his justification for higher-earning per individual marginal productivity, as a result of the individual (per workers') investment.

Malthus (1798), a classic work, set two underlying assumptions. First, an increase in Gross Domestic Product per capita ($GDP_{per\ capita}$) above the economic equilibrium level of consumption will lead to a rise in the economy population size. Second, a country's increasing population size will reduce the nation's resources per capita, and as a consequence, consumption per capita will fall back to its equilibrium level. As a result of this stated underlying assumptions, any economy will be trapped in economic stagnation. This view, now heavily criticized for not factoring the effect of technological advancement, accurately described the demography and economic status of the 18th century. The author concludes his argument by saying that an increase in agricultural productivity leads to an increase in population size with zero long-run improvements in living standards.

Ricardo (1817) discussed the division of labor and the consequences of technological progress in society. Ricardo Agreed with Smith's division of labor, specialization, and mechanization of the production process as a net benefit to any community, leading to a reduction in cost per unit and a net increase in total production. Later changing his position but not opposed to technology, he argued that the introduction of machinery in the production process might lead to permanent unemployment if the expenditure is financed with circulating fixed capital and not savings. He concludes by saying, if the investment is made with net-savings, entrepreneurs will search for more profits venture by increasing productivity through technological advancements or investing abroad.

Mill's (1871) view was contrasted to Ricardo's, arguing that lower prices don't bring additional investment because the demand for a good or service, although correlated, doesn't affect the demand for [its] labor. Marx (1844 & 1867) sociological and philosophical critique of the market economy upon workers' life as distinct from economic well-being. Marx argues that private property and mechanization of production lead to the degrading and dehumanization of workers. But several scholars believe that Smith's Wealth of Nations (Smithian treatment of alienation) was an essential precursor of Marxist socialism (Marxian treatment of alienation) (West, 2020).

Empirical Foundation and Methods of Analysis

The study employs a time series annual data analysis between 1950–2014 for a panel of 14 LAC: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Honduras, Mexico, Nicaragua, Panama, Peru, El Salvador,

Uruguay, and Venezuela. The LAC was selected due to the availability of data compared to other countries that lacked comprehensive data from our data source (Penn World Table (PWT), 2019). Table 1 provides a list of the variables used in the study and abbreviations.

Variables

<p style="text-align:center">**Table 1:** Variables used in our based Model</p>

Variables	Meaning
$RGDP_{per\ capita_{ppp_{i,t}}}$	Real gross domestic product-per capita–purchasing power parity is gross domestic product converted to international dollars using purchasing power parity rates per individual.
$HC_{i,t}$ (lowest $0.1 - 13.4$ highest)	Is based on years of schooling and returns to education
$CS_{i,t}$ at constant (2011 USD)	It is the plant, equipment, and other assets that help with production.
$TB_{i,t}$ as a % of $RGDP$	Trade Balance as a share of real gross domestic product

Source: (PWT, 2019)
i = countries
t = years

The descriptive statistic shows the maximum, minimum, mean, and standard deviation of all variables (See Table 2). The variables used in the study are $RGDP_{per\ capita_{ppp_{i,t}}}$; $HC_{i,t}$ our variable of interest and an explanatory variable. $RGDP_{per\ capita_{ppp_{i,t}}}$ from our econometric equation, is operationalized as Real Gross Domestic Product-purchasing power parity $(RGDP_{ppp}) \equiv RGDP_{per\ capita_{ppp_{i,t}}}$ by dividing $RGDP_{ppp}$ by the total population. $HC_{i,t}$ it is measured as the number of years of schooling and the returns to education of the entire population. The Human Development Index (HDI) from (Barro & Lee, 2013) is based on the average years of schooling, and an assumed rate of return to education, which comes from the Mincer equation estimates explained by (Psacharopoulos, 1994) is used as the measuring tool for $HC_{i,t}$. The HDI formula is:

$$\emptyset(s) = \begin{cases} 0.134.s & if\ s \le 4 \\ 0.134.4 + 0.101(s-4) & if\ 4 < s \le 8 \\ 0.134.4 + 0.101.4 + 0.068(s-8) & if\ s > 8 \end{cases} \tag{1}$$

Where s is the average years of schooling from the dataset. The correlation of decadal growth rates, $\emptyset \frac{s_{it}}{\emptyset(s_{it-10})} - 1$ (PWT equation: human capital in PWT 9.0, 2019); $CS_{i,t}$ an explanatory variable, which measures the infrastructure of a nation (2011 USD); and $TB_{i,t}$ is an explanatory variable, which measures the monetary value of the net exports of a nation as a share of $RGDP$, where: $TB_{i,t} = \frac{Exports - Imports}{RGDP}.100$.

<p style="text-align:center">**Table 2:** Descriptive Statistics of Variables (1950 – 2014)</p>

Variables	$RGDP_{per\ capita_{ppp_{i,t}}}$	$HC_{i,t}$	$CS_{i,t}$	$TB_{i,t}$
Mean	196112	1.96	814383.10	-0.03
Median	419923.58	1.91	127792.50	-0.02
Maximum	3080764	3.05	13311433	0.43
Minimum	1328.68	1.22	6753.31	-0.40
Standard Dev.	402363.1	0.45	1798829	0.10

Source: (PWT, 2019)
Author's calculation

Model Specification

The theoretical structure of the study is based on the endogenous growth theory. The model supports the conclusion that an essential factor for economic growth is the accumulation of knowledge in the form of human capital. ((Mankiw et al., 1992), (Romer, 1989, 1990, & 1994), modeled the production as a function of human capital (HC) physical capital (PC), technology (T), and labor (L) in their growth theory. Holland et al. (2013) explained the production function in the same way. Based on the following literature, our $HC_{i,t}$ using the Augmented Solow Growth Model ($ASGM$) is as follows:

$$Y_t = AH^\alpha K_t^\beta L^\gamma \tag{2}$$

where Y_t is output, H is human capital, K is physical capital, L is labor, A is technology, and the parameters α, β, and γ messages the return to scale. $0 < \alpha, \beta, \gamma < 1$. Restating in per capita terms:

$$\frac{Y}{L} = A \left(\frac{H}{L}\right)^\alpha \left(\frac{K}{L}\right)^\beta \equiv y_t \equiv Ah^\alpha k^\beta \tag{3}$$

To operationalize equation (3), we define the total factor productivity (A) as

$$A = f(T_i) = T_t^\delta \tag{4}$$

Substituting equation (3) into (4) and taking the natural log, we get:

$$lny_t = \beta_0 + \alpha lnh_t + \beta lnk + \delta lnT_t \tag{5}$$

To create the study's econometric-equation; the theoretical model was transformed into an empirical by using $RGDP_{per\ capita_{ppp_{i,t}}}, HC_{i,t}, CS_{i,t}$, and $TB_{i,t}$ to represent y_t, h_t, k_t, and T_t where y_t is $RGDP_{per\ capita_{ppp_{i,t}}}$, h is $HC_{i,t}$; k is $CS_{i,t}$; and T is $TB_{i,t}$.

The econometrics equation is given as

$$lny_{i,t} = \beta_0 + \alpha HC_{i,t} + \beta lnCS_{i,t} + \delta TB_{i,t} + \varepsilon_{i,t} \tag{6}$$

where $\varepsilon_{i,t}$ = error term.

The Vector Error Correction Model (VEC) was employed in this study as the estimation technique. This technique was selected because it allows the exploration of the causal relationship between human capital and economic growth. The Vector Autocorrection has four steps one, the panel unit root test, which determines the stationarity of our data Using the (Levin–Lin–Chu (LLC), 2002), Breitung and Das (Breitung), 2005), and (Im–Pesaran–Shin (IPS), 2003) were implemented. The LLC test is based on the Augmented Dickey-Fuller (ADF) analysis, which assumes homogeneity in the dynamics of the autoregressive coefficients for all panel units with cross-sectional independence. The LLC equation is as follows:

$$\Delta X_{int} = \zeta_i + \eta_i X_{in,t-1} + \theta_i t + \sum_{j=1}^{k} \lambda_{ij} X_{i,t-j} + \mu_{ijt} \tag{7}$$

where: i is an index of variables: $RGDP_{per\ capita_{i,t}}, HC_{i,t}, CS_{i,t}$, and $TB_{i,t}$; t is a time index from 1950 to 2014; n is a country index running across 14 LAC; Δ is the first difference operator; X_{it} is $lnHC_{i,t}, lnCS_{i,t}$, and $lnTB_{i,t}$; and $\mu_{i,t}$ = the error term disturbance with a variance of σ_i^2.

According to (Levin, Lin, & Chi, 2002), the hypothesis of the stationarity of the panel data is: $H_o: \eta_i = 0$ and $H_1: \eta_i < 0$, where the alternative hypothesis corresponds to X_{it} of being stationary. (Levin, Lin, & Chi, 2002)

also specified another equation as follows, which restricts $\hat{\beta}_i$ while keeping it identical across countries, which substantially increases the power of the test in a panel data.

$$\Delta X_{it} = \nu_i + o_i X_{i,t-1} + \pi_i t + \sum_{j=1}^{\rho} \phi_{ij} \Delta X_{i,t-j} + \psi_{it} \tag{8}$$

In equation (8), it is assumed that: $H_o: o_1 = o_2 = \cdots = o_n = 0$ and $H_1: o_1 = o_2 = \cdots = o_n < 0$, where $t - statistics = t_{\hat{o}}/\sigma(\hat{o})$. Equation (8) equals $\hat{o}$ and its standard error $= \sigma(\hat{o})$.

The Breitung unit root test is based on (Breitung 2000), who developed a pooled panel unit root test that does not require bias correction factors. Table 5 includes the Levin et al. (Levin, Lin, & Chi, 2002), the (Breitung, 2000), and the (Kyung, Pesaran, & Shin, 2003) unit root results.

Step two, the determination of the lag length; given our variables are now rendered stationary, we tested for the existence of a cointegrating relationship and to analyze the cointegration test. The lag length is first determined by using the Lag Selection Criteria (LSC) test. Five lag length selection criteria have been employed in this study to determine the Autoregressive (AR) lag length of our variables. The AR lag length p^1 is unknown and can, therefore, be estimated using the LSC. The analysis would be carried out using the likelihood ratio (LR) test, according to (Sims 1980).

$$LR = (T - c)|\log|\Omega_1| - log|\Omega_2| \tag{9}$$

where T is the sample size; c the total number of parameters estimated in the model; Ω_1 the maximum likelihood estimate of the variance-covariance matrix of the residuals in the Vector Autoregression (VAR) model under the null hypothesis; and Ω_2 is the maximum likelihood estimate of the variance-covariance matrix of the residuals in the VAR model under the alternative hypothesis. The LR test is a chi-square distributed with the degrees of freedom equal to the number of restrictions that are tested.

The FPE is given as

$$FPE(\omega) = \left|\check{\Sigma}(\omega)\right| + \left(\frac{\hat{T}+M_\omega+1}{\hat{T}-M_\omega-1}\right)^2 = \det\left(\frac{1}{N}\sum_i^N e(t,\widehat{\tau_N})\left(e(t,\widehat{\tau_N})\right)^T\left(\frac{1+d/N}{1-d/N}\right) \tag{10}$$

where N is the number of values in the estimates; $e(t)$ is the $ny - by - 1$ vector of prediction error; τ_N is the estimated parameters; and d the number of estimated parameters.

The AIC, according to (Akaike, 1969 & 1974), is given as

$$AIC(\varrho) = \ln\left|\hat{\Sigma}_\varrho\right| + \frac{2k^2 p}{T} \tag{11}$$

where T is the number of observations; k is the dimension of the time series; ϱ is the estimated number of lags; and $\hat{\Sigma}_\varrho$ is the estimated error term covariance matrix.

Shibata (1976) proves that the AIC, in the univariate $AR(p)$ representation, is inconsistent in the sense that, asymptotically, it overestimates the true order with a nonzero probability. In the Schwarz Information Criterion (SIC), according to (Schwarz, 1978), the equation is given as

$$SC(\varrho) = \ln|\hat{\Sigma}_\varrho| + \frac{k^2 \varrho lnT}{T} \tag{12}$$

and the HQC is given as

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[1] In which its current value is dependent on its first ϱ lagged values AR(ϱ).

$$HQC(\varrho) = \ln\left|\hat{\Sigma}_\varrho\right| + \frac{2\varrho k^2 \ln\ln T}{T} \qquad (13)$$

Step three, the Padroni cointegration test using the panel, the Cointegration Test, the Kao Residual Cointegration Test (Kao, 1999), Pedroni Panel Cointegration Test (Pedroni, 2002) (Pedronic, 2004), and Fisher Panel Cointegration Test (Yate & Fisher, 1925) were used. These tests allow various cross-sectional interdependencies, along with other different individual effects, to establish the cointegration. Given that our variables are integrated, of the order one, we then tested for the existence of a cointegration relationship. This was carried out using the Pedroni Cointegration Test, Kao Residual Cointegration Test, and Fisher Panel Cointegration Test. These tests enable us to investigate the long-run relationship between the variables. The Pedroni test allows various cross-sectional interdependencies along with other different individual effects to establish the cointegration. Our study identifies two kinds of test statistics: the pooling residuals within the dimension of the panel and the other without the dimension. The long-run equilibrium equations are as follows:

where Panel V-Statistic: $T^2 N^{3/2} Z_{v\,N,T} \equiv \left(\sum_{i=1}^{N}\sum_{t=1}^{T}\hat{L}_{l1i}^{-2}\hat{e}_{it-1}^2\right)^{-1}$; Panel rho-Statistic: $T\sqrt{N}Z_{p\,N,T-1} \equiv T\sqrt{N}\left(\sum_{i=1}^{N}\sum_{t=1}^{T}\hat{L}_{l1i}^{-2}\hat{e}_{it-1}^2\right)^{-1}\sum_{i=1}^{N}\sum_{t=1}^{T}\hat{L}_{l1i}^{-2}(\hat{e}_{it-1}^2\Delta\hat{e}_{it} - \hat{\lambda}_i)$; Panel PP-Statistic: $Z_{t\,N,T} \equiv \left(\sigma^2 N,T\sum_{i=1}^{N}\sum_{t=1}^{T}\hat{L}_{l1i}^{-2}\hat{e}_{it-1}^2\right)^{-1/2}\sum_{i=1}^{N}\sum_{t=1}^{T}\hat{L}_{l1i}^{-2}(\hat{e}_{it-1}^2\Delta\hat{e}_{it} - \hat{\lambda}_i)$; Panel ADF-Statistic: $Z_{t\,N,T}^* \equiv \left(s_{N,T}^{*2}\sum_{i=1}^{N}\sum_{t=1}^{T}\hat{L}_{l1i}^{-2}\hat{e}_{it-1}^2\right)^{-1/2}\sum_{i=1}^{N}\sum_{t=1}^{T}\hat{L}_{l1i}^{-2}(\hat{e}_{it-1}^*\Delta\hat{e}_{it}^*)$; Group rho-Statistic: $N^{-1/2}\tilde{Z}_{t\,N,T-1} \equiv TN^{-1/2}\sum_{i=1}^{N}\left(\sum_{t=1}^{T}\hat{e}_{it-1}^2\right)^{-1}\sum_{t=1}^{N}(\hat{e}_{it-1}^2\Delta\hat{e}_{it} - \hat{\lambda}_i)$; Group PP-Statistic: $N^{-1/2}\widetilde{Z^*}_t \equiv N^{-\frac{1}{2}}\sum_{i=1}^{N}\left(\sigma_i^2\sum_{t=1}^{T}e_{i,t-1}^{*2}\right)^{-1/2}\sum_{t=l}^{T}(\hat{e}_{it-1}\Delta\hat{e}_{it} - \hat{\lambda}_i)$; and Group ADF-Statistic: $\tilde{Z}_{t\,N,T}^* \equiv \sum_{i=1}^{N}\left(\sum_{t=1}^{T}\hat{s}_i^2\hat{e}_{it-1}^{*2}\right)^{-1/2}\sum_{t=1}^{T}(\hat{e}_{it-1}^*\Delta\hat{e}_{it}^*)$ where λ_i is $\frac{1}{T}\sum_{S+1}^{k_i}\left(1 - \frac{2}{k_i+1}\right)\sum_{t=s+1}^{T}\widehat{\mu_{i,t}}\,\widehat{\mu_i},t - s, s_i^2 \equiv \frac{1}{T}\sum_{t=1}^{T}\hat{\mu}_{i,t}\,\widehat{\sigma_i}^2 = \widehat{s_i^2} + 2\widehat{\lambda_i}, \widehat{\sigma_{N,T}} \equiv \frac{1}{N}\sum_{i=l}^{N}\widehat{L_{u_i}^2}\widehat{\sigma_i^2}; \widehat{S_i^2} \equiv \frac{1}{t}\sum_{t=1}^{T}\widehat{\mu_{i,t}^2}, \widehat{s_{N,T}^{*2}} \equiv \frac{1}{N}\sum_{i=1}^{N}\widehat{s_i^{*2}}, \widehat{L_{l1}^2} = \frac{1}{T}\sum_{t=1}^{T}\widehat{\eta_{i,t}^2} + \frac{2}{T}\sum_{s=1}^{k_i}\left(1 - \frac{s}{k_i+1}\right)\sum_{t=s+1}^{T}\widehat{\eta_{i,t}}\,\widehat{\eta_i}\,t - s$ and where the residuals $\widehat{\mu_{i,t}}$, $\widehat{\mu_{i,t}^*}$, and $\widehat{\eta_{i,t}}$ are obtained from the following regressions: $\widehat{e_{i,t}} = \widehat{\gamma_i}\,\widehat{e_{i,t-1}} + \widehat{\mu_{i,t}}\,\widehat{e_{i,t}} = \widehat{\gamma_i}\widehat{e_{i,t-1}} + \sum_{k=1}^{k_i}\widehat{\gamma_i}\,k\Delta\hat{e}_i,t - k + \widehat{\mu^*i},t, \Delta y_{i,t} = \sum_{m=1}^{M}\widehat{b_{m,i}}\Delta x_{mi,t} + \widehat{\eta_{i,t}}$ (Pedroni, 2002 & 2004).

The Panel V-Stat, Panel rho-Stat, Panel PP-Stat, Panel ADF-Stat, Group rho-State, Group PP-Stat, and Group ADF-Stat are normally and asymptotically distributed (see Table 6).

Step four, the VEC, which estimates the long-run and short-run relationship ((E-view, 2019) (Batchelor, 2018) (Stata, 2019)). The study employed the Fully Modified Ordinary Least Squares ($FMOLS$) technique to determine the coefficients of the long-run relationship between the explained and the explanatory variables. The $FMOLS$ estimates show the cointegration regression by accounting for serial correlation effects and endogeneity in the regression (Phillips, 1995). According to (Pedroni 2002 & 2004), the $FMOLS$ can accommodate considerable heterogeneity across individual members of the panel. (Pedroni, 2002) further stated that the cointegration test determines whether our variables are cointegrated without providing estimated coefficients for individual-variables in the panel.

Table 3: Panel Unit Root Results

	Intercept						Trend and Intercept					
	LLC	IPS	Bretung	LLC	IPS	Bretung	LLC	IPS	Bretung	LLC	IPS	Bretung
Variable	Levels			1st Difference (2nd Difference)			Levels			1st Difference (2nd Difference)		
$RGDP_{per\,capita_{ppp_{i,t}}}$	1.00	1.00	n/a	0.00*	0.00*	n/a	1.00	1.00	1.00	0.00*	0.00*	0.00*
$HC_{i,t}$	0.00**	0.00**	n/a	n/a	n/a	n/a	0.00**	0.00**	0.04**	n/a	n/a	n/a
$CS_{i,t}$	1.00	1.00	n/a	0.00*	0.00*	n/a	1.00	1.00	0.00*	0.00*	0.00*	n/a
$TB_{i,t}$	0.00**	0.00*	n/a	n/a	n/a	n/a	0.00**	0.00*	0.00*	n/a	n/a	n/a

Notes: variables are in real terms
*** indicates significance level at 10%
** indicates significance level at 5%
*indicates a significance level at 1%.
Source: Author's calculation

Table 4: Lag Length Selection Criteria Test

Lag	LogL	LR	FPE	AIC	SIC	HQC
0	-1838.11	NA	0.0007	4.13	4.15	4.13
1	2858.91	9341.44	2.04e-08	-6.36	-6.25*	-6.32
2	2902.01	85.34*	1.92e-08*	-6.42*	-6.23	-6.34*
3	2909.60	14.95	1.95e-08	-6.40	-6.12	-6.29
4	2917.86	16.21	1.99e-08	-6.38	-6.02	-6.24
5	2924.95	13.85	2.03e-08	-6.36	-5.91	-6.19
6	2930.96	11.69	2.07e-08	-6.34	-5.80	-6.14
7	2935.49	8.77	2.13e-08	-6.31	-5.69	-6.08
8	2940.79	10.21	2.18e-08	-6.29	-5.58	-6.02

*Indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQC: Hannan-Quinn information criterion
Source: Author's calculation

Table 5: Pedroni Panel Cointegration Test

Panel Group Statistics	Statistic	Prob
Panel V-Statistic	-1.17	0.43
Panel rho-Statistic	2.42	0.98
Panel PP-Statistic	-1.84	0.00***
Panel ADF-Statistic	-1.84	0.00***
Group rho-Statistic	2.62	2.00
Group PP-Statistic	-3.61	0.00***
Group ADF Statistic	-3.55	0.00***

* indicates significance at 10%
** indicates significance at 5%
*** indicates significance at 1%
Source: Author's calculation

.

Table 6*:* Kao Residual Cointegration Test

	T-Statistic	Prob
ADF	-1.97	0.02**

* indicates significance at 10%
** indicates significance at 5%
*** indicates significance at 1%
Source: Author's calculation

.

Table 7*:* Fisher Panel Cointegration Test

	Stat	Prob
None*	129.5	0.00***
At most 1*	53.20	0.00***
At most 2*	29.46	0.11
At most 3*	20.25	0.86

* indicates significance at 10%
** indicates significance at 5%
*** indicates significance at 1%
Source: Author's calculation

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Table 8: Results of Long-term Coefficient
Estimates by FMOLS

Variables	Model
$HC_{i,t}$	0.21
	(0.00)***
$CS_{i,t}$	0.13
	(0.00)***
$TB_{i,t}$	-0.43
	(0.004)***
R-squared	36%
(Adj-R)	36%

Note
p-value in parenthesis
* indicates significance level at 10%
** indicates significance level at 5%
*** indicates significance at 1%
Source: Author's calculation

Results

From Table 3, we find that $RGDP_{per\ capita_{ppp_{i,t}}}$ and $CS_{i,t}$ are non-stationary at level terms. Hence, we fail to reject the null hypothesis indicating that the variables contain a unit root. However, after the first order differentiation, the test statistic shows that we can reject the null hypothesis of non-stationarity for $RGDP_{per\ capita_{ppp_{i,t}}}$ and $CS_{i,t}$ at the 1% significant level while $HC_{i,t}$ and $TB_{i,t}$ were stationary at level terms. Hence, we rejected the null hypothesis of non-stationarity at the 1% significant level.

Table 4 shows the lag length selection results. Out of the five statistics, four—LR, FPE, AIC, and HQC—indicate a lag length of two, while SIC suggested a lag length of one. Therefore, the study selected two lag lengths, viewing the loss of efficiency, which is less of an issue than bias. Tables 5, 6, and 7 show that we can reject the null hypothesis of no cointegrating relationship between our variables. Hence, the Pedroni, Kao, and

Fisher's cointegration tests provide a benchmark for the existence of a panel cointegration between our explained and explanatory variables in the study.

Table 8 shows a positive, statistically significant long-run relationship between $RGDP_{per\ capita_{ppp_{i,t}}}$ and $HC_{i,t}$ with a coefficient of 0.21. This indicates that a 1% increase in $HC_{i,t}$ is associated with a 0.21%-point increase in $RGDP_{per\ capita_{ppp_{i,t}}}$ in our LAC. $HC_{i,t}$ implies that there is an incentive for a nation to improve its citizens' skill-set, knowledge, and innovative ideas. This improvement will lead to the creation of new jobs, an increase in productivity, an increase in the disposable income of employees, and an increase in the consumption of consumer goods and services. This result indicates that the incentive to improve the $HC_{i,t}$ index of a nation would yield a positive result as it translates to an increase in $RGDP_{per\ capita_{ppp}}$. This result is consistent with (Edrees, 2016), (Mehrara & Musai, 2013), (Khembo & Tchereni, 2013), (Rahman, 2011), and (Sharma & Sahni, 2015).

$CS_{i,t}$ was used as a proxy for domestic investment in private and public infrastructures. It showed a positive, statistically significant result with a coefficient of 0.13. This implies that a 1% increase in the $CS_{i,t}$ is associated with a 0.13%-point increase in $RGDP_{per\ capita_{ppp_{i,t}}}$ in our LAC and should increase their investments in the nation's plants and infrastructures. This will lead to the creation of new jobs in the construction sector of their economies, which will lead to an increase in disposable income of the construction worker, which in turn, will lead to an increase in the consumption of more consumer goods and services in the economy, which will increase sales and have a positive impact on the economy. The results indicate that in our LAC, domestic investment, plants, and good infrastructures contribute significantly to the growth of the economy in terms of $RGDP_{per\ capita_{ppp_{i,t}}}$.

$TB_{i,t}$ is a percentage of $RGDP$ (see Table 2) and has a negative and statistically significant long-run relationship with $RGDP_{per\ capita_{ppp_{i,t}}}$. A 1% increase in $TB_{i,t}$ decreases $RGDP_{per\ capita_{ppp_{i,t}}}$ by 0.43%-point. This implies that a negative trade balance affects economic growth in our LAC: an increase in TB will negatively affect the economic growth of the LAC. These countries are net importers of consumer goods and services; hence, these countries should substitute their current economic policy of importing consumer goods and services from the international market to importing more capital goods ($CS_{i,t}$-materials) and services ($HC_{i,t}$). This consumption shift will increase the nations' opportunities for exporting more consumer goods and services in the future in the international market and improve their country's $RGDP_{per\ capita_{ppp_{i,t}}}$.

The study of causal relationships among economic variables has been one of the main objectives of empirical econometrics. According to (Engle & Granger, 1987), cointegrated variables must have an error correction representation. One of the implications of the Granger representation theorem is that if non-stationary series are cointegrated, then one of the series must GC the other (Gujarati et al., 2012). To examine the direction of GCR in the presence of cointegrating vectors, GC is conducted based on the following specifications:

$$\begin{pmatrix} \Delta lnRGDP_{per\ capita_{ppp_{i,t}}} \\ \Delta HC_{i,t} \\ \Delta lnCS_{i,t} \\ \Delta TB_{i,t} \end{pmatrix} = \begin{pmatrix} \emptyset_{i,1} \\ \emptyset_{i,2} \\ \emptyset_{i,3} \\ \emptyset_{i,4} \end{pmatrix} + \sum_{l=1}^{m} \begin{pmatrix} \theta_{1,2,3,4,k} \\ \theta_{2,1,3,4,k} \\ \theta_{3,1,2,4,k} \\ \theta_{4,1,2,3,k} \end{pmatrix} \begin{bmatrix} \Delta lnRGDP_{per\ capita_{ppp_{i,t-l}}} \\ \Delta HC_{i,t-l} \\ \Delta lnCS_{i,t-l} \\ \Delta TB_{i,t-l} \end{bmatrix} + \begin{pmatrix} \lambda_1 \\ \lambda_2 \\ \lambda_3 \\ \lambda_4 \end{pmatrix} ECT_{i,t-1} +$$

$$\begin{pmatrix} \varphi_{1,i,t} \\ \varphi_{2,i,t} \\ \varphi_{3,i,t} \\ \varphi_{4,i,t} \end{pmatrix} \tag{14}$$

where Δ = the first differences, $\emptyset_{i,j}(j,k=1,2)$ = the fixed country effect, $I(I=1,...m)$ = the lag length determined by SIC, $ECT_{i,t-1}$ = the estimated lagged error correction term (ECT) derived from the long-run

cointegrating relationship, λ_i = the adjustment coefficient, and $\emptyset_{1,I,t}$ = the disturbance term, which is assumed to have a zero mean.

Table 9: The estimate of the Panel Vector Error Correction Model Explanatory Variables – Chi-square value (Wald test)

	$RGDP_{per\,capita_{ppp_{i,t}}}$	$HC_{i,t}$	$CS_{i,t}$	$TB_{i,t}$	ECT (-1) [t-Test]
$RGDP_{per\,capita_{ppp_{i,t}}}$		0.00 (0.99)	0.05 (0.95)	9.33 (0.00)***	-0.013 [-2.63]
$HC_{i,t}$	3.27 (0.04)**		2.05 (0.12)	5.43 (0.00)***	-0.05 [-1.95]
$CS_{i,t}$	2.92 (0.05)**	1.06 (0.35)		4.73 (0.00)***	-0.03 [-1.15]
$TB_{i,t}$	1.39 (0.25)	4.91 (0.00)***	5.13 (0.00)***		-0.01 [-5.31]

*indicates significance level at 10%
** indicates significance level at 5%
*** indicates significance at 1%
Source: Author's calculation

Table 9 and 10 shows our estimates indicate a significant unidirectional GCR between $RGDP_{per\,capita_{ppp_{i,t}}} \rightarrow HC_{i,t}$, $RGDP_{per\,capita_{ppp_{i,t}}} \rightarrow CS_{i,t}$, and $RGDP_{per\,capita_{i,t}} \leftarrow TB_{i,t}$. and a bidirectional GCR between $HC_{i,t} \leftrightarrow TB_{i,t}$, and $CS_{i,t} \leftrightarrow TB_{i,t}$. The unidirectional causality link between $RGDP_{per\,capita_{ppp_{i,t}}} \rightarrow HC_{i,t}$ implies that when an individual or nation invests in $HC_{i,t}$ (training people). It takes time to see any return on one's investment. Example, in training an individual to become a world-class/skilled researcher or economist, it will take 12 years of formal education and 2–4 years of post-doctoral training (optional), then the individual will need to have a minimum of 5 years of industrial experience or more in some cases before the country/economy can reap the benefits of the initial investment in $HC_{i,t}$. The unidirectional causality link between $RGDP_{per\,capita_{ppp_{i,t}}} \rightarrow CS_{i,t}$ implies that when a country invests in the construction of infrastructure, it takes time for these projects to be completed, such as the case of new roads, railways, dams with hydro-electric generators, and airports. These projects will take a minimum of 6–10 years before the nation can use them at an optimal level. The unidirectional causality link between $RGDP_{per\,capita_{ppp_{i,t}}} \leftarrow TB_{i,t}$ shows that these LAC are heavily dependent on the importation of consumer goods and services. The bidirectional is $HC_{i,t} \leftrightarrow TB_{i,t}$ and $CS_{i,t} \leftrightarrow TB_{i,t}$, which implies that our LAC is lacking in $HC_{i,t}$ and $CS_{i,t}$; hence, their importation on consumer goods and services is high. So, these countries need to increase their import of more capital goods, $HC_{i,t}$ (skilled expatriate) and $CS_{i,t}$ (raw-materials). Increased importation of $HC_{i,t}$ will translate into $HC_{i,t} \uparrow$ — productivity $\uparrow$ — exportation of consumer goods and services $\uparrow$ — importation of consumer goods and services $\downarrow$. Likewise, if $CS_{i,t} \uparrow$ — productivity $\uparrow$ — exportation of consumer goods and services $\uparrow$ — importation of consumer goods and services $\downarrow$. This implies that the variation in $RGDP_{per\,capita_{ppp_{i,t}}}$ is useful in predicting the variation in $HC_{i,t}$ and $CS_{i,t}$, while the variation in $TB_{i,t}$ is useful in predicting the variation in $RGDP_{per\,capita_{ppp_{i,t}}}$. In a bidirectional causality, the variation in the two variables is useful in predicting the variation in the other.

Table 10: Summary of Main Findings of Short-run Causality

Variables	Direction of Causality	Implication
$RGDP_{per\ capita_{ppp_{i,t}}} \rightarrow HC_{i,t}$	Unidirectional	Granger causality runs from $RGDP_{per\ capita_{ppp_{i,t}}}$ to $HC_{i,t}$
$RGDP_{per\ capita_{ppp_{i,t}}} \rightarrow CS_{i,t}$	Unidirectional	Granger causality runs from $RGDP_{per\ capita_{ppp_{i,t}}}$ to $CS_{i,t}$
$RGDP_{per\ capita_{ppp_{i,t}}} \leftarrow TB_{i,t}$	Unidirectional	Granger causality runs from $TB_{i,t}$ to $RGDP_{per\ capita_{ppp_{i,t}}}$
$HC_{i,t} \leftrightarrow TB_{i,t}$	Bidirectional	Granger causality runs from $HC_{i,t}$ to $TB_{i,t}$ vice versa
$CS_{i,t} \leftrightarrow TB_{i,t}$	Bidirectional	Granger causality runs from $CS_{i,t}$ to $TB_{i,t}$ vice versa

↔ indicates causality running in both direction
→ indicates causality from left to right
← indicates causality from right to left
↑ increase
↓ decrease
━ leads too
Source: Author's Calculation

Summary Statement, Conclusion, and Educational Policy Recommendations

The results contained in Table 9 support the long-term GC between our explained and explanatory variables in all the selected countries, while the short-run GC results from our variables can be found in Table 10. Our results imply that $HC_{i,t}$ does not GC $RGDP_{per\ capita_{ppp_{i,t}}}$ to increase in the short-run, while in the long-run, it does GC economic growth in the respective countries. Given the results obtained, the importance of $HC_{i,t}$ in boosting economic growth can't be overemphasized. Also, $CS_{i,t}$ does not GC $RGDP_{per\ capita_{ppp_{i,t}}}$ to increase in the short-run while in the long-run, it does GC economic growth in the respective countries. On the other hand, $TB_{i,t}$ does GC $RGDP_{per\ capita_{ppp_{i,t}}}$ to increase both in the short-run and long-run.

This study investigates the GCR between $HC_{i,t}$ and economic growth in LAC. The study employs a time series annual data between 1950–2014 for a panel of 14 LAC: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Honduras, Mexico, Nicaragua, Panama, Peru, El Salvador, Uruguay, and Venezuela. The data was collected from (PWT, 2019).

The empirical findings reveal that after controlling for $CS_{i,t}$, $TB_{i,t}$, $HC_{i,t}$, and $RGDP_{per\ capita_{ppp_{i,t}}}$, there is a positive statistically significant long-run relationship between $RGDP_{per\ capita_{ppp_{i,t}}}$ and $HC_{i,t}$ with a coefficient of 0.21. This indicates that a 1%-point increase in $HC_{i,t}$ will lead to a 0.21%-point increase in $RGDP_{per\ capita_{ppp_{i,t}}}$ in the LAC. This result indicates that the incentive to improve the HDI of a nation would yield a positive outcome as it translates to an increase in $RGDP_{per\ capita_{ppp_{i,t}}}$. This result is consistent with (Edrees, 2016), (Mehrara & Musai, 2013), (Khembo & Tchereni, 2013), (Rahman, 2011), (Sharma & Sahni, 2015) and (Osiobe, 2020) which is a similar vein study that analyzes relationship among $RGDP_{per\ capita_{ppp_{i,t}}}$ (as a proxy for economic growth) and the examined variable, $SGE_{i,t}$, ((Secondary School Government Expenditure) as a proxy for human capital), and $VT_{i,t}$ (Trade Volume) as the explanatory variables between 2000-2014. The study preceded this paper with less countries analyzed (excluding Bolivia, Honduras, Nicaragua, Panama, Uruguay, and Venezuela).

$CS_{i,t}$ was used as a proxy for domestic investment in private and public infrastructures. It showed a positive, statistically significant result with a coefficient of 0.13. This implies that a 1%-point increase in the $CS_{i,t}$ will lead to a 0.13%-point rise in $RGDP_{per\ capita_{ppp_{i,t}}}$ in the LAC. The results indicate that in our LAC, domestic

investment, plants, and excellent infrastructures contribute significantly to the growth of the economy in terms of $RGDP_{per\ capita_{ppp_{i,t}}}$. The $TB_{i,t}$ has a negative and statistically significant long-run relationship with $RGDP_{per\ capita_{ppp_{i,t}}}$. A one percentage point increase in $TB_{i,t}$ causes a decrease in $RGDP_{per\ capita_{ppp_{i,t}}}$ by 0.43%-point. This implies that a negative $TB_{i,t}$ affects economic growth in the LAC.

Our results also indicate a significant causal link between $RGDP_{per\ capita_{ppp_{i,t}}}$ and $HC_{i,t}$ with a unidirectional a GCR, moving from $RGDP_{per\ capita_{ppp_{i,t}}}$ to HC. $RGDP_{per\ capita_{ppp_{i,t}}}$ and $CS_{i,t}$ with a unidirectional GCR, moving from $RGDP_{per\ capita_{ppp_{i,t}}}$ to $CS_{i,t}$, and $RGDP_{per\ capita_{ppp_{i,t}}}$ and $TB_{i,t}$ with a unidirectional GCR, moving from $TB_{i,t}$ to $RGDP_{per\ capita_{ppp_{i,t}}}$. While a bidirectional significant GCB can be found between $HC_{i,t}$ and $TB_{i,t}$, and, $CS_{i,t}$ and $TB_{i,t}$. The results imply that the variation in $RGDP_{per\ capita_{ppp_{i,t}}}$ is useful in predicting the variation in $HC_{i,t}$ and $CS_{i,t}$, while the variation in $TB_{i,t}$ is useful in predicting the variation in $RGDP_{per\ capita_{ppp_{i,t}}}$. In a bidirectional causality, the variation in the two variables is useful in predicting the variation in the other.

Further studies need to be examined using different methodologies to investigate the effect of how spending in education translates to higher economic growth, community development, and higher productivity. Notwithstanding, specific government spending on different tiers of education (primary, secondary, and higher education) needs to be investigated.

Although the study doesn't find a direct GCR moving from, $HC_{i,t} \rightarrow RGDP_{per\ capita_{ppp_{i,t}}}$, there is an indirect causal relationship between our variables of interest. This association is the bidirectional GCR between $HC_{i,t} \leftrightarrow TB_{i,t}$. The relationship exists because $TB_{i,t}$ is an explanatory factor of $GDP \equiv RGDP \equiv RGDP_{per\ capita} \equiv RGDP_{per\ capita_{ppp}} \equiv RGDP_{per\ capia_{ppp_{i,t}}}$ in this study and $TB_{i,t}$ is derived from net exports. The result supports the long-term GCR between our explained and explanatory variables in all of the LAC. Meanwhile, the short-run GC results from our variables can be found, and our results imply that $HC_{i,t}$ does not GC $RGDP_{per\ capita_{ppp_{i,t}}}$ to increase in the short-run, while in the long-run, it does GC economic growth in the respective countries. Given these results obtained, the importance of $HC_{i,t}$ in boosting economic growth confirmed our sample. Also, $CS_{i,t}$ does not GC $RGDP_{per\ capita_{ppp_{i,t}}}$ to increase in the short-run, while in the long-run, it does GC economic growth in the respective countries. On the other hand, $TB_{i,t}$ does GC $RGDP_{per\ capita_{ppp_{i,t}}}$ to increase both in the short-run and long-run. This study provides information that will serve as a guide for future studies, as well as the formulation and implementation of short- and long-term development goals of the Latin American region (not limited to the selected countries).

The policy implications of this research involve the following: first, Our Latin America study sample should provide incentives that would foster, attract, and retain public and private investment in $HC_{i,t}$ development and educational advancement in the region. These incentives should be regulated at the regional level under the umbrella of a decentralized governing body for each country. Second, a legal framework regulating government expenditure on education and the educational sector in the region should be strengthened. This will create a conducive learning environment for both the students and teachers.

Acknowledgments

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Handling Bad Debt of Credit Institutions – Experience from Vietnam Asset Management Company (VAMC)

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Abstract
Due to the impact of the global financial crisis, since 2010 Vietnam's economy began to decline, production and business activities of enterprises faced many difficulties leading to bad debt ratios at credit institutions tend to rise and having complicated movements. In order to stabilize the situation, in 2013, the State Bank established the Vietnam Asset Management Company (VAMC). VAMC's activities have brought about certain results in resolving bad debts of credit institutions. This study focuses on VAMC's bad debt handling activities from 2013 to 2018, draws on successful experiences as well as restrictions and recommends some recommendations to enhance bad debt handling efficiency of VAMC

Keywords: Bad Debts, Credit Institution, Debt Buying, Handling Bad Debts, Bad Debt in the Economy

1. Introduction

1.1. The context of bad debts at credit institutions in Vietnam in the period of 2013-2019

The bad debts at credit institutions are loans that have been due but have not been fully repaid and are overdue for more than 90 days after the due date of repayment. The system of credit institutions in Vietnam includes banks, non-bank credit institutions, microfinance institutions, and people's credit funds. By the end of 2018, the total bad debt of the whole system was VND 168.5 trillion, up 14.6% compared to the end of 2017; bad debt ratio was at 2.13%, compared to 1.99% at the end of 2017. In the whole system, there were still many credit institutions with a bad debt ratio of over 3% and the scale of bad debts were large. According to statistics of the State Bank, there were 27 credit institutions with an internal bad debt ratio of over 3%, including 8 commercial banks; 16 finance and financial leasing companies; 01 joint-venture bank and 02 foreign bank branches, of which were mainly weak credit institutions and were in the process of restructuring. The total bad debts of these 27 credit institutions stood at VND 69.6 trillion, accounting for 42% of the system's total bad debt (VAMC, 2018).

Regarding the debt group structure, among the bad debt groups from group 3 to group 5, of which group 5 debt has the highest proportion, accounting for 69% of the total bad debt. By the end of 2018, group 5 debt increased to 13% compared to 2017, with a total value of VND 115.65 trillion. Group 4 debt increased by 9.6% compared to the end of 2017, accounting for 14% of the total bad debt, with a total value of VND 23.17 trillion. Group 3 debt grew up by about 30% over the end of 2017, accounting for 17% of the total bad debt, with a total value of VND 26.68 trillion (VAMC, 2018).

In terms of collateral structure, 90% of bad debts are secured by assets with various types of collaterals such as real estate, machinery, valuable papers, etc., only 10% of the remaining bad debts have no collaterals. Through the above-mentioned statistics data, it can be seen that there are existing a relatively large number of bad debts in the whole system of credit institutions in Vietnam, the bad debts are mainly secured assets. This amount of bad debt, on the one hand, is a burden for the economy as well as the system of credit institutions but it is also a relatively abundant supply for the bad debt trading market in Vietnam and the need to buy and sell bad debts always exists. To deal with bad debts of credit institutions, macroeconomic stability, in 2013, the State Bank established the Vietnam Asset Management Company (VAMC).

1.2. Vietnam Asset Management Company (VAMC).
Vietnam Asset Management Company (VAMC) was established under the Decision No. 1459/2013/QD-NHNN dated June 27, 2013, of the State Bank of Vietnam, the State owns 100% of charter capital and is subject to the management, inspection, and supervision of the State Bank. Accordingly, VAMC had an initial charter capital of VND 500 billion, operating with non-profit purposes, using two main financial sources to handle non-performing loans, namely: charter capital allocated by State Bank and capital issue special bonds to buy bad debts from credit institutions.

VAMC's mission is to focus on handling bad debts of credit institutions which have a bad debt ratio of over 3% of total debt and bad debt with collaterals, especially assets secured by real estate. VAMC can buy and sell bad debts with special bonds or at the market prices.

1.2.1. VAMC buys and sells bad debts with special bonds
Special bonds are valuable papers with a term of 5 years from the date of issuance, with no interest payment and no payment value when they are due, being issued by VAMC to buy bad debts from credit institutions. A special bond is issued corresponding to one bad debt. Special bonds are valuable documents that can be used for refinancing at the State Bank. After 5 years, if the bad debt is not handled, this bad debt will be returned to the credit institution.

The bad debts of credit institutions are purchased by VAMC when meeting the following conditions:

1. *The debts must be bad debts* including bad debts in lending credit activities; Purchase of corporate bonds not yet listed on the stock market or not registered for trading on the market of unlisted public companies; The entrusted purchase of unlisted corporate bonds, entrusted credit for which the credit institution that sells the debt bears the risk of overdue payment of part or all of the principal and interest of 90 days or more; or overdue for less than 90 days but the bond-issuing enterprise, the trustee and the beneficiary of the trust have bad debts at that credit institution.
2. *Bad debts with secured assets;*
3. *Bad debts and collaterals of bad debts must be lawful and have valid documents.*

The purchase price of debts by special bonds is determined as follows:

Face value of special bonds = principal balance sheet value - risk provision

After buying debts with special bonds, VAMC does not directly handle bad debts but authorizes settlement for credit institutions. VAMC plays a leading and coordinating role with credit institutions in drastically

implementing debt settlement solutions in order to accelerate the debt recovery process, actively supporting credit institutions in initiating lawsuits and enforcing judgments, seizing collaterals and making debt auction.

For credit institutions, selling bad debts to VMAC and receiving special bonds, credit institutions only make a provision of 20% per year for the number of bonds received instead of having to set up risk provisions credit for these bad debts at 20%, 50%, and 100% - corresponding to debt groups 3, 4 and 5, and, at the same time, special bonds can be used for mortgage or refinance capital from the State Bank. By transferring bad debts to VAMC, credit institutions can reduce the bad debt burden, gain additional capital, have more time and support to handle and recover bad debts. When a bad debt is settled, the special bond of that debt will be returned to VAMC at the purchase price.

1.2.2. Trading bad debts at market value

VAMC can use its charter capital to buy back bad debts at market value. Bad debts are purchased by VAMC at market value when fully meeting the following conditions:

- Bad debts meet the same conditions as those purchased by special bonds;
- Being assessed by VAMC to be capable of fully recovering the debt purchase amount;
- The collateral of bad debts is likely to be sold;
- Borrowers have prospects of repayment or have feasible repayment plans.

When buying bad debts at market value, VAMC must do self-assessment or hire an organization with an independent valuation function to determine the value of purchased bad debts at market prices; set up a plan to buy bad debts at market prices, submit them to the State Bank and obtain approval from the State Bank. After purchasing bad debts at market value, VAMC will directly manage and handle these bad debts through such forms as seizing collateral, completing legal procedures related to collateral and debts; introduction and offer to sell the debts or collaterals; organize auctions/competitive offers/negotiate debt and collaterals to recover debts; urge and support customers to pay their debts.

2. The activities handling bad debts of VAMC

2.1. Buying bad debt by special bonds

From 2013 to 2017, VAMC focused on buying debts with special bonds. Accumulated from its inception to December 31, 2017, VAMC has purchased special bonds with 26,274 debts of 16,835 customers at 42 credit institutions, with a total of the principal balance loan of VND 309,711 billion, the debt purchase price is 279,255 billion dongs.

In 2019, VAMC purchased debt paid by special bonds of 381 debts, reaching VND 20,544 billion in the principal balance with the debt purchase price of VND 19,846 billion, reaching 99% of the plan approved by the State Bank at the beginning of the year. Accumulated to the end of December 31, 2019, VAMC has purchased bad debts with special bonds to reach 359,393 billion dongs of internal principal debt with the debt purchase price of 327,413 billion dongs.

Table 1: The numeral of debt buying by special bonds until 2019

Criteria	Unit	Accumulated to 31/12/2018	2019	Accumulated to 31/12/2019
Amount of the debt	Debt	26,982	381	**27,363**
Principal balance loan	Billion dongs	338,849	20,544	**359,393**
Debt purchase price	Billion dongs	307,567	19,846	**327,413**

Source: Summary report of VAMC's 2019 activities

Most of the debts bought by special bonds, VAMC authorized the entire management, debt settlement for credit institutions to actively implement. VAMC plays a leading role and closely coordinating with credit institutions in the implementation process, especially the seizure of collaterals, completing legal procedures related to

collaterals and debts, looking for investors to sell collaterals, debts, and procedures related to lawsuits and judgment execution.

Processing and recovering debts purchased with special bonds, as of 2019, VAMC has settled 163,868 billion dongs of special bonds, debt collection reached 125,796 billion dongs. In the period of 2016-2019, more than 50% of bad debts that credit institutions sold to VAMC by special bonds were recovered, contributing to significantly reducing the bad debt ratio at credit institutions. In particular, in 2017, VAMC has collected 30,852 billion dongs, an increase of nearly 2,000 billion dongs compared to 2016, exceeding the plan by 40%.

Table 2: Results of handling debts purchased with special bonds from 2013 to 2019

No.	Criteria	Unit	2013	2014	2015	2016	2017	2018	2019	Accumulated
1	Amount of the debt	Debt	1,514	8,644	14,310	1,241	565	708	381	27,363
2	Debt purchase price	Billion dongs	30,947	77,198	99,243	40,036	31,831	32,631	19,846	331,732
3	The total amount of debt handling	Billion dongs	146	4,875	17,142	28,853	30,852	37,250	125,796	244,914
4	Debt handling ratio	%	0.47	6.31	17.27	72.07	96.92	114.16	633.86	73.83

Source: Summary of the authors' group from VAMC's annual report

Based on the summary data in Table 2, it can be seen that VAMC's debt handling has been promoted since 2017 after the National Assembly's Resolution No. 42/2017 / QH14, VAMC was more autonomous in its operations and receive the support of the State Bank and authorities in the process of debt settlement. Therefore, the debt settlement result in VAMC increased rapidly from 97% in 2017 to 633% in 2019. During the period of 2013-2019, VAMC's debt settlement result reached 73.83%.

2.2. Buying debt at market value

In 2017 was the first year VAMC successfully implemented debt purchasing activities at market value at 05 credit institutions, with the total debt purchase price of VND 3,141 billion and total principal outstanding of VND 2,938.6 billion, reaching 100% of market debt purchase plan in 2017 approved by the State Bank (VAMC, 2018).

In 2019, thanks to an increase of the charter capital of VND 500 billion, VAMC has signed contracts with 04 credit institutions to buy debt at market value for 16 customers of 37 debts with a total purchase price of VND 2,247 billion, reaching 112% of the market debt purchase plan approved and adjusted by the State Bank (Nhung, 2020).

Accumulated from 2017 to the end of December 31, 2019, VAMC has purchased bad debts at the market value of VND 8,013 billion with the original principal balance of debt with the purchase price of VND 8,207 billion.

Table 3: The numeral of debt buying at market value until 2019

Criteria	Unit	Accumulated to 31/12/2018	2019	Accumulated to 31/12/2019
Amount of the debt	Debt	46	37	83
Principal balance loan	Billion dongs	5,882	2,131	8,013
Debt purchase price	Billion dongs	5,960	2,247	8,207

Source: Summary report of VAMC's 2019 activities

Debts purchased at market value, VAMC directly manages and handles debt, not authorizing credit institutions to sell debts. Accordingly, VAMC has actively implemented the full debt management process, urged, recovered debts from customers, carried out procedures for handing over, seizing, and valuing ... to deploy the handling plan debt recovery. After buying debt at market value, VAMC has immediately implemented appropriate debt settlement solutions such as regularly urging customers to pay debts, applying debt restructuring, seizing and selling collaterals by auction or agreements; assisting the buyers in completing legal procedures related to project transfer to recover debts. As a result, in the first year of buying debt at market value, VAMC has basically recovered the debt purchase amount with the total amount recovered from the debt purchased at the market value of VND 2,641 billion compared to VND 3,141 billion debt purchased. In 2019, VAMC has recovered bad debts bought at the market value of VND 1,630 billion. Accumulated to December 31, 2019, VAMC has recovered bad debts purchased at the market value of VND 5,178 billion out of VND 8.013 billion of debt purchase, reached 64.61%. Also in 2019, VAMC has organized many successful auctions with a total winning price of nearly VND 831 billion, the total value of assets sold exceeded the starting price of VND 3.15 billion.

3. Experiences from VAMC's activities

The results of dealing with bad debts have shown that VAMC is an effective and feasible tool to handle bad debts, contributing to settling bad debts for the credit institution system, solving difficulties for businesses, and creating conditions for the enterprise to recover. Besides, VAMC strengthens financial health, especially in facilitating and promoting credit expansion to the economy safely and effectively.

VAMC uses a special bond tool to buy bad debts, in essence, to keep bad debts for credit institutions, helping these credit institutions to have opportunities, resources and time to resolve bad debts. VAMC's purchase of bad debts by special bonds has achieved certain results in recent years, contributing to the handling of bad debts quickly, bringing the bad debts ratio to below 3%, ensuring the safety of the banking system, creating conditions for credit institutions to have more capital to supply the economy and restructure for surviving and development However, through the handling of NPLs of VAMC, there is a number of limitation issues as follows.

Firstly, VAMC buys bad debts by special bonds, in fact, VAMC is only a place to store bad debts for a time to help credit institutions reduce the pressure of provisioning without being able to direct financial supplement for credit institutions, so the process of dealing with bad debts is only technical and its effectiveness is limited.

Secondly, after acquiring bad debts with special bonds, VAMC does not directly handle bad debts but authorizes credit institutions to directly handle them, VAMC only supports the procedures for seizing and selling collaterals. Thus, the handling of purchased debts of VAMC is still quite passive and depends on the activeness of credit institutions.

Thirdly, VAMC's chartered capital is only VND 500 billion initially, and be added another VND 500 billion in 2019, making it difficult to meet bad debt acquisition activities at market prices, limiting the ability to handle bad debts of VAMC.

Fourthly, although buying debt by special bonds or buying at market value but the implementation of VAMC's right to seize, transfer, mortgage collaterals still face many difficulties. Many mortgage contracts do not specify and not all bad debts can be secured collateral; The transfer of real estate projects without land-use certificates still faces many difficulties when conducting the transfer procedures at the competent authorities. Therefore, discouraging organizations and individuals from buying back debt from VAMC.

Fifth, during the process of debt settlement by VAMC, the borrower agrees to add collaterals as land use rights under the 2013 Land Law, VAMC has no lending function and cannot directly receive the mortgaged by land-use rights. This limitation greatly affected the handling of bad debts that VAMC had bought.

4. Recommendations

To facilitate and improve the efficiency of VAMC's in purchasing and handling of bad debts, there are some recommendations:

The Government and the State Bank of Vietnam consider continuing to finance VAMC so that VAMC can afford to buy bad debts at market value, paving the way for VAMC to change its operational mechanism from debt purchase by special bonds to buy at market prices, thereby increasing the autonomy in handling debt of VAMC.

The authorities should urgently consider and permit the establishment of the Debt Trading Center. There is currently a relatively large amount of bad debts in the Vietnamese credit institution system, which can be considered as a fairly abundant supply for the bad debt trading market in Vietnam. The establishment of the Debt Trading Center is really necessary to promote the development of the debt trading market, which can be used as a place to provide information, consulting services, brokerage, purchase, and sale the bad debts and collaterals at credit institutions.

The Government and functional agencies should urgently adjust and complete the guiding regulations on the seizure, transfer, and mortgage of collaterals from bad debts of credit institutions, especially are collaterals by land use rights, assets attached to land-use rights or properties attached to land in the future. Assuring VAMC to carry out the right to seize, transfer and mortgage safely and conveniently.

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Capital Adequacy Requirements and Profitability: An Empirical Study on Banking Industry in Sri Lanka

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Abstract

In Sri Lanka, capital adequacy requirements conforming to Basel III was implemented in June 2017. The Central Bank of Sri Lanka introduced the internal capital adequacy assessment process in 2013, which facilitated the introduction of Basel III. In this paper an attempt has been made to study the impact of capital adequacy requirements on profitability of banking industry in Sri Lanka. The main objectives of this study were to identify the relationship between the capital adequacy requirements and profitability and to examine the effect of capital adequacy requirements on profitability of banking industry in Sri Lanka. The study adopted a descriptive explanatory research design. Capital adequacy ratio, core capital ratio, asset quality, risk-weighted assets to total assets ratio, tier 1 capital to total assets were used as the proxies for the capital adequacy requirements. Non-interest income to average assets, net interest margin and return on assets were used as the proxies for the profitability. The results of the multiple regression analysis shown that capital adequacy ratio had a positive significant relationship with Non-interest income to average assets. Tier 1 capital to total assets had a negative significant relationship with Non-interest income to average assets. Asset quality had a negative significant relationship with net interest margin. Other factors had insignificant relationship with dependent variables.

Keywords: Capital Adequacy Ratio, Basel III, Core Capital Ratio, Sri Lanka

1. Introduction

1.1 Background

Banking industry plays a pivotal role in the economy of a country, given the relationship between the well-being and growth of the economy (Ranasinghe, Udawatta, Jayasanka, Peiris & Nanayakkara, 2018). Banks are expected to make profit to absorb losses from their earnings (Asikhia & Sokefun, 2013). Profitability is an essential element to the survival of financial institutions (Ini & Eze, 2018 & Chandan & Abdullah, 2018). When it comes to the literature in terms of banking industry, the determinant factors of profitability are empirically

well explored. Disregarding the profitability, most of the studies in relation to banking industry have noticed that capital adequacy requirements and risk weighted assets are important factors in achieving profitability (Agbeja, Adelakun & Olufemi, 2015 & Ahmad & Ahmad, 2017 & Ajayi, Ajayi, Enimola & Orugun, 2019). The influence of the capital adequacy requirements on profitability is essential for the central banks, commercial banks, managers of banks, bankers' associations, governments and other financial authorities (Asikhia, Sokefun, 2013). Capital adequacy is one of the vital indicators of the financial solvency of the banking industry and it is considered as a safety valve to protect the depositors to promote stability and efficiency in the whole financial system of a country (Herath, 2015 & Ahmad & Ahmad, 2017). The maintenance of adequate capital reserves can stimulate the confidence in the financial soundness and stability of the banks (Aruwa & Naburgi, 2014). Badar, Sidra and Yuancheng (2016) emphasized that capital regulation has a more noticeable effect on bank assets portfolio.

Basle Accord sets minimum capital standards for internationally active banks (Josephat, 2016). The Basel Committee on Banking Supervision was established in 1974 to encompass global banking risks by formulating rules and regulations relating to credit risk, market risk and operational risk. Basel I was issued in 1988 with the aim of harmonizing bank capital globally and updated in 2004 with Basel II. After the global financial crisis in 2008, many banks attempted to find what are banks' risk-weighted assets and capital adequacy? (Ahmed & Mohamed, 2017, Ahmad & Ahmad, 2017, Chandan & Abdullah, 2018). As a consequence of the global financial crisis, global banking is becoming very risky and this has led banks to measure and manage their level of risk. The Basel accord thus has been materialized as a mode to ensure stability in the financial system in view of risks. Basel III was issued after the global financial crisis in 2008, with tighter regulations and requirements around capital adequacy, leverage, liquidity and funding to ensure that banks maintain sufficient capital to meet financial obligations and absorb unexpected losses (Chandan & Abdullah, 2018).

The banking industry in Sri Lanka plays a critical role within the Sri Lankan financial system, as they are engaged in provision of liquidity to the whole economy, while transforming the risk characteristics of assets. The banking industry in Sri Lanka is comprised of Licensed Commercial Banks and Licensed Specialized banks, leads the financial system for the highest share of the total assets in the financial system. In Sri Lanka, capital adequacy requirements conforming to Basel III was implemented in June 2017, setting targets over the next two years. The Central Bank of Sri Lanka introduced the Internal Capital Adequacy Assessment Process in 2013, which facilitated the introduction of Basel III. Standards such as Common Equity Tier I, Capital Conservation Buffer and Capital Surcharge for Domestic Systemically Important Banks were gradually come into effect between June 2017 and January 2019. Sri Lankan banks may not have this problem given that most banks here have maintained solid capital adequacy ratios around 10% even before Basel III. However, the new liquidity and funding requirements will restrict a bank's ability to make profits by increasing spreads from maturity mismatches, so banks will have to shift strategy. Raising additional capital for lending growth can be challenging in the absence of limited options to raise Additional Tier I capital in Sri Lanka. The equity market's small size is also a challenge—the combined market cap of listed companies is nearly 25% of GDP. Convertible structures to claim Additional Tier I Capital are not common in Sri Lanka. However, this will change as the economy develops, market earnings improve and more companies list – the capital market will be an important place to raise capital. Also, banks that manage their affairs well and deliver decent returns will always attract investors (Central Bank of Sri Lanka, 2018). The Basel III proposals aim to strengthen the global capital and liquidity ratios with the goal of promoting a more resilient banking sector and to improve the banking sector's ability to absorb shocks arising from financial and economic stress which, in turn, would reduce the risk of a spillover from the financial sector to the real economy. (Gunawardhana & Damayanthi, 2019). With the Basel Accord (2008), operational capital is observed to consist of core capital (Primary or Tier 1 capital) and supplemental capital (Secondary or Tier 2 Capital) (Ini & Eze, 2018). The regulations required globally active banks to maintain a minimum capital of 8 per cent of their risk adjusted assets, with capital consisting of Tier I capital and Tier II capital (Jalloh, 2017).

1.2 Research Problem
Some previous studies have attempted to show that capital adequacy measures influence the financial performance of banks (Ahmed & Mohamed, 2017, Ahmad & Ahmad, 2017, Ini & Eze, 2018 & Chandan &

Abdullah, 2018). The argument surrounding the effect of capital adequacy requirements on profitability of banking industry, constitute a research problem stems from being findings of those studies are inconsistent describing the bank capital adequacy on profitability, this study attempts to examine empirically. Based on the research gap identified above and according to the Sri Lankan banking industry how far risk weighted assets, regulatory capital and capital adequacy impact on profitability needs to be examined. In order to address research problem, this study tried to answer following research questions, which are: What would be the relationship between the capital adequacy requirements and profitability of banking industry in Sri Lanka? and Do the capital adequacy requirements influence profitability of banking industry in Sri Lanka?

1.3 Research Objectives
Based on the problem formulation and research questions, following objectives were formulated:
1.   to identify the relationship between the capital adequacy requirements and profitability of banking industry in Sri Lanka.
2.   to examine the effect of capital adequacy requirements on profitability of banking industry in Sri Lanka.

This study would facilitate financial institutions, potential investors and financial analysts in investment decision making. Also, this study will enable them to take precautionary actions to guard from financial leverage and operating leverage and to avoid the financial crises affecting the national economy. The remaining of this research paper is structures as follows: Section 2 describes research methods and; section 3 shows the results; section 4 shows the discussions and section 5 shows the conclusion.

1.3 Literature Review
1.3.1 Theoretical Review
This study will be based on buffer theory of capital adequacy since this study as it in consonance with Central Bank of Sri Lanka' s approach in ensuring Capital Adequacy for banks profitability. This theory was developed by Calem and Rob in 1996 (cited in Aruwa & Naburgi, 2014) and used by Aruwa & Naburgi (2014), Josephat (2016), Ini & Eze (2018) and Ajayi et al., (2019). The theory predicts that a bank approaching the required minimum capital ratio may have an incentive to boost capital and reduce risk in order to avoid the regulatory costs triggered by a breach of the capital requirements (Calem and Rob, 1996 cited in Aruwa & Naburgi, 2014) According to Buffer Theory of Capital Adequacy, banks may prefer to hold a 'buffer" of excess capital to reduce the probability of falling under the legal capital requirements, especially if their capital adequacy ratio is very volatile (Ajayi et al., 2019).

1.3.2 Empirical Review
Using US banks data for the relatively less regulated 1983 to 1989 period as well as the more highly regulated 1996 to 2002 period David and Raymond (2006) examined the relationship between capital structure and ROE for banks in the U.S. and results shows that there is a positive relationship between financial leverage and the ROE and there is a positive relationship between equity capital and ROA. A study by Samy and Magda (2006) on the impact of capital requirements on banks' performance of Egypt revealed that the Central Bank's efforts to enforce capital regulations towards improving the performance of the banking sector. In examining the effect of capital adequacy on profitability of deposit- taking banks in Nigeria Asikhia and Sokefun (2013) found a positive significant relationship between capital adequacy and profitability. As a comparative analysis of private and public banks in India, Priyanka and Ruchika (2015) examined the capital adequacy-a financial soundness indicator for banks and found that there is a significant difference in capital to risk-weighted assets ratio between private and public banks. Hasan and Aykut (2014) undertook an examination of the effect of bank capital on profitability and Risk in Turkish Banking over the period 2003 to 2011. Results found that there is a positive and negative relation between the capital and profitability.

Over the period from 2002 to 2014 Ruochen and Xuan (2014) examined the factors affecting bank profitability of US banks and the results found that banks have higher profitability when they have a lower loan to total assets ratio, a lower customer deposits to total liabilities ratio, a lower nonperforming loans to gross loans ratio, higher efficiency and higher revenue diversification. Results also find that better-capitalized banks have higher ROA. For the period of 15 years from 1997 to 2011 Aruwa and Naburgi (2014) empirically studied the impact of

capital adequacy on the financial performance in term of profitability and saving mobilization of quoted banks in Nigeria. The results shown that financial performance is not majorly influenced by capital adequacy. Olivier de, Boubacar, Pierre and Martin (2014) examined the effect of banks' capitalization on banks' ROE for large French banks over the period from 1993 to 2012. Results found that an increase in capital leads to a significant increase in ROE and a negative relationship between the share of credit activities and ROE. Peterson (2015) investigated the determinants of bank profitability and Basel capital regulation in Nigeria. The results found that Basel capital regime had no significant effect on bank profitability. Net interest margin and ROA profitability metrics were found that the determinants of bank profitability, and its significance, depends on the profitability metric employed. Loan quality significantly influences bank interest margin while bank size and cost efficiency significantly influence return on asset. Bank capital adequacy ratio is observed to be a significant determinant of bank profitability. Herath (2015) empirically examined the factors influencing the capital adequacy ratio and to identify the impact of such factors on capital adequacy ratio of licensed 25 banks in Sri Lanka. The results revealed that profitability is negatively correlated with capital adequacy ratio. Agbeja, Adelakun and Olufemi (2015) examined capital adequacy ratio and bank profitability in Nigeria. The results found that there is a significant relationship between capital adequacy ratio and bank's profitability.

Josephat (2016) examined the relationship between capital and risk of Tanzanian commercial banks during the period 2009-2014. The study shows a positive and significant association between profitability and bank capital implying that that as the profitability of banks increases, they retain more earnings to raise the level of their capital. Mwai, Jagongo and Fredrick (2017) evaluated the relationship between capital requirement set by the Central Bank of Kenya and the financial performance for the Kenyan banking sector. The study found that capital requirements have positive linear relationship with ROA and ROE but insignificant for Net Interest Margin.

Using the cross-panel methodology from nine deposit money banks with significant foreign operations Jalloh (2017) examined impact of capital adequacy on the performance of Nigerian banks using the Basel Accord Framework. The results show that 76% of the variations in profit after tax were caused by capital. Ahmad and Ahmad (2017) examined a study to find out the effect of capital Adequacy on profitability between two banks in Saudi Arabia. Results indicated that, one bank shows a low positive correlation relationship between the ROA and ROE and a high positive relationship between ROA and core capital, equity capital, total capital, cost income ratio, debt to equity. A low negative relationship found between ROA and risk weighted capital, bank size, asset growth, assets to liabilities. ROE has a positive relationship with core capital, equity capital, total capital, risk weighted capital and bank size. A negative relationship found between ROE and cost income ratio, asset growth, assets to liabilities. second bank shows a high positive correlation relationship between ROA and ROE and a positive relationship found between ROA and debt to equity. A negative relationship between ROA and core capital, equity capital, total capital, cost income ratio, risk weighted capital, bank size, asset growth, assets to liabilities. A positive relationship found between ROE and cost income ratio, debit to equity, and a negative relationship with core capital, equity capital, total capital, risk weighted capital, bank size, asset growth, assets to liabilities.

Using the Arellano-Bond estimator Rufo and John (2017) examined the credit risk and capital adequacy of the 567 rural banks in the Philippines to investigate how both variables affect bank profitability. The results found that credit risk has a negative and statistically significant relationship with profitability. However, empirical analysis showed that capital adequacy has no significant impact on the profitability of rural banks in the Philippines. Hope (2017) investigated the relationship between bank equity capital and profitability of fourteen banks using the purposive sampling technique, out of the twenty-eight universal banks operating in Ghana for period from 2005 to 2015. The study revealed that equity capital is significantly and positively related to Net Interest Margin and ROE. Bank size is significantly and negatively related to ROE, and insignificantly inversely related to NIM. Regulated bank capital is a disincentive to inclusive financial intermediation in Ghana. Matthew, Ana and Alistair (2017) examined the effect of capital ratios on bank profitability over economic cycles using data from the US banking sector spanning several economic cycles from the late 1970s to the recent financial crisis. Results revealed that banks with a surplus of capital relative to target exhibit a strongly negative relationship between capital and profitability.

Using a mixed model approach Arijan (2017) examined a study to describe and explain the relation of changes in capital requirements on the profitability of Swedish banks. The analysis revealed that capital requirement ratios seem to have a negative and statistically significant correlation with ROE for both large banks and niche banks. On the other hand, capital requirement ratios seem to have a positive and statistically significant correlation with the Net Interest Margin for niche banks. Pasaman (2017) examined a study to test and determine the Bank's health level consisting of capital adequacy ratio, net interest margin and non-performing loans partially or simultaneously on bank profitability based on data from the Indonesian Stock Exchange for a period from 2012 to 2016. The results indicate that capital adequacy ratio does not have a significant effect on bank profitability. Net interest margin improves the growth of bank profitability. This can happen because NIM has a component of net interest in its ratio. Non-performing loans have a negative effect on bank profitability.

A study by Ini and Eze (2018) on the effect of capital adequacy requirements on the performance of commercial banks in Nigeria revealed that adjusted shareholders fund, capital to risk weighted assets, total qualifying capital together have significant effect on the ROA. Ajayi et al., (2019) examined the effect of capital adequacy ratio on profitability of deposit money banks as obtained from their annual report for 2017. Findings shown that there exists a strong positive relationship between Capital Adequacy Ratio and ROA. As a comparative study between small-sized banks and large-sized banks of 30 Vietnamese commercial banks during the period of 2012-2018 Linh and Trang (2019) empirically investigated the impact of capital on bank profitability. The findings shown the positive relationship between capital and bank profitability and the influence of capital is more pronounce in small-sized banks, whereas it exercises insignificant influence on the profitability of large-sized banks. Further the results found a high degree of capital increased the profitability of private-owned banks, the impact of capital is positive and significant for the net interest margin of state-owned banks only.

In Sri Lanka Ranasinghe, Udawatta, Jayasanka, Peiris & Nanayakkara (2018) examined the impact of credit risk management on profitability of commercial banks covering the period from 2014 to 2017. Findings show that the relationship between non-performing loan ratio and ROE and non-performing loan ratio and ROA are not significant and there is a significant negative relationship between capital adequacy ratio and ROE and between capital adequacy ratio and ROA. In a dynamic structural banking model, Jochen, Alexander and Spyros (2018) examined the interaction between risk-weighted capital adequacy and unweighted leverage requirements and found that the tighter risk-weighted capital requirements reduce loan supply and lead to an endogenous fall in bank profitability. Chandan and Abdullah (2018) explored a study on the impact of capital adequacy on profitability under Basel II for the commercial banks of Bangladesh for the period of eight years from 2007 to 2014. Results found that the regulatory capital held by banks is greater than the minimum capital requirement guided under Basel II accord. Capital adequacy, operating efficiency and loan structure are positively related to profitability of a bank.

On the basis of keen literature as reviewed above, it is imperative to the regulators of bank and other financial institutions of Sri Lanka since the above country specific studies give the mixed results in nature. On the area of impact of capital adequacy on performance of banking industry in Sri Lanka were rare. In order to fulfill this gap this study has been undertaken.

2. Method

This section covers the research approach, data collection, variables, conceptual framework and operationalization of the variables, mode of data analysis, hypotheses of the study and empirical model.

2.1 Research approach
The research is descriptive explanatory, that is research which aims to explain the impact of capital adequacy requirements on profitability.

2.2 Data Collection

The data used for this research was generated from the CBSL website (Microsoft Excel track sheets) from 2008 Quarter 1 to 2019 Quarter 3.

2.3 Variables

Capital adequacy ratio, core capital ratio, asset quality, risk-weighted assets to total assets ratio and Tier 1 capital to total assets ratio were used as the proxies for the independent variables. Non-interest income to average assets, net interest margin and return on assets were used as the proxies for the dependent variables.

2.3 Conceptual Framework

Independent variables
Capital Adequacy Requirements

Capital adequacy ratio
Core capital ratio
Asset quality
Risk-weighted assets to total assets ratio
Tier 1 capital to total assets ratio

Dependent variables
Profitability

Non-Interest Income to Average

Net Interest Margin

Return on Assets
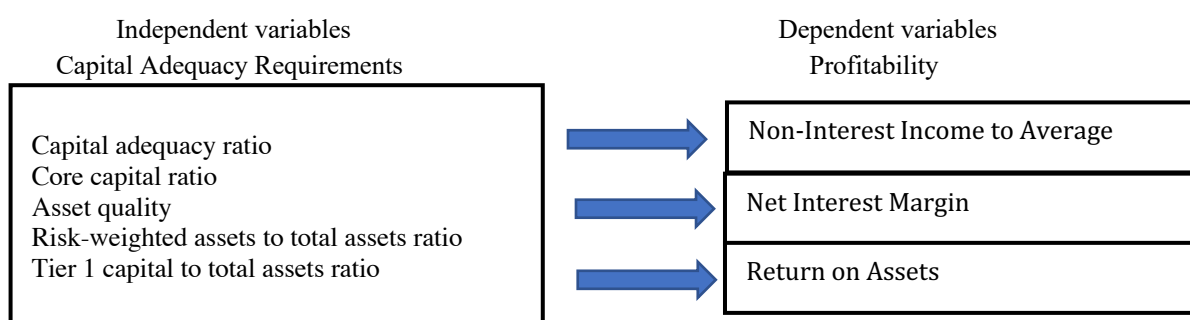
Source: Author developed based on Literature review.
Figure 1. conceptual framework

2.4 Operationalization of Study Variables

Table 1 illustrates the operationalization of the selected independent and dependent variables.

Variable	Proxies	Acronym	Definition	Measurement	Extant Literature
Independent variable (Capital Adequacy Requirements)	Capital adequacy ratio	CAR	It measures a bank's financial strength by using its capital and assets.	(Tier 1 Capital + Tier 2 Capital)/ Risk Weighted Assets	Asikhia and Sokefun (2013) Ini and Eze (2018) Ajayi et al., (2019) Ranasinghe, Udawatta, Jayasanka, Peiris & Nanayakkara (2018) Mwai, Jagongo and Fredrick (2017)
	Core Capital ratio	CCR	It is the minimum amount of capital that thrift banks must maintain in line with Risk Weighted Assets	Tier 1 Capital/ Risk Weighted Assets	Chandan and Abdullah, 2018, Mwai, Jagongo and Fredrick (2017)
	Asset Quality	AQ	It shows the asset quality of a bank.	Net non-performing loans/ total loans and advances	Peterson (2015) Ranasinghe, Udawatta, Jayasanka, Peiris & Nanayakkara (2018)
	Risk-weighted assets to total assets ratio	RWATA	It shows how Risk-weighted assets are used to determine the minimum amount of capital that must be held to reduce the risk of insolvency.	Risk-weighted assets/ total assets	CBSL (2018)
	Tier 1	T_1CTAR	The ratio uses tier	Tier 1 capital/ total	CBSL (2018)

	capital to total assets ratio		1 capital to judge how leveraged a bank is in relation to its consolidated assets.	assets	
	Non-Interest Income to Average Assets	NIIAA	This ratio is comprised of annualized income from bank services and sources other than interest-bearing assets, divided by average assets.	Non-Interest Income/ Average Assets	CBSL (2018)
	Net Interest Margin	NIM	It shows how much it earns on interest from its credit products.	(Interest received - Interest paid) / Interest generating assets	Hope Korbla Gadagbui (2017) Mwai, Jagongo and Fredrick (2017)
Dependent variable (Profitability)	Return on Assets	ROA	It shows the percentage of profit that a company earns in relation to its overall resources.	Profit after tax/Total assets	Ini and Eze (2018) Ajayi et al., (2019) Ranasinghe, Udawatta, Jayasanka, Peiris & Nanayakkara (2018)

Source: Researcher's own compilation based on Literature review.

2.5 Mode of Data Analysis

The study carries time series data from 2008 Quarter 1 to 2019 Quarter 3. Further, the statistical analysis tool Eviews has been used to perform the following analysis such as: descriptive statistics, data diagnostic testing like normality, stationarity, serial correlation, heteroscedasticity and multicollinearity, inference statistical analysis like correlation and multiple regression analysis.

2.6 Hypotheses of the Study

As a follow-up to the research questions and objectives of the study, following series of hypotheses were formulated based on the literature review:

H_1:   There is a significant impact of capital adequacy ratio on non-interest income to average assets.

H_2:   There is a significant impact of core capital ratio on non-interest income to average assets.

H_3:   There is a significant impact of asset quality on non-interest income to average assets.

H_4:   There is a significant impact of risk-weighted assets to total assets ratio on non-interest income to average assets.

H_5:   There is a significant impact of Tier 1 capital to total assets ratio on non-interest income to average assets.

H_6:   There is a significant impact of capital adequacy ratio on net interest margin.

H_7:   There is a significant impact of core capital ratio on net interest margin.

H_8:   There is a significant impact of asset quality on net interest margin.

H_9:   There is a significant impact of risk-weighted assets to total assets ratio on net interest margin.

H_{10}:   There is a significant impact of Tier 1 capital to total assets ratio on net interest margin.

H_{11}:   There is a significant impact of capital adequacy ratio on return on assets.

H_{12}:   There is a significant impact of core capital ratio on return on assets.

H_{13}:   There is a significant impact of asset quality on return on assets.

H$_{14}$:   There is a significant impact of risk-weighted assets to total assets ratio on return on assets.

H$_{15}$:   There is a significant impact Tier 1 capital to total assets ratio on return on assets.

2.7 Econometric Models

Multiple regression equation based on functional relation for the models are econometrically stated as follows:

NIIAA = β0 + β1 CAR + β2 CCR + β3 AQ + β4 RWATA + β5 T$_1$CTAR + ε

NIM = β0 + β1 CAR + β2 CCR + β3 AQ + β4 RWATA + β5 T$_1$CTAR + ε

ROA = β0 + β1 CAR + β2 CCR + β3 AQ + β4 RWATA + β5 T$_1$CTAR + ε

Where:

CAR:	Capital adequacy ratio
CCR:	Core Capital ratio
AQ:	Asset quality
RWATA:	Risk-weighted assets to total assets ratio
T$_1$CTAR:	Tier 1 capital to total assets ratio
NIIAA:	Non-Interest Income to Average Assets
NIM:	Net Interest Margin
ROA:	Return on Assets
ε:	Error term

3. Results

3.1 Descriptive Statistics

Table 2: Descriptive Statistics

Variable	Mean	Max	Min	SD	Skewness	Kurtosis	Jarque-Bera	P
CAR	15.42	17.18	13.06	0.97	-0.45	2.89	1.62	0.44
CCR	0.14	0.16	0.12	0.01	0.03	1.73	3.16	0.21
AQ	2.92	5.71	1.25	1.17	0.64	2.63	3.43	0.18
RWATA	0.53	0.58	0.49	0.03	0.15	1.65	3.73	0.15
T$_1$CTAR	6.93	7.66	6.33	0.32	0.53	2.74	2.33	0.31
NIIAA	1.59	2.36	1.00	0.36	0.40	1.99	3.24	0.20
NIM	3.88	4.60	3.16	0.39	0.33	2.08	2.50	0.29
ROA	1.38	2.22	0.89	0.30	0.59	3.20	2.83	0.24

Note: Please see Table 1 for profile of variables.

CAR with an average value of 15.42 is the object of the research, with a standard deviation of 0.97 indicating that the data is relatively homogeneous. CCR with an average value of 0.14 is the object of the research, with a standard deviation of 0.01 indicating that the data is relatively homogeneous. AQ with an average value of 2.92 is the object of the research, with a standard deviation of 1.17 indicating that the data is relatively homogeneous. RWATA with an average value of 0.53 is the object of the research, with a standard deviation of 0.03 indicating that the data is relatively homogeneous. T$_1$CTAR with an average value of 6.93 is the object of the research, with a standard deviation of 0.97 indicating that the data is relatively homogeneous. NIIAA with an average value of 0.32 is the object of the research, with a standard deviation of 0.36 indicating that the data is relatively homogeneous. NIM with an average value of 3.88 is the object of the research, with a standard deviation of 0.39 indicating that the data is relatively homogeneous. ROA with an average value of 1.38 is the object of the research, with a standard deviation of 0.3 indicating that the data is relatively homogeneous.

3.2 Diagnostic Testing

3.2.1 Normality

To test normality of the data skewness statistics were used. According to the Table 2, Skewness shown the extent to which a distribution of values deviates from symmetry around the mean.

3.2.2 Stationarity

The augmented Dickey Fuller (ADF) unit root test was used with the null hypothesis of nonstationary and if the test statistic is more negative (since it is a one-sided test) than the critical value at 5% level of significance, the null is rejected to imply stationarity.

Table 3: Unit root test

Variables	Level			First Difference			
	Intercept	Constant and trend	None	Intercept	Constant and trend	None	Order of I
CAR	-2.892*	-2.989	0.570	-0902***	-8.963***	-8.967***	I(1)
CCR	-3.108**	-3.842**	0.167	-	-	-	I(0)
AQ	-2.565	-5.588**	-1.632*	-4.314**	-4.409**	-4.242**	I(1)
RWATA	-0.754	-1.711	-0.276	-4.981**	-5.214**	-5.027***	I(1)
T₁CTAR	-3.624**	-4.342**	1.586	-8.061***	-7.956***	-7.740***	I(1)
NIIAA	-1.560	-4.559**	-0.859	-8.441***	-8.327***	-8.403***	I(1)
NIM	-1.274	-2.038	-0.595	-6.653***	-6.576***	-6.696***	I(1)
ROA	-2.374	-2.615	-0.553	-7.005***	-7.045***	-7.081***	I(1)

Note: *, ** and *** indicate statistical significance at the 10%, 5% and 1% respectively; Please see Table 1 for profile of variables.

The result of the unit root test is depicted in the Table 3. As revealed, all variables employed in the study are stationary since the ADF Statistics is less than the critical values at 5% and significant.

3.2.3 Serial Correlation

Serial or auto correlation is a situation where the error terms for different time periods are correlated. A p value of less than the 5% level of significance indicates presence of serial correlation.

Table 4: Breusch-Godfrey Serial Correlation LM Test

	NIIAA	NIM	ROA
F-statistic	0.2801	0.0845	0.5824
Obs*R-squared	0.7456	0.2276	1.5239
Prob. F(2,34)	0.7574	0.9191	0.5640
Prob. Chi-Square(2)	0.6888	0.8924	0.4668

Null hypothesis: No serial correlation at up to 2 lags

Note: Please see Table 1 for profile of variables.

According to the Table 4, the Breusch-Godfrey test results indicate that the Null is of absence of autocorrelation.

3.2.4 Heteroscedasticity

This was also tested using Whites test and conclusions drawn. Heteroscedasticity is lack of constant error variance. White test is a chi square test of the form nR^2 where n is the sample size and R^2 is the unadjusted coefficient of determination of the auxiliary regression (a regression equation between lagged squared error terms and predictor variables) with m (number of independent variables) degrees of freedom (df). Unless it is severe, heteroscedasticity should not be a bother since it does not result to biased parameter estimates.

Table 5: Breusch-Pagan-Godfrey Test

	NIIAA	NIM	ROA
F-statistic	1.0761	1.7200	0.2988
Obs*R-squared	9.7519	13.8327	3.1976
Scaled explained SS	6.8347	12.5036	1.8814
Prob. F(9,36)	0.4034	0.1201	0.9704

Prob. Chi-Square (9)	0.3709	0.1284	0.9559
Prob. Chi-Square (9)	0.6543	0.1864	0.9932
Null hypothesis: Homoskedasticity			

Note: Please see Table 1 for profile of variables.

According to the Table 5, the results indicate that both the F test and the LM (obs*Rsquared of the auxiliary regression) conclude for the rejection of the null of homoskedasticity.

3.2.5 Multicollinearity

Variance inflation factors (VIFs) and correlation coefficients were used to test multi-collinearity.

Table 3: Multicollinearity

Variable	VIF
DCAR	9.9118
DCCR	4.4423
DAQ	1.1367
DRWATA	2.6610
DT$_1$CTAR	9.6462

Note: Please see Table 1 for profile of variables.

According to the Table 6, VIFs are not exceeded 10 and variables are not signing of serious multicollinearity.

3.3 Inference Statistics

Table 7: Correlation Analysis

Variable	DCAR	DCCR	DAQ	DRWATA	DT$_1$CTAR	DNIIAA	DNIM	DROA
DCAR	1							
DCCR	0.8567***	1						
DAQ	-0.1741	-0.1497	1					
DRWATA	-0.1657	-0.1791	-0.2373	1				
DT$_1$CTAR	0.8755***	0.8000***	-0.2907**	0.2112	1			
DNIIAA	0.0233	-0.0465	-0.022	-0.2684*	-0.1837	1		
DNIM	0.2799**	0.2674*	-0.3262**	-0.1454	0.1831	0.0201	1	
DROA	-0.0832	-0.0149	-0.0476	-0.1939	-0.1962	0.6724***	0.0731	1

Notes: *, ** and *** indicate statistical significance at the 10%, 5% and 1% respectively; Please see Table 1 for profile of variables.

According to the Table 7, there was a weak positive correlation between DCAR and DNIIAA. There was a weak negative correlation between DCAR and DNIIAA. DCCR had a weak negative correlation with DNIIAA and DROA. DCCR had a weak positive correlation with DNIM. DAQ and DRWATA had a weak negative correlation with DNIIAA, DNIM and DROA. D1CTAR had a weak negative correlation with DNIIAA and DROA. D1CTAR had a weak positive correlation with DNIM.

Table 8: Multiple Regression Analysis

	Model 1 DNIIAA	Model 2 DNIM	Model 3 ROA
C	-0.0190 (-0.7294)	-0.0132 (-0.6223)	0.0007 (0.0252)
DCAR	0.2715** (2.2265)	0.1124 (1.1292)	0.0744 (0.5143)
DCCR	-1.1124 (-0.1214)	5.0546 (0.6757)	12.3566 (1.1365)
DAQ	-0.0595 (-0.9998)	-0.1175* (-2.4172)	-0.0726 (-1.0278)
DRWATA	1.5210 (0.3551)	-0.0581 (-0.0166)	0.5842 (0.1149)
DT$_1$CTAR	-0.6300** (-2.2471)	-0.2474 (-1.0805)	-0.4893 (-1.4702)
R^2	0.2048	0.2163	0.1228
Adjusted R^2	0.1054	0.1183	0.0132
F-statistic	2.0609	2.2083	1.1208

Prob (F-statistic)	0.0906	0.0723	0.3649
Hannan-Quinn criter	-0.4475	-0.8524	-0.1045
Durbin-Watson stat	2.0449	1.8520	2.0693
No. of Observation	46	46	46

Notes: [*], [**] and [***] indicate statistical significance at the 10%, 5% and 1% respectively; Numbers in parentheses are t-statistics; Durbin-Watson stat closer to 2 infers evidence in favor of no autocorrelation. Please see Table 1 for profile of variables.

The results of the multiple regression as shown in the table 8, in relation to model 1, the overall regression model is significant at ten percent level ($p < 0.1$). The overall model is in good position and results can be interpreted. The F-ration is 2.0609 ($p < 0.01$) which also supports the significance of the model. Model 1 revealed that it is capable enough of explaining a considerable portion of the total variability (10.54%) as the model R^2 value is 0.1054. In relation to model 2, the overall regression model is significant at ten percent level ($p < 0.1$). The overall model is in good position and results can be interpreted. The F-ration is 2.2083 ($p < 0.01$) which also supports the significance of the model. Model 2 revealed that it is capable enough of explaining a considerable portion of the total variability (11.83%) as the model R^2 value is 0.1183.

4. Discussion

According to the results, DCAR had a positive significant relationship (p=0.0317) with DNIIAA and the hypothesis H_1 was supported. Similar to other researchers CAR found to be positive significant relationship with profitability. DT_1CTAR had a negative significant relationship (p=0.0302) with DNIIAA and the hypothesis H_5 was supported. Other factors had insignificant relationship with DNIIAA. Therefore, hypotheses H_2, H_3 and H_4 were not supported. DAQ had a negative significant relationship (p=0.0203) with DNIM and the hypothesis H_8 was supported. Similar to other researchers (Peterson, 2015; Ranasinghe, Udawatta, Jayasanka, Peiris & Nanayakkara, 2018), AQ found to be negative significant relationship with profitability. Other factors had insignificant relationship with DNIM. Therefore, hypotheses H_6, H_7, H_9 and H_{10} were not supported. In relation to model 3, all factors had insignificant relationship with DROA. Therefore, hypotheses H_{11}, H_{12}, H_{13}, H_{14} and H_{15} were not supported. Similar to other researchers (Aruwa & Naburgi, 2014 & Rufo & John, 2017 & Pasaman, 2017 CAR found to be insignificant relationship with ROA. But the findings of this study contrary with those of (Asikhia & Sokefun, 2013; Agbeja, Adelakun & Olufemi, 2015; Peterson, 2015; Ahmad & Ahmad, 2017; Ajayi et al., 2019 & Chandan & Abdullah (2018) who found positive significant relationship between capital adequacy and ROA and contrary with those of (Herath, 2015 & Ranasinghe & Udawatta, Jayasanka, Peiris & Nanayakkara, 2018 who found negative significant relationship between capital adequacy and ROA. In terms of risk weighted capital, the findings of this study deviates with studies of (Ahmad & Ahmad, 2017 & Ini & Eze 2018) who found negative significant relationship between risk weighted capital and ROA In terms of core capital, the findings of this study deviates with studies of Ahmad and Ahmad (2017) who found positive significant relationship between core capital and ROA.

5. Conclusion

This study examined the capital adequacy requirements and profitability of banking industry in Sri Lanka using a time series data from 2008 Quarter 1 to 2019 Quarter 3. The study revealed that DCAR had a positive significant relationship with DNIIAA. DT_1CTAR had a negative significant relationship with DNIIAA. DAQ had a negative significant relationship with DNIM. Based on the analysis it can be recommended that banking regulators should ensure that the gains of the banking reforms processes are sustained, the CBSL should take more significant measures aimed at tightening the risk management of the banking industry of Sri Lanka. Further they should also focus strategic monitoring and evaluation on capital adequacy requirements for long-term stabilization. By enhancing capital base and applying risk mitigating techniques, Sri Lankan banking sector will be able to maintain the capital adequacy requirements.

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Banking Relationship Ties to Firm Performance: Evidence from Food and Beverage Firms in Vietnam

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Abstract
This paper is aimed at analyzing the effects of banking relationship on performance of Vietnamese firms in Food and Beverage (F&B), one of the highest potential sectors. Panel data of 170 observations covers 34 F&B firms listed in the Vietnam stock exchanges in the period 2014-2018. The fixed effect model (FEM) is applied. The key findings are: *First,* short-term loan financing, leverage, and fixed asset ratios all negatively impacted on F&B firm performance, while firm size and net profit margin had positive impacts. These findings were consistent with previous studies. *Second,* the opposite results with previous studies were: (i) negative corelation of ROE and number of banks firms working with, as F&B firms were inefficient in selecting bank partners; (ii) positive relation of short-term liabilities ratio and ROA/ROE, as F&B firms utilize other non-bank liabilities shortly; (iii) foreign ownership had negative relationship with ROA& ROE. Foreign investors did not have significant roles in most F&B firms. *Third*, long-term borrowing from banks, state ownership and ages all insignificantly correlated with firm performance. Recommendations to F&B firms include: (1) Reduce the short-term loans and fixed assets investment, while increase the cheap equity funding sources via shareholders (2) Be selective in working with banks to have better fees and interest saved with banks. (3) Utilize other short-term liabilities, including payables and advances – the low-cost funding sources. F&B firms have good bargaining powers in requesting advances from their clients. (4) Have smart buy-in strategies on foreign ownership.

Keywords: Bank Relationship, Firms' Performance, Foreign Ownership, Leverage, Vietnamese Food and Beverage Listed Firms

1. Introduction

Literature have several discussions on the determinants of firm performance, focusing on firms' internal factors such as size and age, export propensity, ownership, organizational innovation (Burger, Damijan, Kostevc &

Rojec, 2017; Thi Thuc Anh Phan, 2019). However, bank relationship is becoming an increasingly important factor. It can bring great benefits to both banks and firms, expanding their market and reputation (Diamond, 1984; Best & Zhang, 1993; Belaid, Boussaada & Belguith, 2017; Bonfirm, Dai, & Franco, 2018; Nguyen Thu Hang, Khuu Thanh Quy & Nguyen Ngoc Dieu Le, 2018). However, this relationship can also cause negative effects on firm performance due to four problems: holdup, soft-budget constraint, liquidity risk and asymmetric information problem (Diamond, 1991; Weinstein, & Yafeh, 1998; Ongena, & Degryse, 2001; Chen, Li & Zhang, 2016; Höwer, 2016; Yildirim, 2019). Therefore, how to confirm this relationship in specific conditions for improving firm performance is interesting for exploration.

Vietnam has been one of remarkable development markets with almost 97 million population in goldern age and fast-growing economy (GDP growth rate of 6.51%/year in period 2000-2020) (Trading Economics, 2020). However, Vietnam is still the bank-based economy, with more than 80% of firms' funding sources from banking system (Vuong, 2019; SBV, 2020). Even for listed firms, borrowing from banks are still common.

The Vietnamese F&B industry is very promising and potential, expected to maintain average growth of 10.9% per year thanks to household income improvement and consumer trend on higher value products will dominate the tastes consumption. The golden age population with eat-out habits lightened the future for this sector (Lien Nguyen, 2018; Kantar, 2019; Nielson, 2020; Le Ha, 2020). However, these firms are facing with several challenges in the future because of regulation changes (GoV, 2020) and the unexpected events such as COVID-19 pandemic.

Therefore, analysing the determinants of F&B firm performance, focusing on utilizing bank relationship and fundings are interesting for Vietnam case. Le & Nguyen (2012) did the assessment on the impact of long-term debts on F&B firm performance, while Nguyen (2017) did the analysis of determinants on F&B firms in Vietnam. However, none have considered bank relationship in wider aspects and put into account the ownership problems. This is the research gap for our study in period 2014-2018.

This paper is aimed at answering four critical research questions: (i) What are the determinants of F&B firm performance in Vietnam? (ii) What are the components of the banking-firm relationship in Vietnam? (iii) How such banking relationship's variables affect to Vietnamese F&B listed firm performance and why? (iv) What are the implications for improving F&B firm performance via utilizing the bank relationship?

2. Literature review

Firm performance
Firm's performance can be measured by two main indicators: financial efficiency and profitability (Walker & Brown, 2004; Reijonen, & Komppula, 2007). Companies' financial results play an important part in the existence of them (Li, Markowski, Xu & Markowski, 2008; Nguyen Thu Hang, Khuu Thanh Quy, Nguyen Ngoc Dieu Le, 2018; Thi Thuc Anh Phan, 2019). Many different previous researches proposed various methods to measure the performance of firms. Among those probability ratios, return on equity (ROE) and return on asset (ROA), are appeared in many corporate governance studies (Yermack, 1996; Anderson & Reeb, 2003).

Bank-firm relationship
The bank – firm relationship is known as the long-term connection between a depository organization and an enterprise to provide financial services in addition to normal transactions (Udell & Berger, 1998). Typically, this banking relationship can be classified into two different relations: close and transaction. The banking relationship convey the benefits to either deposit institutions or businesses. The bank provides steady financial protection for the business, and in return, the firm offers profit and many other perks. Moreover, bank will hold firms' shares with the banking system in exchange when providing a long-term lending relation and various banking services. Additionally, there are various factors which are being taken into consideration by firms when establishing the relationship with bank and those determinants include: number of banking relationship, size of the bank and ownership of banks (Aristei, Gallo & Angori, 2016).

The bank-firm relationships can bring benefits but also drawbacks to both parties. Following is the summary of literature review on this relationship.

Table 1. Summary of Literature Review on Bank-Firm Relationship

Paper	Main Findings
Benefits of bank-firm relationship for banks	
(Diamond, 1984); (Rajan, 1992); (Thadden, 1995)	Banks can both acquire the cost-effectiveness in managing activities and find out diversification is an effective way to alleviate problem of the agency
(Limpaphayom & Polwitoon, 2004); (Prowse, 1990); (Agarwal & Elston, 2001)	Close bank-firm relationship plays a role as a solution to secure the creditors' wealth against the action of shareholders
(Jensen & Meckling, 1976); (Weinstein, & Yafeh, 1998)	Banking relationship is a useful tool used in reducing the information asymmetric and incentive issues
Benefits of bank-firm relationship for firms	
(Bonfirm et al., 2018)	Ongoing banking relationship with a clean credit record can be considered as a certificate for firm in defending the moral hazard problem
(Best & Zhang, 1993); (Bonfirm et al., 2018)	The more acknowledgement the public know about the bank loan; the higher company's share price can be
(Hoshi, Kashyap & Scharfstein, 1990); (Belaid, Boussaada & Belguith, 2017); (Aristei et al., 2018); (Rajan & Petersen (n.d); (NguyenThu Hang et al, 2018)	Strong relationship with bank ensures a stable financial background and a strong credibility for the firm, attracting outsiders to invest and consequently, diversifying the number of sources of financing in the future
(Li et al., 2018); (Bonfirm et al., 2018); (NguyenThu Hang et al, 2018)	Firms can reduce the expenditure and cost
(Ongena & Degryse, 2001); (Le & Nguyen, 2012)	Long-term banking relationship brings profit and avoids switching cost for firms
(Hoshi et al., 1990)	Banking relationship is helping firms to reduce the risk of financial during the economic turmoil by effectively maintaining the borrowings
(Höwer, 2016)	Close banking relationship can not only help companies avoid risk during the financial crisis but also have positive effects on the financially distressed firms
(Campbell, 1979); (Aristei et al., 2018); (Strahan & Weston, 1998)	The close banking relationship is more necessary to relatively small-sized firms
Drawbacks of bank-firm relationship for firms	
(Diamond, 1991); (Ongena & Degryse, 2001); (Chen et al., 2016); (Yildirim, 2019); (Castelli, Gerald & Hasan, 2006); (Höwer, 2016)	Bank may raise the required interest rate easily, which has negative effects to firms in relationship
(Weinstein & Yafeh, 1998); (Rajan, 1992)	The close relationship with bank tends to limit the firms from maximizing profitability as banks control over the firms in making investment

(Weinstein & Yafeh, 1998); (Yasuda, A. 2005) (Agarwal, R. & Elston, J. A., 2001) (Arikawa, Y., & Miyajima, H., 2005)	The deregulation in lending process will gradually turns the relationship to be less supportive to the funding process in long-term.

Source: Authors' compilation from literature review

3. Data and method

Data

The data of this research is derived from financial statements and published reports of Vietnamese officially listed firms on the F&B Industry in Hanoi Stock exchange and Hochiminh City Stock Exchange. Among 55 listed F&B firms, only 34 were chosen after omitting the firms with missing data and outliers (with Z-score analysis) to avoid interruption during the analysis process. Therefore, total final sample of 34 listed F&B firms in 5-year period (2014- 2018) includes 170 observations for this study. The full name of these firms presents in appendix A.4.

Research approach and model

With panel data, either fixed effects model (FEM) or random effects model (REM) is proposed for regression analysis. The Hausman test is used to check the difference between the coefficient estimates observed by fixed and random effect at statistically significant level. Also, the heteroscedasticity and autocorrelation should be also tested and fixed in order to have a soundness estimation. Wald test is used to check heteroskedasticity while Durbin-Watson test is used to check autocorrelation. Following is the summary of research model and hypotheses bases on literature review in this article.

Table 2. Expected Relationship Between Variables And Firm Performance

Variable	Code	Formula	Hypothesis	References
Dependent variables				
Return on equity	ROE	$\dfrac{Net\ income_{i,t}}{Total\ Average\ Equity_{i,t}}$		
Return on asset	ROA	$\dfrac{Net\ income_{i,t}}{Total\ Average\ Asset_{i,t}}$		
Independent variables				
Quantity of bank relations	Bank_num	*Number of banks providing firm loans*	Positive	(Castelli et al., 2006); (Vu & Nguyen, 2013)
	Bank_num^2	*The square of Bank_num*	Negative	
Short-term credit financing relationships (%)	Short_financing	$\dfrac{Short\ term\ bank\ loans}{Total\ Liabilities}$	Negative	(Vo & Le, 2017)
Long-term credit financing relationships (%)	Long_financing	$\dfrac{Long\ term\ bank\ loans}{Total\ Liabilities}$	Positive	(Schiantarelli & Jaramillo, 2002)
Firm size	Size	$Ln(Total\ Assets)$	Positive	(Wei, Xie & Zhang, 2005); (Geroski, Mata & Portugal, 2007)

Asset tangibility structure	FATA	$\dfrac{Fixed\ asset}{Total\ asset}$	Negative	(Mohammed & Andrew, 2019); (Vu & Nguyen, 2013); (Nguyen, 2017)
Short-term liabilities ratio	Short_term_liabilities_ratio	$\dfrac{Short-term\ liabilities}{Total\ liabilities}$	Negative	(Haseed & Muhammad, 2013); (Ben, 2017)
Firm leverage	Leverage	$\dfrac{Total\ Debt}{Total\ Asset}$	Negative	(Nguyen, 2009); (Pham, 2011); (Ilyukhin, 2015) (Nguyen, 2013); (Nguyen, 2017)
Net profit margin	Net_profit_margin	$\dfrac{Net\ income}{Total\ sales}$	Positive	(Costea & Brasoveanu); (Haseed & Muhammad, 2013)
State ownership status	State_ownership_status	$\dfrac{Shares\ held\ by\ State}{Total\ shares}$	Negative	(Tran, Walterm & Ann, 2014)
Foreign ownership status	Foreign_ownership_status	$\dfrac{Shares\ holded\ by\ foreigners}{Total\ shares}$	Positive	(Nguyen & Pham, 2017)
Firm age	Age	$Current\ year-\ established\ year$	Positive	(Loderer & Waelchli, 2009); (Ericson & Pakes, 1995)

Source: Authors' compilation from literature review

In order to have a good comparison on F&B firm performance, both ROE and ROA as dependent variables are chosen.

Two research models are applied as followed.

Model 1: $ROA_{i,t} = \beta_1 + \beta_2\ Bank\_num_{i,t} + \beta_3\ Bank\_num\char`\^2_{i,t} + \beta_4\ Short\_financing_{i,t} + \beta_5\ Long\_financing_{i,t} + \beta_6$ $Size_{i,t} + \beta_7\ FATA_{i,t} + \beta_8\ Short\_term\_liabilities\_ratio_{i,t} + \beta_9\ Leverage_{i,t} + \beta_{10}\ Net\_profit\_margin_{i,t} + \beta_{11}$ $State\_ownership_{i,t} + \beta_{12}\ Foreign\_ownership_{i,t} + \beta_{13}\ Age_{i,t}$

Model 2: $ROE_{i,t} = \beta_1 + \beta_2\ Bank\_num_{i,t} + \beta_3\ Bank\_num\char`\^2_{i,t} + \beta_4\ Short\_financing_{i,t} + \beta_5\ Long\_financing_{i,t} + \beta_6$ $Size_{i,t} + \beta_7\ FATA_{i,t} + \beta_8\ Short\_term\_liabilities\_ratio_{i,t} + \beta_9\ Leverage_{i,t} + \beta_{10}\ Net\_profit\_margin_{i,t} + \beta_{11}$ $State\_ownership_{i,t} + \beta_{12}\ Foreign\_ownership_{i,t} + \beta_{13}\ Age_{i,t}$

4. Results and discussions

4.1. Overview

Vietnam has been one of remarkable development markets with almost 97 million population in goldern age and fast-growing economy (GDP growth rate of 6.51%/year in period 2000-2020, increased gradually from 5.98% in 2014 to 7.02%) (Trading Economics, 2020; GSO, 2014-2019). However, Vietnam is still the bank-based economy, with more than 80% of firms' funding sources from banking system (Vuong, 2019; SBV, 2020). Even for listed firms, borrowing from banks are still common.

Figure 1. VIietnamese GDP'S Growth From 2014-2019

GDP's growth from 2014-2019
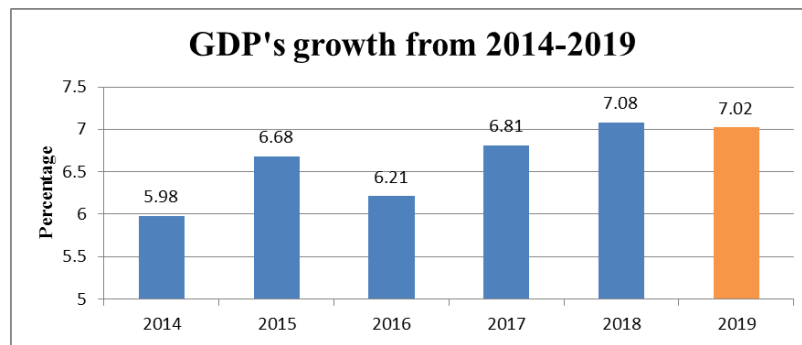
Source: GSO (2014-2019)

I

n Vietnam, F&B industry is very promising and potential (Lien Nguyen, 2018; Kantar, 2019; Nielson, 2020; Le Ha, 2020). The F&B industry is expected to maintain strong growth momentum until 2020 with an average growth of 10.9% per year thanks to household income improvement and consumer trend on higher value products will dominate the tastes consumption (Kantar, 2019; Nielson, 2020). According to Statista (2019), revenue in the F&B segment amounts to USD 289 million in 2020. Also, revenue is expected to show an annual growth rate (CAGR 2020-2024) of 10.1%, resulting in a market volume of USD 423 million by 2024. The golden age population with eat-out habits lightened the future for Vietnamese F&B sector (Lien Nguyen, 2018; Kantar, 2019; Nielson, 2020; Le Ha, 2020).   The F&B in Vietnam may still continuously attract investment from businesses and the participation of diverse global business chains since the profitability of the F&B industry in Vietnam is still promising. However, the government Decree 100/2019/ND-CP in effective from January 2020 on penalties for alcohol-related violations by vehicle operators has been negatively affected the growth rate of the F&B industry significantly (GoV, 2019; Le Ha, 2020). In addition, the COVID-19 pandemic has spread to almost all countries in the world including Vietnam, which may create the global economic depression worldwide (Duffin, 2020; McKinsey, 2020). It may strongly impact on the vietnam GDP's growth in general, the revenue of the F&B industry in particular.

4.2. Results and discussions

Descriptive statistics

The statistical description summary of variables in the appendix A.1 showed that the Vietnamese F&B firms have a diversified range of banking relationship, which can up to 20 banks; but in general, most firms only maintain about 3 to 4 relationships. On average, short-term bank borrowings takes up 32% of the firms' total debts, but long-term loans just accounted for 5.8%. In addition to borrowing from banks, firms also borrowed short-term mainly from other sources, mainly under payables (average 90% of liabilities are short-term). F&B firms have wide range of leverage ratio, from 10%-80%, but on average, the F&B firms utilize its own equity than debt, with average leverage ratio of 42%. Fixed assets are minor for these firms, with 26% of total assets. There is no Vietnamese F&B firm that is totally owned by state or foreign partners, with the portion up to 60-62% of total ownership. Most of the firms listed in the stock exchange have been established for long time, with average 25 years of operation.

Correlation matrix result

As stated in appendix A.2, variables in the model has not very high correlation case between any two variables (both dependent and independent) expect for the bank_num and bank_num^2 which are calculated based on each other and thus, the high correlation is reasonable. Size and bank_num, however, have a moderate relationship because their correlation is + 0.57, which also means that the bigger the firm size, the more bank relationships a firm has. It also implies that those identified variables are relevant and there is no need to conduct the sensitivity analysis on the effect of removing violated variables, no multicollinearity problem is detected in the model.

Hausman test for selecting the model

The result of Hasman test in appendix A.3 (p-value of 0.04) confirms that FEM should be applied for this regression.

Regression results and discussions

Table 2. The Regression Result Of Fixed Effects Model

	Model	
	ROE (1)	**ROA (2)**
Bank_num	-3.0216(**)	-1.2461
Bank_num^2	0.1003	0.0361
Short_financing	-0.1214(*)	-0.1116(***)
Long_financing	-0.0148	-0.0444
Size	7.6380(**)	5.3223(***)
FATA (fixed assets/total assets)	-0.2654(***)	-0.2365(***)
Short term liabilities ratio	0.1408(***)	0.0803(***)
Leverage	0.0148	-0.1052(**)
Net Profit Margin	1.7558(***)	0.9644(***)
State	-0.0665	-0.0517
Foreign	-0.2844(**)	-0.1578(**)
Age	0.3181	-0.3782
Observations	170	170
R-squared	0.772243	0.775914
Adjusted R-squared	0.689590	0.694593

Notes: (***) Significant at 1% level, (**) Significant at 5% level, (*) Significant at 10% level
Source: Authors' compilation from primary data

From the regression results with two models, the key findings are:
First, short-term loan financing, leverage, and fixed asset ratios all negatively impacted on F&B firm performance, while firm size and net profit margin had positive impacts. These findings were consistent with previous studies (Nguyen, 2009; Pham, 2011; Nguyen, 2013; Vu & Nguyen, 2013; Ilyukhin, 2015; Nguyen, 2017; Vo & Le, 2017; Mohammed & Andrew, 2019). It means that F&B firms have been using expensive short-term lending from banks, due to the interest rate fluctuation. The debts were also costly to F&B listed firms for in their capital structure, as equity source is now cheaper in Vietnam. Shareholders mostly did not pay attention to dividends. They bought firm shares because of the expected price increase. Investing in fixed assets heavily was also ineffective to firms due to the high propotion of depreciation, especially with industrial revolution 4.0. In addition, in this industry, big firms have strong comparative advantages thanks to their economies of scale and economies of scopes in penetrating huge market and diversifying various products. It also implies that the F&B firms still have potential to expand its size as they did not reach the best scale yet.
Second, the opposite results with previous studies were:

(i) Negative corelation of ROE and number of banks firms working with. It showed that F&B firms were inefficient in selecting bank partners, as average 3 banks to work with/firm seem too much. Some firms also worked with 20 banks. Therefore, these F&B firms did not get the highest preference rates for their loans and other services under bank's customer profitability analysis pricing policies.

(ii) Positive relation of short-term liabilities ratio and ROA/ROE. F&B firms who have low short-term loans from banks, but higher level of payables and advances got the better financial results, as these sources are non- or low cost. These F&B firms have strong bargaining powers thanks to their potential growth and good liquidity status. Therefore, they can ask suppliers and buyers to provide them with these facilities.

(iii) Foreign ownership status had negative relationship with ROA& ROE. The main reasons are (i) all the big and famous F&B firms in Vietnam are domestic, such as Masan, VNM, Hanoi Beer Corporation. (ii) Foreign investors did not have significant roles in most F&B firms yet. Vietnam F&B sector has attracted foreign investors (VIR, 2018). However, except for Sabeco case, Vietnamese F&B firms are still mainly dominated by domestic shareholders.

Third, long-term borrowing from banks, state ownership and ages all insignificantly correlated with firm performance. the purpose of state ownership is for control or orient economy as well as divert firm objectives to social performance, but this also provides better access to the resources to meet the demand of companies. Therefore, in this situation, particularly in the context of F&B companies in Vietnam, these two effects of state ownership would cancel each other out, leaving no net effect on the firm's performance. For the age of firms, older firms may have been doing better in business with their experience; however, they also have slow adaptability to the change in technology to upgrade its quality of products. These effects might lead to no impact of firm age on firm performance. This insignificant result of age is consistent with Nguyen, Do & Trinh (2019) for all Vietnamese listed companies.

Table 3. Summary of Bank Relationship vs F&B Firm Performance – Vietnam Case

Variable	Code	Hypothesis	Actual signal	Hypothesis acceptance
Quantity of bank relations	Bank_num	Positive	Negative with ROE, insignificant with ROA	Reject
	Bank_num^2	Negative	Insignificant	No conclusion
Short-term credit financing relationships (%)	Short_financing	Negative	Negative	Accept
Long-term credit financing relationships (%)	Long_financing	Positive	Negative	Reject
Firm size	Size	Positive	Positive	Accept
Asset tangibility structure	FATA	Negative	Negative	Accept
Short-term liabilities ratio	Short_term_liabilities_ratio	Negative	Positive	Reject
Firm leverage	Leverage	Negative	Negative with ROA, insignificant with ROE	Accept
Net profit margin	Net_profit_margin	Positive	Positive	Accept
State ownership status	State_ownership_status	Negative	Insignificant	No conclusion
Foreign ownership status	Foreign_ownership_status	Positive	Negative	Reject
Firm age	Age	Positive	Insignificant	No conclusion

Source: Authors' compilation from primary data and analysis

5. Recommendations

For improving firm performance and utilizing the bank relationship, the following recommendations are proposed for listed F&B firms in Vietnam.

First, reduce the short-term loans from banks and fixed assets investment, while increase the cheap equity funding available in the market. As firms avoid keeping unnecessary amount of short-term credit, they can eliminate high borrowings cost in short run and therefore, increase both the amount of profit gained and firms performance. To take this solution into action, companies should improve the managerial activities and process of production following the demand of markets. Also, applying more advanced technology in doing business and finally, acquiring better organized accounting procedure and market analysis with the purpose of enhancing the efficiency of bank credit. Limitation on the amount of fixed assets will save F&B firms significantly, as the fixed assets in this industry have very high depreciation rates, especially with industrial revolution 4.0. F&B firms can raise funding by issuing more shares to the public or to existing shareholders, as this is still the cheap funding source in Vietnam thanks to shareholders' expectation on pricing changes rather than dividends.

Second, be more selective in working with banks to have better fees and interest saved. Banks usually apply the customer profitability analysis pricing policies with clients having huge transactions in total. Therefore, reduce the relationship with banks down to 2-3 maximum, not up to 20. Choose the banks which can provide the whole packages of solutions to the firms to reduce all transaction opportunity costs.

Third, utilize other short-term liabilities, focusing on payables and advances – the low-cost funding sources. F&B firms have good reputation and advantages in requesting advances from their clients. They are in good position to ask for very low or zero payables or advances. This solution also can help to increase firm sizes.

Fourth, have smart buy-in strategies on foreign ownership. A reasonable ratio of foreign ownership can give firms advantages in having stronger financial background, more professional management and chances to study from people with long-term experience, while avoiding problems from information asymmetry and deconcentration from foreign ownership. To gain that ratio, board of director of firms should think carefully about how much foreign ownership is suitable for their ownership construction and how to use the strength of foreign shareholders in managing effectively.

Fifth, increase firm size to utilize the economies of scope and economies of scale in the market. F&B firms can do that by several ways: (i) increase equity and non-bank low cost liabilities such as payables, advances, (ii) issue subordinated debts; (iii) implement M&A with other firms.

6. Acknowledgement

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Appendices

APPENDIX A.1. DESCRIPTIVE STATISTIC SUMMARY OF VARIABLES IN THE MODEL

Variables	Obs.	Mean	Std. Dev.	Min	Max
ROE	170	17.16106	16.70943	-42.88	91.24
ROA	170	9.983176	10.11227	-18.99	72.19
Bank_num	170	3.094118	2.90734	0	20
Bank_num^2	170	17.97647	42.33313	0	400
Short_financing	170	32.52672	29.00266	0	100
Long_financing	170	5.866341	13.86779	0	80.3515
Size	170	13.57818	1.595999	11.56092	18.1065
FATA	170	25.81366	17.07344	0	99.13
Short_term_liabilities_ratio	170	88.16365	21.38562	0	100
Leverage	170	42.02941	17.54232	10	80
Net_profit_margin	170	10.09576	9.007154	-6.39	43.33
State_ownership	170	16.12018	23.42762	0	61.9
Foreign_ownership	170	11.79868	14.79582	0	59.76
Age	170	25.94118	13.18045	4	62

Source: Authors' compilation from primary data

APPENDIX A.2: CORRELATION MATRIX

Probability	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
1. ROE__	1													
2. ROA__	0.90*	1												
3. Bank_Num	-0.16*	-0.19*	1											
4. Bank_Num_2	-0.10	-0.13*	0.88*	1										
5. Short_Financing__	-0.16*	-0.25*	0.40*	0.22*	1									
6. Long_Financing__	-0.02	-0.06	0.14	0.10	-0.09	1								
7. Size	0.05	0.05	0.57*	0.39*	0.05	0.05	1							
8. Fata__	-0.07	-0.06	0.04	-0.02	-0.11	0.23*	0.22*	1						
9. Short_Term_ Liabilities_Ratio	0.17*	0.20*	-0.28*	-0.20*	-0.03	-0.16*	-0.45*	-0.46*	1					
10. Leverage	-0.03	-0.28*	0.30*	0.22*	0.30*	0.12	0.09	-0.26*	0.03	1				
11. Net_Profit_Margin__	0.31*	0.37*	0.16*	0.10	-0.12	0.01	0.44*	0.10	-0.15*	-0.05	1			
12. State__	-0.02	0.07*	-0.19*	-0.15*	-0.13*	-0.22*	-0.29*	-0.20*	0.29*	-0.06	-0.06	1		
13. Foreign__	-0.01	0.05*	0.13	0.08	-0.26*	-0.02	0.59*	0.11	-0.21*	-0.14*	0.14*	-0.12	1	
14. Age	-0.06	-0.04*	-0.08	-0.08	0.06	-0.02	-0.09	-0.04	0.01	-0.07	-0.26*	-0.15*	-0.15*	1

Source: Authors' compilation from primary data

* $p < 0.1$

APPENDIX A.3: HAUSMAN TEST RESULT

APPENDIX A.4: LIST OF F&B FIRMS COVERED IN THE RESEARCH

No	Code	Full name of the firm
1	AGM	An Giang Import – Export Company
2	BBC	Bibica Corporation
3	CAN	Ha Long Canned Food Joint Stock Corporation
4	CAP	Yen Bai Joint Stock Forest Agricultural Products And Foodstuff Company
5	CLC	Cat Loi Joint Stock Company
6	DBC	Dabaco Group
7	FMC	Sao Ta Foods Joint Stock Company
8	GTN	GTNFoods JSC
9	HAD	Ha Noi – Hai Duong Beer JSC
10	HAT	Ha Noi Beer Trading Joint Stock Company
11	HHC	Haiha Confectionery JSC
12	HNM	Hanoimilk Joint Stock Company
13	KDC	KIDO Group
14	KTS	Kon Tum Sugar Joint Stock Company
15	LAF	Long An Food Processing Export Joint Stock Company
16	LSS	Lam Son Sugar Joint Stock Corporation
17	MCF	Mechanics Contruction & Foodstuff JSC
18	MSN	Masan Group Corporation
19	NSC	Vietnam National Seed Group JSC
20	NST	Ngan Son Joint Stock Company
21	SAF	Safoco Foodstuff Joint Stock Company
22	SBT	Thanh Cong – Bien Hoa Joint Stock Company
23	SCD	Chuong Duong Beverages Joint Stock Company
24	SGC	Sa Giang Import Export Corporation
25	SLS	Son La Sugar JSC
26	SMB	Sai Gon – Mien Trung Beer JSC
27	SSC	Southern Seed Corporation
28	TAC	TuongAn Vegetable Oil Joint Stock Company
29	THB	Ha Noi – Thanh Hoa Beer Joint Stock Company
30	TSC	Techno – Agricultural Supplying Joint Stock Company
31	VCF	Vinacafé Bienhoa Joint Stock Company
32	VDL	Lam Dong Foodstuffs JSC
33	VNM	Viet Nam Dairy Products Joint Stock Company
34	VTL	Thang Long Wine Joint Stock Company

A Brief Analysis of the Reasons and Preventive Measures for the Loss of Assets in China's Mixed-Ownership Reform: The Case of the CITIC Guoan Group in China

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Abstract

To establish a perfect socialist market economy system with Chinese characteristics, the reform of mixed ownership of state-owned enterprises has been the general trend. The original intention of the mixed-ownership reform of state-owned enterprises is to reform the disadvantages of the full ownership of state-owned capital, absorb the advantages of private enterprises, realize the purpose of improving the operating conditions of enterprises and improving the efficiency of enterprises, and better serve the Chinese economy. However, in the process of practical operation, the mixed-ownership reform of state-owned enterprises has sometimes become a tool to enrich the pockets of a few people, resulting in serious losses of state-owned assets. It is urgent to establish an effective and feasible reform system to prevent the loss of state-owned assets.

Keywords: State-Owned Enterprises, Reform of Mixed Ownership, Loss of State Assets

Background

Since the establishment of the socialist market economy system with Chinese characteristics at the 14th national congress of the communist party of China (CPC) in 1992, the scale of the mixed-ownership reform of state-owned enterprises has been expanding day by day. On November 12, 2013, the third plenary session of the 18th CPC central committee adopted the decision of the CPC central committee on some major issues concerning comprehensively deepening the reform, which takes the development of the mixed-ownership economy as one of the priorities of the reform in the new era, thus kicking off a new round of mixed-ownership reform of state-owned enterprises. On August 24, 2015, the guiding opinions on deepening the reform of state-owned enterprises (hereinafter referred to as the "opinions") issued by the CPC central committee and the state council also showed the determination of the central government to further deepen the reform of state-owned enterprises. Jia (2020)considered that while enjoying the benefits brought by the mixed-ownership reform of state-owned enterprises, we cannot ignore one of the major risks -- the loss of state-owned assets. The guideline also said the supervision system of state-owned enterprises should be further improved to prevent the loss of state-owned assets and ensure their value is maintained and increased. This paper will specifically analyze the risk of the loss

of state-owned assets in the process of the mixed-ownership reform of state-owned enterprises and put forward some preventive measures.

1. Case analysis of the mixed-ownership reform process of CITIC Guoan Group

The following author will take the concrete process of the mixed-ownership reform of CITIC Guoan Group as an example to discuss the real cause of the loss of state-owned assets. Before the mixed-ownership reform, CITIC Guoan Group was fully controlled by CITIC Guoan Group, a subsidiary of the ministry of finance, and was wholly state-owned.

At the beginning of 2014, CITIC Guoan Group held a general meeting of shareholders and voted to transform the company from a sole proprietorship to a joint-stock liability company. Then in August 2014, CITIC Guoan Group group released information that the group would complete the mixed-ownership reform, this reform will introduce five private capital, after the reform CITIC Guoan Group's shareholding ratio will be changed from 100% full control to 20.945%. The base date of the reorganization of CITIC Guoan Group is December 31, 2012. On that day, the combined net assets of CITIC Guoan Group are 15.5 billion yuan, and the net assets belonging to CITIC Guoan Group are 1.06 billion yuan. Based on the evaluation value, in October 2013, CITIC Guoan Group and five private investors jointly signed the agreement on the capital increase and share expansion of CITIC Guoan Group co., LTD. The five investors added 8 billion yuan in cash to CITIC Guoan Group, occupying nearly 80% of the shares. After the mixed-ownership reform, the ownership structure of private capital is shown in the following figure.

Table 1: CITIC Guoan Group after the reform of the non-public part of the shareholding structure

Stockholders	Shareholding ratio (%)	Capital contributions (billion yuan)
Heilongjiang Dingshang decoration engineering co. LTD	19.76	20.00
Trust King Group	17.79	18.00
Senyuan Group	15.81	16.00
Beijing Qianrong investment (group) co. LTD	15.81	16.00
Tianjin Wanshun property co. LTD	9.88	10.00
Total	79.06	80.00

Of the 8 billion yuan invested by the five private companies, 5.662 billion yuan was recorded as paid-in capital, and the remaining 2.338 billion yuan was recorded as capital reserve. The registered capital of the CITIC Guoan Group increased from 1.5 billion yuan to 7.617.7 billion yuan, and the capital reserve increased from 0.35 billion yuan to 2.7323 billion yuan. After the mixed-ownership reform, the net assets of CITIC Guoan Group increased from 15.5 billion yuan to 23.8 billion yuan, of which the original parent company CITIC Guoan Group holds 20.945% shares, totaling 5 billion yuan, and the five private capitals hold 79.055% shares, totaling 18.8 billion yuan.[1]

Since the mixed-ownership reform only conducted a transaction but has not yet entered the real operation stage, we can conclude that five private capital by buying the shares of CITIC Guoan Group will increase the assets of more than 10 billion yuan. Thus it can be seen that in the process of the mixed-ownership reform, CITIC Guoan Group has a huge gap in its value estimation, resulting in a huge amount of state-owned assets being sold at a low price, which has caused a serious loss of state-owned assets. Under CSRC rules, there is a 12-month lock-up

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[1]Data from the official website of CITIC Guoan Group

period for the shares.[2]But as soon as the lock-up period ended, four of the five investment firms cashed out of their holdings in CITIC Guoan Group, making huge profits in a series of share changes that eventually led to their exit.

Looking back at the case of the mixed-ownership reform that caused the serious loss of state-owned assets, we can find that the role of China United Assets Appraisal Group as the fair value appraiser of assets and the role of SASAC and the ministry of finance as the auditor of the reform is virtually empty. And CITIC Guoan Group has not fully disclosed all the necessary information, for information disclosure obligations prescribed by the CSRC provisions promulgated by the state council and the "proposed by capital and share the implementation of the restructuring of enterprises, should be through the property rights trading market, the media, or network public enterprise restructuring information on situation, investors, merit-based investors" rules.[iii]Here we have too much discussion on whether there is any fraud in the management, but the lack of information disclosure and wrong judgment on asset valuation are the important reasons for the major loss of state-owned assets. Besides, we should also see that after the loss of state-owned assets, no individual is responsible for it.(Mai,2016)

According to a large number of cases of mixed-ownership reform, much private capital, especially investment companies, choose to cash out in a short time after passing the lock-up period, which also reflects the motivation of much private capital to participate in the mixed-ownership reform. Since the stock market is a zero-sum game mechanism, and the opposite of an investment company is state-owned assets and the majority of small and medium-sized investors, this way of arbitrage is bound to harm the interests of the state and the masses of the people.(Tang,2015) We can even further deduce that for investment companies, the motivation for them to enter the mixed-ownership reform market is the profit, the low price of entry and the high price of exit, which is a monopoly rent-seeking opportunity. If shares in state-owned enterprises are only allowed to be bought by private companies at fair value, there is no speculation. To sum up, in the implementation process of mixed-ownership reform, some private capital does try to fish in troubled waters and make profits by earning price difference in a short time, and this kind of profit-seeking behavior will put forward a huge challenge to the original intention of mixed-ownership reform to maintain and increase the value of state-owned assets.

2.Reasons for the loss of state-owned assets

2.1 Theoretical reason based on the case of CITIC Guoan Group

According to the profit equalization theory of Marxist political economy, in the market of free capital flow, no matter which production sector, will comply with the average profit margin of a society. Therefore, we can infer that in the process of the mixed-ownership reform of some state-owned enterprises, the non-open non-market transaction is the reason why individuals or enterprises grab huge profits and cause the loss of state-owned assets. Taking the case of mixed-ownership reform of CITIC Guoan Group as a typical analysis, there are two main ways to drain state-owned assets:

One is that state assets are undervalued. And this kind of undervaluation of asset value often comes from the information asymmetry in the reform. Before the implementation of mixed-ownership reform, state-owned enterprises were fully controlled by the state, and there may be incomplete risks in terms of information disclosure. Based on the situation that the ownership agents and operators of state-owned enterprises are often the same part of people, the internal business information of enterprises, such as the true price of assets, the true benefits of enterprises, etc., are often in the hands of this part of people. (Zhang,2014)Therefore, when entering the market transaction stage, a foundation of information asymmetry is created. In the process of the reform in the national security group, for state-owned assets valuation problem has not been a clear measure, after fulfilling the reform only roughly by the publication of five private capital investment and asset values, and in addition to financial data released parts subsidiary, the national security group also does not release its full asset information. However, compared with the financial statements of CITIC Guoan Group in previous years, the actual amount of state-owned assets after the reform is far from the amount of state-owned assets. As a result of

information asymmetry, SASAC and other departments as regulators and other transaction participants in the market may not have a clear understanding of this part of real information, and cannot carry out good political supervision and market competition, thus creating loopholes for the loss of state-owned assets. In essence, this kind of loss means that a few people grasp the information advantages that others do not have, and use these advantages to seek benefits unknown to others, resulting in the loss of state-owned assets.

The second is that there are non-market backroom deals. In an open market with full flow of resources, if there is a transaction in one market with a profit margin much higher than that in other markets, then the flow of resources in the market will flood into the transaction, and the profit margin will be reduced to the normal level through the influence of supply and demand. In this case, the asset loss behavior in the reform of state-owned enterprises will attract a large number of private resources to flood in(Huang,2014), and the price of state-owned assets will be pushed up again through market adjustment, thus blocking the trend of state-owned assets loss. However, in the case of CITIC Guoan Group, the introduction process of the five private capital was not disclosed. It was not until August 2014, when the reform was almost completed, that the two listed subsidiaries of CITIC Guoan Groupdisclosed the information of the five private capital involved in the reform, which led to the suspicion of whether there was a behind-the-scenes transaction. In behind-the-scenes trading, the actual controllers of some state-owned assets have the power to decide the trading object, trading mode and trading price. Through non-market behind-the-scenes trading, private capital can acquire a large number of state-owned assets at the cost of market law. This loss of state assets is due to the excessive government power in the transaction stage of reform, but the reason for this monopoly is not the government itself, but the improper use of government power by a few people.(Zhang,2009)

In addition to the above two reasons, many other reasons cause the loss of state-owned assets, such as the personal corruption of managers and the deadweight loss caused by the poor efficiency of reform, etc., but these are not the behaviors in the transaction process, nor are they the main reasons that cause the loss of state-owned assets. This paper will not make further analysis.

To sum up, the above two reasons for the loss of state-owned assets are, in the final analysis, non-public and non-market behaviors in the process of reform. This article will further analyze the more general process of mixed-ownership reform, find the reasons that are applicable to explain most cases of state-owned assets loss and develop a universal solution.

2.2.Reasons based on Specific process of reform

At present, there are three specific ways to carry out the mixed-ownership reform in the market: state-owned enterprises transfer equity to private capital, state-owned enterprises purchase the equity of private enterprises through private placement, the state capital and employees' equity in state-owned enterprises.Tang(2020)concluded that in these three specific ways, there are more or fewer loopholes that lead to the loss of state-owned assets. The most common form of reform is the transfer of equity from state-owned enterprises to private capital. By analyzing the specific process of state-owned enterprises transferring equity to investors, we can observe how the risk of specific loss of state-owned assets is generated. The following chart is a flow chart of the basic mixed-ownership reform of municipal state-owned enterprises.
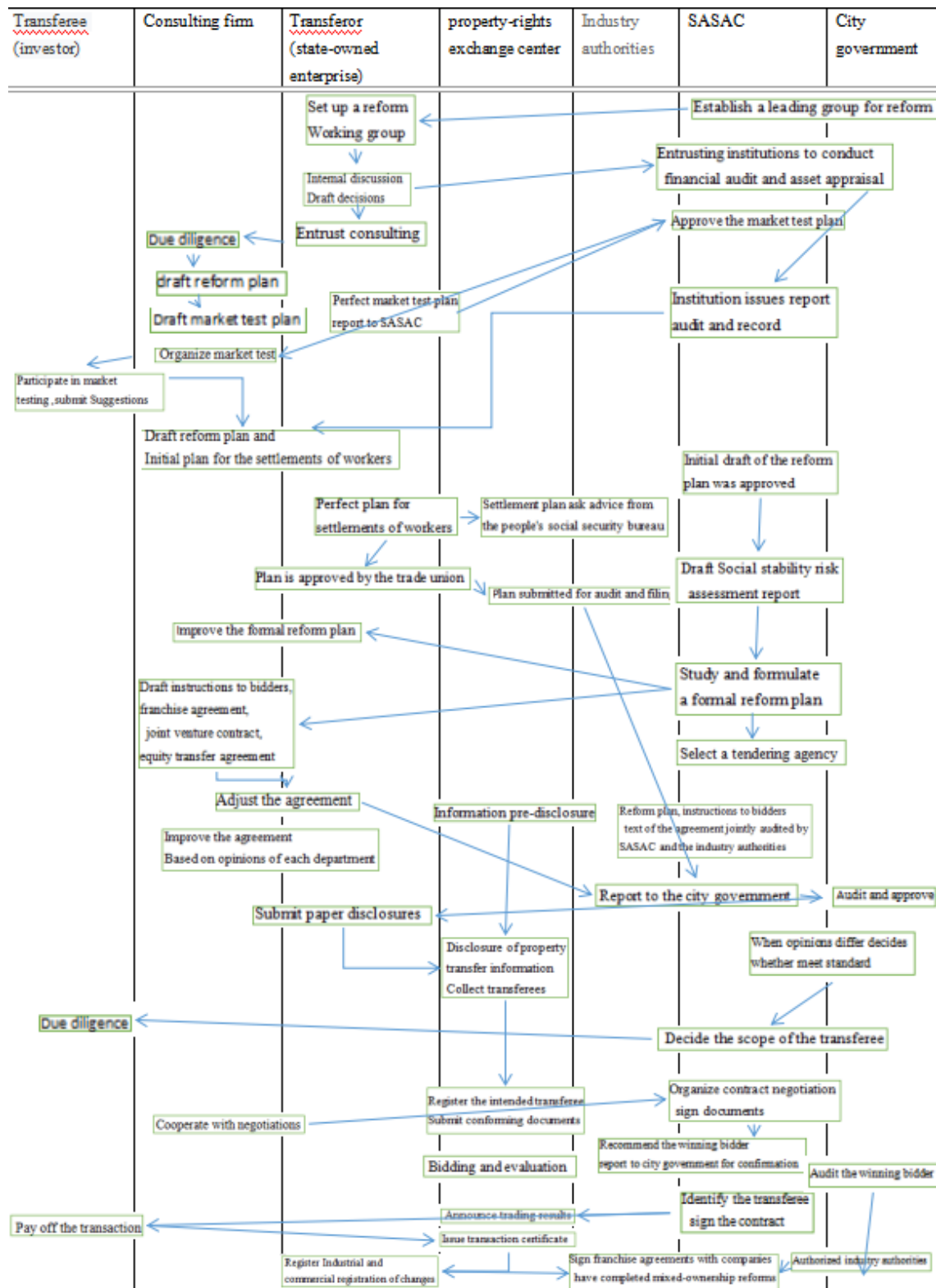
As can be seen from the figure, the process from proposing the reform plan to the completion of the reform can be mainly divided into two steps: one is the steps of government behavior, and the other is the steps of market behavior. The three parties leading the reform are SASAC, state-owned enterprises, and investors. Through the comparative analysis of these three parties, it can be found that the internal personnel of state-owned enterprises, as the managers and operators of state-owned assets, have natural advantages in information, while the private capital in SASAC and the general market participating in the transaction, as the regulator, have limited access to information. The reason is that SASAC is not personally involved in the daily operation and supervision of enterprises, and its access to information is often through the reporting of enterprise operators. Private capital in the market can only understand the assets of state-owned enterprises through their information disclosure, which

is often incomplete from the perspective of the reform process of the CITIC Guoan Group. This information asymmetry, in turn, provides the basis for potential back-room deals.

Here the loss of state-owned assets can be divided into active loss and passive loss. The loss of initiative refers to that the insiders of state-owned enterprises seek profits by taking advantage of their information advantages and potential power to carry out behind-the-scenes transactions(Guo et al,2019). When the enterprise operators have a moral hazard, it is difficult for SASAC to deeply identify the authenticity of the information they provide, and it is also difficult to supervise whether they carry out behind-the-scenes transactions. Once the enterprise operators collude with individual investors, or further collude with third-party evaluation institutions, the state-owned assets will face the risk of serious loss. Passive loss refers to the failure of some local departments or enterprises to make a detailed assessment of state-owned assets to quickly complete the task of mixed-ownership reform, and the wrong prediction of the value of state-owned assets, resulting in the sale of state-owned assets at a low price. In either case, there is a lack of information that is not fully available to all parties. Most cases of the loss of state assets can be attributed to the fact that the assets were not accurately valued and disclosed, and that the few people holding the power of the government decided the detailed process of the transaction, such as the price and the object, under incomplete conditions.

We can split the whole process into two parts: the government and the market. At the government level, on the one hand, the government fails to fulfill its duty of breaking down information barriers and maintaining a free competitive market, which is the traditional work of "night watchman". On the other hand, the government's power is excessively expanded. It crosses the boundary of "night watchman", and some people use the government's power to gain a dominant position in market transactions, such as pricing power. This dominant position is supposed to be a seller's monopoly market of state-owned assets, and the government can use this dominant position to maximize the national interests(Wang,2019).However, the reality is that a few people with such power only realize the maximization of their interests, and it is a loss for the country to sell off state-owned assets for personal interests. From the perspective of the market, the market should have determined the equilibrium price of the transaction in the process of the transaction, to realize the reasonable allocation of resources, but in the process of the mixed-ownership reform, the market's role of such decision is deprived by the government's power. Mixed ownership reform is an important stage to realize the marketization of the economy, but the process of implementation is so non-marketization.

To sum up, in the process of implementing mixed-ownership reform, the government, on the one hand, controls too little, resulting in information barriers, on the other hand, controls too much, depriving the market of the function of resource allocation, resulting in the loss of state-owned assets.

3.Ways to improve the system of preventing the loss of state-owned assets

To solve the problem of the loss of state-owned assets, we must solve two key points: "who will manage" and "how to manage". To sum up, the reason for the loss of most state-owned assets lies in the information asymmetry and non-market transaction. To avoid the loss of state-owned assets to the greatest extent, we should focus on these two points.

At present, most of the Suggestions of the mainstream public opinion on this issue are that the state should strengthen the control, establish more detailed management methods, refine the asset accounting, and implement more strong supervision measures on state-owned enterprises. Specific measures might include: perfecting the relevant laws and regulations of the legislative work, standardization of enterprise assets evaluation criteria, in the enterprise internal-external build more regulators or is it strengthens the audit of circulation of state-owned assets, such as setting up a state-owned asset valuation and price difference of the legal scope, responsibility, and penalties for violators. These measures are of course beneficial, and to some extent they can indeed alleviate the problem of the loss of state-owned assets.

In fact, for a long time, the legislative supervision of such issues has been gradually promoted. The law on state-owned assets of enterprises clearly defines the above issues, such as information disclosure, asset accounting,

equity transfer method, and operator supervision.[iii]In the following ten years, various supplementary provisions based on the spirit of the law on state-owned assets of enterprises have been successively introduced. Facts have proved that the establishment of these provisions does not fundamentally prevent the loss of state-owned assets.

In many market models, only one model does not have monopoly behavior, that is, the free competitive market. Although there is no condition to constitute a free competition market in reality, the closer a market is to free competition, the less likely monopoly will appear. It is also important to recognize that most monopolies arise because governments have crossed the line of "night watchmen" and intervened in the market. As in mixed-ownership reform, part of the business operators to master the power of the government is too big, they have the freedom to exercise power to determine matters such as stock issue price, the information disclosed object, although this is not the power of the government's original intention, but essentially, they represent the government determines which private capital have the right to participate in, the resulting nonmarket transactions.

By comparing the state intervention and the free market can have more effect on the trading behavior of mixed-ownership reform, we can see that the country's legislation and controls are always asked for a universal, if specific to an industry, a company, the assessment of the value of state-owned assets and the current price differences within the scope of what is feasible? Is this standard applicable to another industry or company? Zheng(2014) reckoned that the real economic situation is always complex and changeable, while state control is fixed and cannot be changed in a short time. When it comes to every micro-economic decision, the market naturally has more flexible advantages than the government. The market of information flow can price every specific state-owned asset more accurately than the government so that every transaction is in an equilibrium state. All the government needs to do is to ensure that the market takes full advantage of this(Duckett.,2001).The loss of state-owned assets is essentially caused by the government. Relying on the government to further control cannot fundamentally solve the problem. Meanwhile, the cost of supervision is gradually increased. On the contrary, if the force of the market can be used at this time, it can often return to the market equilibrium.

Imagine such a situation: when a when facing mixed-ownership reform of state-owned enterprises and all potential participants of the market, access to all information provided by the government, the market access system and be relaxed at the same time, so when the possibility of a state-owned asset sale, all the capital market will flock to the unbalance of supply and demand relations will push the state-owned assets back to the real price level.

To sum up, it is inevitable to establish an open and free market system to solve the problem of loss of state-owned assets in the reform of mixed ownership. Mixed ownership reform is essentially the process of marketization of non-market enterprises. In this case, it is more necessary to adopt the marketization approach. Hayek(1984) argued that the more imperfectly competitive the market, the greater the benefits of competition. There is inevitably no perfect competition, but it cannot be regarded as the reason for not implementing the competition system. Market allocation of resources is often more efficient in the subtle and subtle areas that are hard to reach directly. The specific approach is that the country only needs to do a full disclosure of information and relax the market access system, pricing and trading rights back to the market. The transaction of state-owned assets, each item should be fully complete message to the society of private capital, and make the selection of appropriate response to the market price and computation, can also set up a standard auction of state-owned assets of the trading system, by private capital rising price is to avoid unreasonable price for holes on state-owned assets. Such market-determined transactions can largely push the value of state assets to a market-recognized equilibrium price.

This measure can be compared to the stock market IPO pricing system from fixed price to inquiry. First, to set up the system of the stock market in China, the issue of new shares tend to adopt the model of a fixed price, the resulting defects is the issue of stock prices sometimes serious deviation from the real value of the company, that occurs after the listed stock value is not reasonable and unreasonable fell, serious when even appeared after value into one over ten or more than ten times. To solve this problem, the securities and futures commission promulgated the several problems about IPO trial inquiry system notice, "notice" provisions of the companies

issuing new shares for the first time, have to comply with the China Securities Regulatory Commission (hereinafter referred to as the CSRC requirements as prescribed in the securities investment fund management companies, securities companies, trust investment companies, finance companies, insurance institutional investors and qualified foreign institutional investors (QFII), and other institutional investors approved by China Securities Regulatory Commission for inquiry, with the result of the inquiry as to the stock price and decided to purchase the important basis of the object.[iv]This is the return of pricing and trading rights to the market. From the implementation of the effect, this measure did play a stabilizing role in the stock market.

In fact, in the current mixed-ownership reform of state-owned enterprises, some enterprises do use the IPO listing procedure, but there are also defects of the complex internal structure of state-owned enterprises and insufficient information disclosure, which make this procedure fail to fully play its role. To this end, the government still needs to further improve the relevant system, should grasp, should let go, to build a more adequate competitive market, to fundamentally cut the seeds of monopoly, from the source of blocking the loss of state-owned assets.

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Does Bangladesh Need to be Established Derivatives Markets?

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Abstract
Derivatives are very cardinal agreement, not just for the purpose of investors but for the overall economies. They excellently affect the general execution of a nation's economy and along these lines the global economy. The world derivative markets are gigantic and it has developed widely in the last decades in both developed economy and rising economy. Derivative markets protect bonds, currency, equity, and short-term interest rate assets from various risks. Bangladesh is a developing country it has an emerging economy. It is necessary to establish derivative market in Bangladesh. In our article, we discuss about theoretical framework such as different derivative products, benefits, and limitations of derivative markets. We also analyze six countries (Australia, Canada, Hong Kong, India, Japan, and US) derivative annual turnover. We see both exchange-traded derivative turnover and over-the-counter turnover. We find that every countries annual turnover increase in present year as compared to previous year. In the last part of our study, we are recommending some essential requirements sequentially to establish derivative market in Bangladesh.

Keywords: Capital Market, Derivatives Markets, Economic Growth, Financial Instruments

1. Introduction

Derivatives have recently become an essential feature of global financial development. The foundation of financial derivative markets has been significant improvement pattern in financial markets in the course of recent years. Financial advancement and market demand accelerated the growth of derivative trade. Financial derivatives have a long story. In 12th century, early trading started at Venice. At that time, credit derivative arrangements appeared as advances to subsidize transport campaign with some protection on the ship not returning. Later in 16th century derivatives agreements on commodities come out. Since 1970s, various

principles changes in global financial markets have added to the strong development in derivative markets. The breakdown of the Bretton Woods system of fixed exchange rates in 1971 expanded the demand for protection against exchange rate risk. The next year Chicago Mercantile Exchange permitted exchanging in currency futures. US Federal Reserve (FED) developed different derivatives markets by changing its monetary policy target instrument. The adoption of a target for money expansion by the FED in 1979 has prompted expanded interest-rate volatility of Treasury bonds. That in turn increased the need of derivative to protection against unfavorable movements in interest rate. The US Federal Open Market Committee moved to straightforward state its target for federal funding rate, a policy that encourages the increase of derivatives in federal fund rates after 1994. There are many financial crises occur in 1990s, which are often conducted by an acute expansion of corporate bankruptcy, greatly expanding the need of worldwide investors for hedging in opposition to credit risk (Rahman and Das, 2015). This paper aims to show the positive scenario of establishing derivative market in Bangladesh. For this, at first we sum up the hypothetical ideas of derivatives markets, types of derivatives, advantages, and limitations of derivatives. At that point, the rationale for building up derivatives market in Bangladesh is presented.

1.1 Research objectives

    i. To examine the advancement of different derivative products.
    ii. To overview of the average turnover of derivative market in some developing and developed countries.
    iii. To examine the consequences of the derivatives markets in Bangladesh.
    iv. To propose some recommendation about establishment of derivatives markets in Bangladesh.

2. Literature Review

Derivatives are the financial instruments whose value depends on underlying variables. Prices of traded assets are the underlying variables. The example of derivative instrument is a stock option. Because the value of the derivative is dependent on the price of a stock. Be that as it may, Derivatives are normally at some points rely on any factors, from the value of swine to the quantity of snow falling at an exact ski resort (John C. Hull, 2009). Sahoo (1997) discussed about the legal framework for derivatives trading. He said derivative markets some time complicated part of its regulatory structure when it is used as derivative trading. The basis of regulatory structure is to persuade the efficiency and competition instead of preventing it. Greenspan (1997) also said the most vital event in finance throughout there are extraordinary development and growth of financial derivative in the past decades. The economic growth of a country is also increasing by the derivative market. In the world everywhere, derivative markets have gotten a speedy momentum so that average derivative turnover growing faster. If we need financial stability in a country, we have to establish derivative market. If one country establishes derivative market, they can improve in many sectors such as capital structure and profit-making ability of banks, and occupy additional international capital into a country. In this way their economic growth increases faster. (Li Tian, 2005).

There is a relationship between the increasing number of the derivatives market and the real economy (Sipko, 2011). He focuses that the trading volume of the derivatives market has accrued considerably in recent decades which this increase contributed significantly to the worldwide financial crisis. The author conjointly compares the growth of nominal and real GDP with the worldwide derivatives market, and specially the over-the-counter market (OTC).

Oliver Fratzscher (2006) discussed about his research paper that, Asian derivative markets return to seventeenth century rice trading in Japan and have increased rapidly over the last decade. Derivative contracts enable the trading of agricultural or financial instruments within the future at planned costs. Those standardized contracts that are traded at an organized exchange are referred to as exchange-traded derivatives (ETD) and those customized contracts that are traded individually are referred to as over-the-counter (OTC) derivatives. He also said that financial sector across region of Asian derivative markets are safe and efficient enough. For example witnessed with cooperation on reserve management, safety credit lines among central banks, and developing second Asian bond fund. Derivative trading increasingly transferring towards some of the worlds largest and

most innovative exchanges. This are considering to grow new strategic partnerships Dangers are still hiding in shore side and unregulated markets, especially it occurs in the low transparent credit derivative products.

Sendeniz-Yüncü et al. (2018) mention in their paper that a useful derivatives market makes it possible for company to share risks efficiently and permits them to conduct projects with higher risk and consequently to increase economic growth. At the same time, investors, consumers, and producers, can trust on the derivatives market as an information media that reflects equilibrium prices. Economic growth may occurs by taking right decisions, stimulating the efficiency of resource distribution. They utilized time series information to see the connection between the future markets and economic advancement in both developed and emerging nations. They studied about 29 out of the 32 countries and discovered that the two variables of concern have a long-run relationship. The middle-income or developing countries have a Granger-causality result from the futures market. The high-income or developed countries economic growth is reversed than middle- income countries. The futures market development and economic growth have opposite unidirectional relationship. The authors distinguished this relationship. On the one hand, direction starts with the countries whose per capita GDP is low but economic growth of future market development. On the other hand, Economic growth leads to the development of futures market if that have a relatively high real per capita GDP.

Panel vector autoregressive method and the Granger causality approach are used by Khan et al. (2017), Vo et al. (2019) show that here is a bidirectional Granger causality between the derivatives market and economic growth, although the causal relation differs between high- and middle-income or developing and developed countries.
There are many theoretical and empirical research discussed about there is a link between economic growth and financial development that surely include the derivatives market. (Kim et al. 2010) mention that macroeconomics determinants are used separately.

Vo et al. (2018) discussed their article derivatives market development has played an increasingly significant role in the financial market. The derivatives market serving not only effective hedging instrument but also an essential provider of quick information. The derivatives markets are increasing the efficiency of financial market activities. Some researcher studied that there is a positive effect of economic growth and minimizing uncertainty in the economy using risk-hedging instruments. Economic growth may be occurred by accelerating capital accumulation, creating investment more efficient by offering more diversity in risky projects. They also said that if one country developed derivative market, there economic growth expanding long run.

Turbeville (2013) said that Derivatives were aggressively produced and traded by big financial companies that were influential trading. The participants in this market sometime are not good at efficiency in the tasks required to manage the markets. High technology, analytical abilities, and proper knowledge can able to increase efficiency of the participants. This knowledge are helpful for making profit of an institution.

Gogoncea and Paun (2013) have studied about the advantages and disadvantages of using derivatives. They said derivatives are the protecting instruments that may be found in an investor's portfolio. By their own nature, these contracts meet a lot of specialized needs that arise within the current context of world financial system. Derivatives allow companies and individuals to hedge risks and handle risks in an effective manner. Besides protecting risks, they can also make firm-wide risk, especially if the firm uses derivatives episodic. Risk increase if there has no experience of using derivatives. For the economic environment in general, the collapse of a big derivatives dealer could produce systemic risk. However, the derivatives market assist in building a more efficient economy.

There were many researches are conducted about establishment of derivatives market in Bangladesh. They were discussed about the importance, risks, and advantages of derivative markets. Nazmul Hasan et.al discussed the importance of derivatives. They also said that in this century Bangladesh is far away from the positive effects of derivative markets. Our long-run plan should be derivative market. The short-run plan should embody dismissal of present issues of the capital market and the other important task is initiating liquid bond market. Some specialists aforesaid that while not derivative, investors feel insecure when investing in a market. There are many authors who have discussed about the importance of derivative market they also discussed the establishment of

derivative market is necessary in Bangladesh. There are many positive results have found by establishing derivative market including economic growth and financial development. Derivatives can help to protecting risk of emerging country like Bangladesh.

3. Methodology of the Study

This study is mainly based on secondary data. Secondary data is collected from articles, newspapers, magazines and related websites. Various books and articles related to financial derivatives were also the valuable sources. For the aim of the literature of the study, we have studied different types of articles, research papers, journals, bools etc. After collecting of relevant data and information from reliable sources, this information is analyzed, organized through tables and graphs to obtain the best results. To illustrate data Microsoft Office package is exercised here systematically.

4. Theoretical framework

Exchange traded derivatives and over the counter (OTC) derivatives are the two group of derivatives contracts. *Exchange-traded derivatives:* Exchange-traded derivatives (ETD) are the instruments that are buying or sell by means of particular derivatives trade or different trades. A derivatives market is a place where people buy and sell standardized contracts known as trading. A derivatives trade performs as a middleman to every single associated exchange and takes the beginning edge from each side of the exchange to perform as an assurance (eduinfomatics).

Over-the-counter: Over-the-counter (OTC) derivatives are instruments that are buy and sell that are also privately negotiated instrument. Buy and sell occur directly in this instrument. Buy and sell occur between 2 parties, while not going through a trading or other intermediary. The OTC derivative market is the biggest market for derivatives. The OTC derivative market is generally not under control with respect to the declaration of information between the parties (Lumen).

Classifications of Derivatives: There are 4 kinds of derivatives contracts: forwards; futures; options, and swaps. Forward contracts- a forward contract may be a non-standardized contract between two parties to buy or sell an asset at a specified future time, at a price agreed upon today. The party agreeing to buy the underlying asset in the future assumes a long position, and therefore the party agreeing to sell the asset in the future assumes a small position. Future contracts- futures contract is a standardized agreement written by a clearinghouse that executes an exchange where the contract can be buy and sell. Options contracts- an options contract is an agreement between a buyer and seller that gives the buyer of the option the right to buy or sell a particular asset at a belated date at an agreed upon price. Swaps contracts- swaps are derivatives in which analogues exchange cash flows of one party's financial tool for those of the other party's financial tool.

4.1 Why Derivatives Markets Are Important?
There are many author discuss about advantages of derivatives markets. That are given below:

Points	Bright Sides
Risk management	Risk management or hedging risk is the foremost necessary objectives of the derivatives market Risk management is the method of identifying how much risk we are expecting, determining the existing level of risk and shifting the risk. Risk can be managed by two ways: hedging and speculation. (Investopedia)
Price discovery	Futures market prices rely upon a continuous flow of information from around the globe and need a high level of clarity. A wide range of elements impact on the supply and demand of assets. These elements are climate changes, political problems, loan default, refugee movement problem, land recovery and environmental health. Thus, the present and future prices of the primary asset on which the derivative agreement is formed have a great impact on demand and supply. This type of information can changes the price of the product. The way people occupy it also constantly changes the price of a commodity. This method is called as price discovery. (Investopedia)
Market efficiency	Derivative market increase the efficiency of financial markets. By using derivative contracts, one can reproduce the reward of the assets. Therefore, the prices of the

	underlying asset and the associated derivative tend to be in equilibrium to avoid arbitrage opportunities. (CFI)
Reduce market transaction costs	Derivatives are the instruments that may help as an insurance or risk manages tools. In this instruments cost of trading may be lower or investor may not find it economically viable to purchase such risk management tools for their conditions.
Access to unavailable assets or markets	Derivatives can help organizations or companies get access to otherwise unavailable assets or markets. By using interest rate swaps, a company may acquire a more beneficial interest rate relative to interest rates available from direct borrowing. (CFI)
Capital intermediation	The capital intermediation function, the core social value afforded by the financial system, permits investment funds to be deployed to productive functions. One part of this method is just matching investors up with capital demand. However, the needs of investors and consumers of capital are often not the same. For instance, investors may want to lend at floating rates of interest whereas a borrower might want to have a fixed rate. A giant part of the services provided by capital intermediaries is to reconcile these differences (Wallace C. Turbeville, 2013)

Beside the benefits there are some limitations involved in financial derivatives that are given below:

4.2 Limitations of Derivatives Markets:

Points	Limitations
High risk	The high volatility of derivatives exposes them to probably huge losses. The sophisticated style of the contracts makes the valuation very difficult or even not possible. Thus, they bear a high inherent risk. (CFI)
Speculative features	Derivatives are widely considered as a tool of speculation. Due to the very risky nature of derivatives and their unpredictable behavior, unreasonable speculation could result in huge losses. (CFI)
Counter-party risk	Derivatives traded on the exchanges typically go through a thorough due diligence method, some of the contracts traded over-the-counter do not embody a benchmark for due diligence. Thus, there is a possibility of counter-party default. (CFI)
Liquidity risk	Liquidity risks are present for investors who want to complete a trade before its maturity. However, doing so presents big bid-ask spreads and should result in inefficient, large costs. (The new savvy)
Interconnection risks	Derivatives rely on its underlying assets' performance. Beside from its assets, it is also affected by external grounds. External factors and all the assets in a derivative are all interconnected. (The new savvy)

4.3 What are the derivative products: There are some derivative products that can be traded. Oliver Fratzscher (2006) discussed about derivative products in Asia in his journal. He said that there are five main derivatives product traded in Asian markets:

- *Foreign Exchange derivatives:* A foreign exchange derivative is a financial derivative whose return rely on the foreign exchange rate(s) of 2 (or more) currencies. These instruments are generally used for currency speculation and arbitrage or for hedging (protecting) foreign exchange risk. Oliver Fratzscher (2006) said that Asian foreign exchange markets are the biggest market within the world. Foreign exchange derivatives covered one third of the worldwide markets

- *Interest rate derivatives:* Interest rate derivative is a financial tool with a value that is linked to the movements of an interest rate or rates. Interest rate derivative include forwards or futures, options, or swaps contracts. Interest rate derivatives protect investors, banks, institutions, and individuals against fluctuation in market interest rates by using hedges; however, they can also be used to increase or refine the holder's risk figure or to speculate on rate moves. According to Oliver Fratzscher (2006), less than 5% of the world markets with a stagnating trend in over-the-counter markets and migration towards exchange traded markets.

- *Equity derivatives:* An equity derivative is a financial tool whose value is depend on equity movements of the rudimentary asset. For example, equity derivative is a stock option; price changes of primary stock have a great impact on its value. An investor hedges risk by using equity derivative that are related to taking big or small positions in stock. The investors also use speculation on the price changes of the primary assets. Equity derivatives have witnessed the most rapid growth, often doubling every two to three years, they are mostly exchange traded derivative markets with US, Canada, and Australia showing the most impressive recent growth.

- *Commodity derivatives:* Commodity derivatives are financial tools whose value depends on rudimentary commodities, like oil, gas, metals, agricultural materials, and minerals. Other assets such as exhalation buy and sell credits, freight rates and even the weather can also be a commodity derivatives. China has a history of commodity derivatives. Asia has third largest derivative contract called as Dalian Commodity Exchange.

- *Credit derivatives:* A credit derivative is a financial instrument that allows parties to handle their exposure to risk. Credit derivative comprising of a personally held, negotiable agreement between two parties in a creditor/debtor relationship. It permits the creditor to transfer the risk of the debtor's default to a third party. 10% of the credit derivative market is found in Asia.

4.4 Benefits of Derivatives in Bangladesh: Derivatives have become very vital tools in the Asia for transferring risks from one entity to another. Derivatives markets are growing faster in many developing countries. Sultana et.al (2014) have discussed their paper about the benefits of derivatives. We are discussed benefits of derivatives earlier in a table. Now we discuss about the possibility, good sides, and overcoming limitations of derivatives in Bangladesh from different viewpoints. SEC (Securities & Exchange Commission) Bangladesh has the power that can establish Derivatives Market. According to SEC's view point they told that today the full focus is stock exchange to the individual investors, organizations and companies. However, consciousness and education among investors are important. According to National Stock Exchange of India, they mention that overall amount of trade in derivatives are mostly occurred by the equity derivative product. Like any, one investor who invested in both stock exchange and an indexed market of securities. It is protecting risk hinge on index. Therefore, presently the investor can gain hedging for that product market though they are not making profit. Derivatives Market have different types of investors. Speculators- speculators is that kind of investor who want to take risks. Hedger- Hedger is that kind of investor who want to avoid risks. Arbitragers- arbitragers is that kind of investors who want to utilize short-term fluctuations.

5. Results and discussion

5.1 Results and discussion

In the below table and we discuss about six countries Exchange-traded and OTC derivatives market. In the below we are comparing previous and present situation of derivative market in six country.

Table 1: Exchange-traded futures and options, by currency
Notional principal, in billions of US dollars

Interest rate	Open interest		Daily average turnover	
	Dec-18	Dec-19	Dec-18	Dec-19
Australian Dollar	1352	1572	142	157
Canadian Dollar	753	1041	102	115
Hong Kong Dollar	0	0	0	0
Indian Rupee	0	1	0	0
Yen	203	132	47	48
US Dollar	68093	68216	6186	3970

Source: Bank for International Settlements

According to Bank of International Settlements (BIS) statistics of Dec-2018 and Dec-2019, we see that in the above table open interest of Exchange-traded futures and options, by currency in interest rate. Table 1 shows that

Open interest of the Australian dollar in Dec-18 was 1352 billion dollars and that was increased in Dec-19 at 1572 billion dollars. In Canadian currency, open interest was 753 billion dollars in 2018 and that was increased by 1041 billion dollars in 2019. In Hong Kong dollar there is no change in open interest. In Indian Rupee, there was 0 open interest in 2018 and that was increased 1 billion dollar in 2019. In Japanese yen, open interest was 203 billion dollars and that was decreased by 132 billion dollars. In US Dollar, open interest was 68093 billion dollars in 2018 and that was increased by 68216 billion dollars in 2019.

Table 1 also shows that the daily average turnover in Dec-2018 and Dec-2019. We see that daily average turnover of Australian dollar in Dec-18 was 142 billion dollars and that was increased in Dec-19 at 157 billion dollars. In Canadian currency, daily average turnover was 102 billion dollars in 2018 and that was increased by 115 billion dollars in 2019. In Hong Kong dollar and Indian Rupee there was no change in daily average turnover. In Japanese yen, daily average turnover was 47 billion dollars and that was increased by 48 billion dollars. In US Dollar, daily average turnover was 6186 billion dollars in 2018 and that was decreased by 3970 billion dollars in 2019.

We can see in the above table open interest was increased in 2019 at Australia (220bn), Canada (288bn), India (1bn), and US (123bn). On the other hand, open interest was decreased in Japan (71bn). Again, daily average turnover was increased in 2019 at Australia (15bn), Canada (13bn), and Japan (1bn). On the other hand, daily average turnover was decreased in US (2216bn).

	Open interest		Daily average turnover	
Foreign exchange	Dec-18	Dec-19	Dec-18	Dec-19
Australian Dollar	14	17	9	8
Canadian Dollar	18	19	7	7
Hong Kong Dollar	0	0	0	0
Indian Rupee	6	13	12	12
Yen	42	36	18	18
US Dollar	382	374	159	147

Table 2: Exchange-traded futures and options, by currency
Notional principal, in billions of US dollars

Source: Bank for International Settlements

According to Bank of International Settlements (BIS) statistics of Dec-2018 and Dec-2019, we see that in the above table open interest of Exchange-traded futures and options, by currency in foreign exchange. Table 2 shows that Open interest of the Australian dollar in Dec-18 was 14 billion dollars and that was increased in Dec-19 at 17 billion dollars. In Canadian currency, open interest was 18 billion dollars in 2018 and that was increased by 19 billion dollars in 2019. In Hong Kong dollar there is no change in open interest. In Indian Rupee, open interest was 6 billion dollars in 2018 and that was increased by 13 billion dollars in 2019. In Japanese yen, open interest was 42 billion dollars and that was decreased by 36 billion dollars. In US Dollar, open interest was 382 billion dollars in 2018 and that was decreased by 374 billion dollars in 2019.

Table 2 also shows that the daily average turnover in Dec-2018 and Dec-2019. We see that daily average turnover of Australian dollar in Dec-18 was 9 billion dollars and that was decreased in Dec-19 at 8 billion dollars. In Canadian currency, daily average turnover was constant 7 billion dollars in 2018 and 2019. In Hong Kong dollar there is no change in daily average turnover. In Indian Rupee, daily average turnover was constant 12 billion dollars in 2018 and 2019. In Japanese yen, daily average turnover was constant 18 billion dollars in 2018 and 2019. In US Dollar, daily average turnover was 159 billion dollars in 2018 and that was decreased by 147 billion dollars in 2019.

We can see in the above table open interest of foreign exchange was increased in 2019 at Australia (3bn), Canada (1bn), and India (7bn). On the other hand, open interest was decreased in Japan (6bn) and US (8bn). Again, daily average turnover was decreased in 2019 at Australia (1bn). Daily average turnover was constant in

2019 at Canada (7bn), India (12bn), and Japan (18bn). On the other hand, daily average turnover was decreased in US (12bn).

Chart 1: OTC foreign exchange derivatives turnover
in billions of US dollars
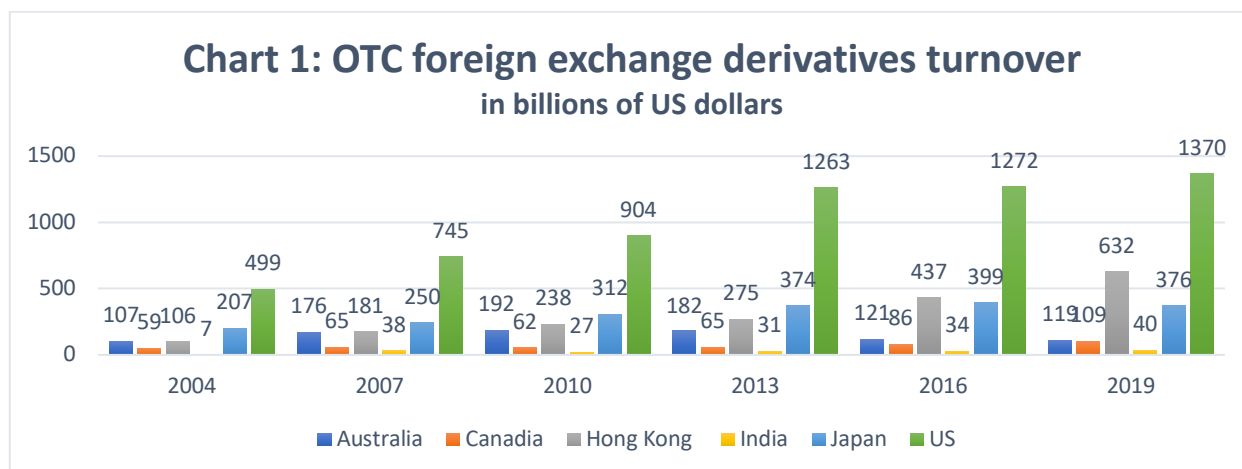
Source: BIS Triennial Central Bank Survey 2019

In the above chart, we can see that OTC foreign exchange turnover in 2004, 2007, 2010, 2013, 2016, and 2019 at Australia, Canada, Hong Kong, India, Japan, and US. In Australia OTC foreign exchange turnover in 2004, 2007, 2010, 2013, 2016, and 2019 was 107bn, 176bn, 192bn, 182bn, 121bn, and 121bn dollars respectively. In Canada OTC foreign exchange turnover in 2004, 2007, 2010, 2013, 2016, and 2019 was 59bn, 65bn, 62bn, 65bn, 86bn, and 109bn dollars. In Hong Kong OTC foreign exchange turnover in 2004, 2007, 2010, 2013, 2016, and 2019 was 106bn, 181bn, 238bn, 275bn, 437bn, and 632bn dollars. In India OTC foreign exchange turnover in 2004, 2007, 2010, 2013, 2016, and 2019 was 7bn, 38bn, 27bn, 31bn, 34bn, and 49bn dollars. In Japan OTC foreign exchange turnover in 2004, 2007, 2010, 2013, 2016, and 2019 was 207bn, 250bn, 312bn, 374bn, 399bn, and 376bn dollars. In US OTC foreign exchange turnover in 2004, 2007, 2010, 2013, 2016, and 2019 was 499bn, 745bn, 904bn, 1263bn, 1272bn, and 1370bn dollars. In the chart, we can also see that in each country, OTC foreign exchange turnover increased by 2019 compared to 2004.

Chart 2: OTC interest rate derivatives turnover
in millions of us dollars
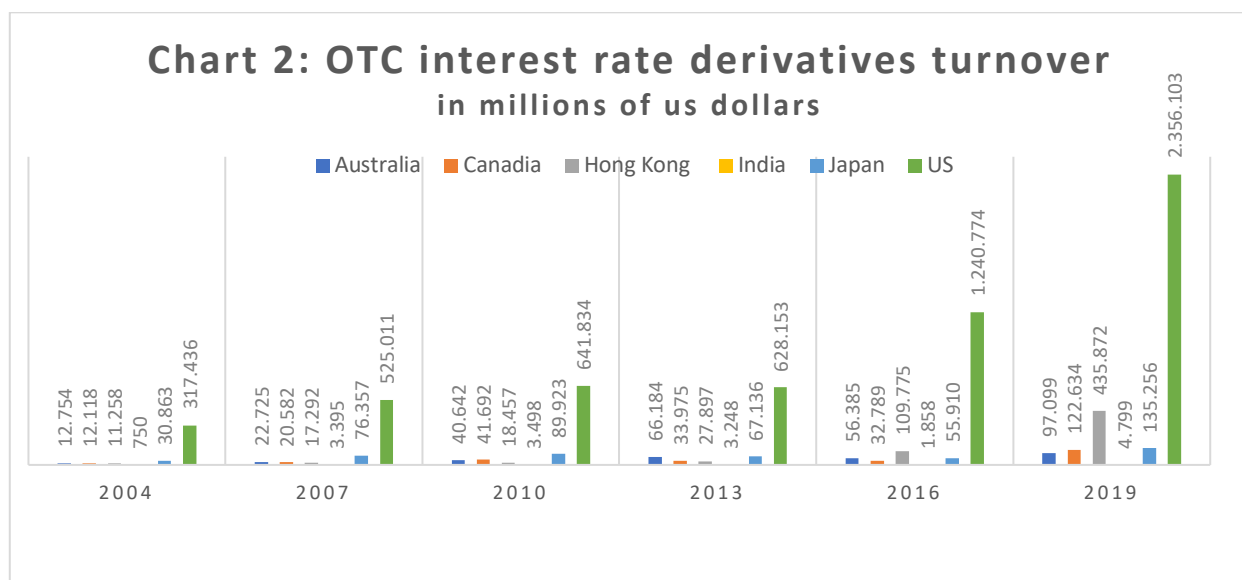
Source: BIS Triennial Central Bank Survey 2019

In the above chart, we can see that OTC interest rate turnover in 2004, 2007, 2010, 2013, 2016, and 2019 at Australia, Canada, Hong Kong, India, Japan, and US. In Australia OTC interest rate turnover in 2004, 2007, 2010, 2013, 2016, and 2019 was 12754m, 22725m, 40642m, 66184m, 56385m, and 97099m dollars respectively. In Canada OTC interest rate turnover in 2004, 2007, 2010, 2013, 2016, and 2019 was 12118m,

20582m, 41692m, 33975m, 32789m, and 122634m dollars. In Hong Kong OTC interest rate turnover in 2004, 2007, 2010, 2013, 2016, and 2019 was 11258m, 17292m, 18457m, 27897m, 109775m, and 435872m dollars. In India OTC interest rate turnover in 2004, 2007, 2010, 2013, 2016, and 2019 was 750m, 3395m, 3498m, 3248m, 1858m, and 4799m dollars. In Japan OTC interest rate turnover in 2004, 2007, 2010, 2013, 2016, and 2019 was 30863m, 76357m, 89923m, 67136m, 55910m, and 135256m dollars. In US OTC interest rate turnover in 2004, 2007, 2010, 2013, 2016, and 2019 was 317436m, 525011m, 641834m, 628153m, 1240774m, and 2356103m dollars. In the chart, we can also see that in each country, OTC interest rate turnover increased by 2019 compared to 2004.

In the above table 1 and table 2 have shown that almost every country open interest and daily average turnover of interest rate and foreign exchange are increased in the present years compared to past years. Chart 1 and chart 2 also shows that OTC foreign exchange and OTC interest rate is also increased in the present years compared to past years. On the developing country, Bangladesh needs to establish derivatives markets. Derivative market increase the economic growth of a country. There are many authors have found a positive relationship between the development of the derivative market and economic growth. India is the Bangladesh's neighbor country. According to National Stock Exchange in India there is gradually increasing in annual turnover of derivatives. We can also see in the chart given below.

Chart 3: Annual Turnover of Indian Derivative Market
in trillions of Indian Rupee
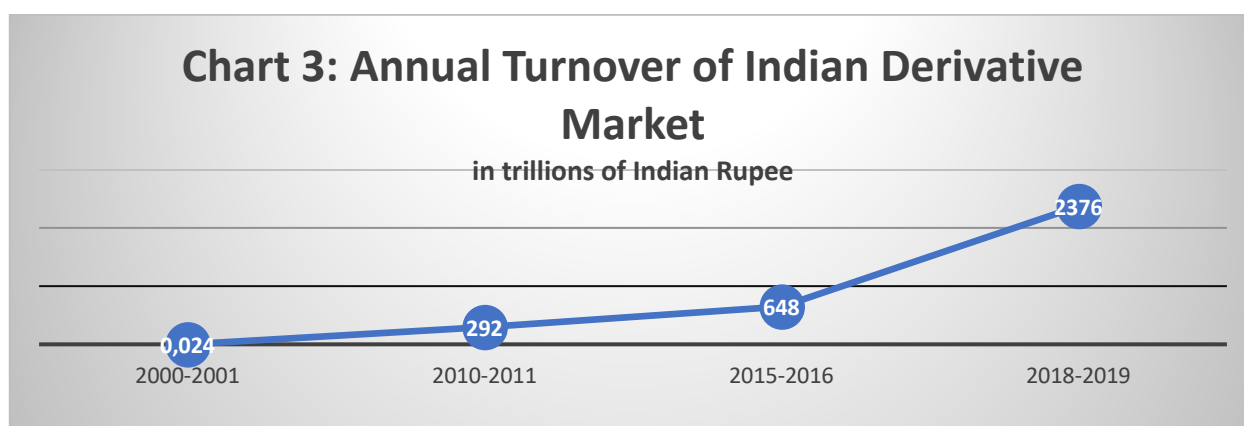
Source: National Stock Exchange

Chart 3 shows that the annual turnover of derivatives market on NSE was Rs0.024 trillion in 2000-01 that was increased by Rs292 trillion in 2010-2011. Annual turnover of derivative market then increased Rs648 trillion in 2015-2016 compared to 2010-2011. In 2018-2019, Rs2376 was the derivative turnover trillion that is greater than previous years. During this financial year, 75% derivative turnover increased in the NSE as compared to past years.

5.2 The efficiency of capital markets and derivative markets:
Economic efficiency is increased by the development of derivative products in recent years. Derivatives have become a major part of the financial system in the world's developed economies. "Efficient markets result in tighter bid-ask spreads, higher volumes of trading, and bigger market liquidity. In an efficient market, all information relevant for identifying the value of a product is reflected in the current market value. Financial derivative represents a number of the basic tools necessary in the mechanics of efficient capital markets. The array of derivative products that have been developed in recent years has increased economic efficiency" (Seminar, Buenos Aires, Argentina, 1997). A stable and efficient capital market is necessary for long-term economic expansion and advancement. Derivative markets are essential for many reasons such as it create a capital market more effective, acceptable, and feasible that can help to the economy of a country in this modern competitive world.

Li Tian (2005) in his article discusses some fundamental factor that indicated that financial stability and economic growth could occur by establishing derivative markets. Like him, Rahman and Das (2015) also give

some point that they may believe that establishment of derivative market can increase the economic growth and financial development in Bangladesh.

- ♦ Strengthening financial market function
- ♦ Obviate risks of participators
- ♦ Financial market development
- ♦ Deepening amelioration of financial business of Bangladesh
- ♦ Globalization of the economy

5.3 Why Bangladesh need to establish derivative market?

In the above results, we can see that there is increasing trend of derivative markets of six country (Australia, Canada, Hong Kong, India, Japan, and US). We see that whether it is exchange traded or OTC there annual turnover most of the time increase. We compare previous years and present years we see that there is a growth rate of most of the countries. In our neighbor country India, there derivative market turnover growth rate is higher. There annual turnover of derivative market is gradually increase compare to 2000 to 2019. In our country. In the developing country like Bangladesh, Bangladesh need to establish derivative market for sustainable growth and development. Rahman and Hassan (2011) discuss about their paper that why Bangladesh needs a derivative market. They discuss about some core point.

5.3.1 Increased volatility in the capital markets needs to be monitored: Market volatility is inevitable; it is the nature of the markets to move up and down over the short-term. Bangladeshi capital market is also volatile in nature. There are many researcher said about reduced volatility by derivative market. According to Rahman and Das (2015), there are many researcher believe that derivative market is the risk-shifting tool so that establishment of derivative market in Bangladesh have a greater positive impact on capital market. Reduction of volatility of capital market, monetary market stability are the advantages of derivative markets. There are many advantages of derivatives such as increasing the amount of instruments, increasing number of participants, and advancement of markets. It is difficult to protect the risks when people make those risks.

5.3.2 Implication of perfect portfolio: Financial market of Bangladesh now at the beginning stage of development. Here, subsidiary financial tools are difficult to find. There is no bond market is created in Bangladesh. On the other hand, money market is not familiar enough. When an investor purchase a risky asset, they cannot use any hedging techniques. Because there is no risk-shifting instrument like derivative markets in Bangladesh. Assume, when a buyer buys a stock from a market and at the same time investor buy futures or options from the same market one can protect his/her investment. In this way, the implication of perfect portfolio could be possible.

5.3.3 Protection of major export sector: The readymade garments (RMG) sector in our country is developed and that plays a vital role in our economy. The RMG sector earns billions of dollars by exporting. It also creates jobs for millions of people (especially women) in the country. The readymade garments (RMG) sector is export-oriented in Bangladesh. Its import of raw materials and export of final products both are susceptible to exchange rate fluctuation. When the exchange rate fluctuate, that highly effects on our income of RMG sector and costs of RMG sector. If garments industry some time falls into major difficulties they cannot protect themselves. Because there is no risk-shifting tool are available in Bangladesh like derivatives.

5.3.4 Protection of major import sector: Petroleum is the principal imported product in Bangladesh. Every year a huge amount of money is used to import various product. The price isof the petroleum product highly unyielding. However, the price of the products increase or decreases, the demand for the petroleum products are not change. Futures, options, and swap contracts are used to hedge against such a risky petroleum trend. Bangladesh needs to establish a derivative market to protect both the import and export sector.

6. Recommendations

Bangladesh Capital Market Development Plan (2012-2020) created by the Securities and Exchange Commission (SEC), Bangladesh. In this masterplan, there is also a plan for an initiative to promote the derivative market. SEC said derivative is likely to be successful in Bangladesh. The following recommendations are proposed to establish aa derivative market in Bangladesh.

- Increase education and knowledge among all market pparticipants
- At the beginning of the establishmentof of the f derivative market in Bangladesh, an advisory committee is necessary. This commmakese make ana oflysis the benefits of derivative market in Bangladesh, present and upcoming capital market structure and create a way for prosperous initiation.
- The administrator must find a way to make a monetary market in Bangladesh that is liquid. Liquid financial market is mandatory to create a proficient derivative market.
- Securities and Exchange Commission of Bangladesh already take a master plan. Therefore, Government should monitor this plan and take immediate initiate to establish the derivative market.
- Advisory committee must arrange seminars, workshops, training about the establishment of derivative markets. In addition, make the stakeholder aware to derivative instrument and take opinion from them.
- Extending of capital market is required. Capital market extensions occur by many ways such as increasing number of participants, increasing number of shares, increasing number of investors alluring many individuals within the market, correct rules and regulations, ensured reasonable price, minimize corruption etc.
- Introduce derivatives products that can be used to hedge risks in natural gas industries, petroleum and other commodity-based industries.
- Proper coordination among SEC, secondary and other markets must be ensured.
- Absence of proper infrastructure is the major problem in Bangladesh. Infrastructure is important requirement for using derivative instruments such as options, futures, and swaps. Hence, the development of institutional infrastructure is necessary.

7. Conclusion

Derivative market provides risk management tools furthermore as various investment opportunities to participants. There are many types of derivative products in Asian markets. Derivative market increase the economic growth of a country. In the developed and developing countries, derivative turnover is increased present year compared to previous years. They gain in both stock market capitalization and trading volume. Bangladesh is a developing country and our economy is developing day by day. It can now compete with any emerging economy. If we want to develop our economy, we need to enter Future and Forward Market. We surely benefited from these markets. For the development of our economy, we have to build Future and Forward market in the country. Our existing institutional setup and regulatory framework is adequate for building sophisticated instrument like derivatives. The necessity of the development of institutional infrastructure and human capital should not be underestimate. Our human capital are strong enough. Nevertheless, we need to create infrastructure for new markets. If the capital market of Bangladesh want to be competitive with other emerging economies of India, Japan, Hong Kong, the process of progressive policy making cannot wait for our market players to catch up with their counterparts in more developed financial markets. So that our policy maker and regulators must initiate to establish derivative market in Bangladesh as soon as possible. We believe that financial innovation such as creating new market may have contributed to favorable conditions in our country and thus to strong economic growth and financial development for Bangladesh. The expansion of derivative turnover in emerging markets are faster than in advance economies. Derivative turnover in emerging market is becoming worldwide.

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Electronic Banking and Profitability: Empirical Evidence from Selected Banks in Nigeria

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Abstract
This study examines the link between electronic banking and profitability of Nigerian deposit money banks. The study adopted Ex post facto, research design. A sample size of 9 deposit money banks in Nigeria were employed from the population of 15 banks quoted on the Nigerian Stock Exchange. Data was collected from annual reports and accounts of the sampled banks and CBN Statistical bulletins for the periods from 2009 to 2018. The study employed regression analysis to test the formulated hypotheses with aid of E-View 9.0. Based on the data analyzed, the followings were revealed; that Automated Teller Machine (ATM) payment method has negative effect on return on equity of deposit money banks in Nigeria and this effect is not statistically significant; that Point of Sales (POS) payment methodmethodsitive effect on return on equity of deposit money banks in Nigeria and this effect is not statistically significant and that Mobile banking Payment (MPAY) has positive effect on return on equity of deposit money banks in Nigeria and this effect is statistically significant. It recommended that Nigerian banks should embark on sensitization programme to education their customers on ATM usage.

Keywords: ATM Payment, POS Payment, Mobile Payment and Return on Equity

INTRODUCTION

For most of the past decade and half, commercial banks in Nigeria have been at the forefront of adopting the use of information and communication technology in banking business. This has for the most part followed by the increased use of electronic payment systems in the country (Bingilar & Bariweni, 2019). From the use of Automated Teller Machine (ATM),Point of Sales (POS) machines, Internet (online) banking services and Mobile banking transactions, the Nigeria banking industry has witnessed a phenomenal growth in the use

electronic banking channels. These have been credited with various advantages which includes removal of risks inherent in cash based banking transactions and elimination of associated costs and. Furthermore, the use of electronic banking systems also reduces the rates of errors in transactions, makes the tracking of specific transactions much easier in addition to increasing the speed of complete transaction in real-time not minding the distance between parties to the transaction (Kelvin, 2012; Tijani & Ilugbemi, 2015).

Today's banking sector is extremely dynamic and experience rapid changes as a result of technological improvement, increased awareness and demands that banks serve their customers electronically. Ugbede, Yahaya and Edicha (2019) noted that banks have traditionally been in the forefront of harnessing technology to improve their products and services. Recently, the banking industry operates in a complex and competitive environment full of changing conditions and highly unpredictable economic climate. The issue of Information and Communication Technology (ICT) is at the Centre of this global change today that led to Electronic Banking System in Nigeria. Electronic banking involves using electronic means to deliver banking services, such like, online banking.

Alsmadi and Alwabel (2011) reported that the definition of electronic banking varies among different studies, which means that electronic banking refers to various types of services by which bank customers can request information and carry out banking services. Mainly all the banks in Nigeria offer online or internet banking services and any banks that cannot key in with this new development will definitely losing their customers. Internet or mobile banking system has now become commonplace as customers are offered the ease of operating their various accounts in any branch of their bank's network. Online banking transactions are like ancient or traditional means of payment, inquiry, and information processing systems, differing only in that it uses a different means of delivery channel. Any decision to adopt electronic banking is being affected by a number of factors. These include customer service enhancement and competitive costs, all of which motivate banks to assess their electronic commerce strategies (Kondabagil, 2007).

Initially, Nigeria was reluctant on the issues of electronic banking, compared to other countries across the globe. In the year 1986, Societe Generale Bank of Nigeria (SGBN) now called Heritage Bank Plc. The rapid growth of e-banking was made possible with the proliferation of the internet, coupled with the world increasingly addicting to e-business, the trend of cash transactions is now giving way to electronic payment system. Salehi and Alipour (2010) stated that this rapid growing acceptance of the digital lifestyle has brought about a significant transformation in customers' expectations from their financial service providers.

Offei and Nuamah-Gyambrah (2016) documented that customers are now seeking for an easy and convenient technology with more rewarding banking experience. Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) are two factors mentioned in Davis's Technology Acceptance Model (TAM) that influences users' decision to use a particular technology system (Surendran, 2012), users will eventually lose interest in e-banking if they feel that it is no longer useful even if the system is somewhat easy to handle (Obiri-Yeboah et al., 2013). Therefore banks that fail to key in to the emergence of electronic banking system in the market are likely to lose their customers (Salehi and Alipour, 2010); Lee (2009) reported that the adoption seem not to be yielding the anticipated results, thereby creating a gap between the actual returns and its proposed objectives.

Despite benefits associated with electronic banking in Nigeria, it has not come without some challenges. Studies on electronic banking have been conducted in Nigeria and other foreign countries of the world, some studies documented a positive and statistically significant relationship between electronic banking and bank profitability. (Okon and Amaegberi, 2018; Obiekwe and Mike, 2017; Eze and Egoro, 2016; Akhisar, Tunay and Tunay, 2015; Wali, Wright and Reynolds, 2014), while documented a positive and statistically significant relationship between electronic banking and bank profitability (Oloyede, Azeez and Aluko, 2015; Olasope, 2013; Shehu et al, 2013). Furthermore, electronic banking as reported by Ekwueme, Egbunike and Okoye (2012) to have immensely enhanced the keeping money administrations of banks to their clients, though the study was on six selected banks in Lagos State, Nigeria. Majority of these studies conducted in Nigeria on the effect of electronic banking on profitability of commercial banks uses survey design (see Yunus & Waidi, 2011; Abaenewe, Ogbulu and Ndugbu, 2013; Shehu et al, 2013; Adewoye, 2013; Nnolim, 2013; Olasope, 2013). It

becomes necessary to use secondary data given the fact that electronic banking has diverse effects on banking system at different periods.

In the light of the above, this present study seeks to consolidate on the existing studies thereby determine the level of relationship between electronic banking and profitability in Nigerian deposit money banks using central bank of Nigerian Statistical Bulletin and banks annual reports.

This study investigates the effect of electronic banking on the profitability of deposit money banks in Nigeria. Specifically, the study sought to do the following:
1. To investigate the effect of ATM payment method on return on equity of deposit money banks in Nigeria.
2. To investigate the effect of POS payment method on return on equity of deposit money banks in Nigeria.
3. To determine the effect of E-Mobile payment on return on equity of deposit money banks in Nigeria.

REVIEW OF RELATED LITERATURE

Conceptual Review

Electronic Banking

Of all the sectors in the Nigeria Economy, Banking stands out despite "a not too good" economy. Electronic banking provides the facility of accessing customer accounts from anywhere in the world by using a home computer with Internet connection, is particularly fascinating to Non-Resident Nigerians and High Net worth Individuals having multiple bank accounts (Eze, & Egoro, 2016). The growth potential is, therefore, immense. Further incentives provided by banks would dissuade customers from visiting physical branches, and thus get 'hooked' to the convenience of armchair banking.

Eze and Egoro (2016) reported that the situation does not seem to have shown any significant improvement. Whereas about 90 percent of the banks in the country offer other forms of electronic banking services like telephone banking. ATM and electronic fund transfer, Internet banking is yet to take centre stage. This aspect of banking is still at the basic informative stage, this is so despite the widely acclaimed benefits of Internet banking against the traditional branch banking practice (Ovia, 2001). Part of the reasons identified for the inability of banks in Nigeria to take full advantage of this mode of banking includes lack of adequate operational infrastructure like telecommunication and power, upon which Electronic banking generally relies. Due to the inability of the banks to integrate their operations into the Internet development process, Internet banking can be said to have less in the existing banking structure in the country (Eze & Egoro, 2016).

E-banking is defined as the provision of retail and small value banking products and services through electronic channels (Njogu, 2014). Such products and services can include deposit taking, lending, account management, the provision of financial advice, electronic bill payment, and the provision of other electronic payment products and services such as electronic money. The term "electronic banking" or "e-banking" covers both computer and telephone banking. It refers to the use of information and communication technology by banks to provide services and manage customer relationship more quickly and most satisfactorily (Charity-Commission, 2003). Burr (1996) describes it as an electronic connection between the bank and the customer in order to prepare, manage and control financial transactions (Njogu, 2014).

The term e-banking is technically and intricately complex to define as it may be interpreted differently from other accessing viewpoints. The versatility of e-banking as delivery multichannel increases the intricacy of being precisely defined in the literature. Nonetheless, several attempts have been made to offer succinct of e-banking (Kricks, 2009; Auta 2010). For example, Kricks (2009) termed e-banking as automated delivery of new and conventional banking products and services directly to customers through electronic, interactive channels. Now, compared to the traditional system of banking, banks provide fast information delivery from customer to customer making it obvious that variations exist between services offered by electronic enable banks and non-banks (Singhal & Padhmanabhanm, 2008).

Operating Variables

Internet banking: This is a type of e-banking service where customers' instructions are taken and attended to through the internet. Internet banking offers customers the possibility of enjoying banking services from the comfort of their homes and offices. What this means is that customers can buy goods by placing orders from the net, instruct their banks to pay the vendor the invoice amount involved, and the products are delivered to the destination where the buyer wants. Internet banking is also another form of banking which allows customers to make use of the bank's website in order to make transfers, pay bills, and view their bank statement without having to visit the banking hall.

Smartcard banking: is the conduct of banking transactions through the use of electronic cards (Value Card, ATM Card, Debit Card, Credit Card etc.). Electronic card is a form of internet banking is a physical plastic card that identifies the holder of the card. It is used for financial transactions on line which includes point-of-sale (POS) and Automated Teller Machine (ATM) which are used to authorize payments to the sellers (Chimaobi, 2018). The various types of card include; credit and debit card which have to be replenished. An ATM combines a computer terminal, record keeping system and cash vault in one unit, permitting customer to enter a financial firm's book keeping system with either a plastic card containing a Personal Identification Number (PIN) or by punching a special code number into a computer terminal linked to a financial firms computerized records 24hours a day.

E-Mobile/banking: This involves the conduct of banking business through the use of mobile phones or fixed wireless phones. It takes the following steps: Instructions are passed via voice or short messages (SMS) to the computer; the computer decrypts the message and executes the instructions through a highly coded device, then, the outcome is given back to the customer. Telephone banking is a form of internet banking which is used by customers in order to perform or conducted retail transactions by calling phone communication units which are linked to an automated system of bank. Some activities that can be carried out are change of pin and transfer of funds (Chimaobi, 2018). Mobile banking is a form of internet banking which involves the use of cell or mobile phones in order to settle some transactions. Some of the examples of this transactions includes; change of pin, transfer of little amount of funds, phones recharge.

Point of Sales POS: In this system customers are issued with online cards which could be slotted into special electronic machines in order to effect payments. At the centre of such payment system are the Point of Sales (POS) terminals (Azeez, 2011). These are to be distributed across commercial centers in the country. These POS terminals thus deployed will serve like the Automatic Teller Machines (ATM). In this case, upon completing a transaction and the value ascertained, the amount is entered into a POS terminal into which the electronic card has been slotted. The cash equivalent of the amount is transferred from the payer's account into the account of the payee automatically (Olaegbe, 2011).

Review of Empirical Studies

Ugbede, yahaya and Edicha (2019) examined the effects of electronic payment on financial performance of deposit money bank in Nigeria. Data for the study were collected from statistical bulletin of Central Bank and annual reports and accounts of Nigerian banks. Electronic banking measured with the Automatic teller machine, internet banking and POS and financial performance was measured with profitability of deposit money banks in Nigeria. Multiple regression technique was used. The study revealed that ATM does not contribute to profitability of the sampled banks and also is not significant to banks profitability, POS has a positive contribution to bank profitability, and is also statistically significant to bank profitability, likewise, internet banking also has a positive contribution and statistically significant to profitability of the banks. Bingilar and Bariweni (2019) investigated the effect of electronic payment systems on the performance of commercial banks in Nigeria. Data was analyzed with regression analysis technique. Findings of the research showed that there is a statistically significant positive relationship between ATM transactions and the assets base of commercial banks in Nigeria. Internet (online) banking transactions had a positive relationship with the asset base of commercial banks. There is a positive and statistically significant relationship between mobile banking transactions and the assets base of commercial banks. Okon and Amaegberi (2018) estimated the impact of mobile banking

transactions on bank profitability in Nigeria using selected banks data from Electronic payment system office, Central Bank of Nigeria statistical bulletin from 2007-2016.The study adopts Panel unit root and SURE model estimation technique to conduct quantitative analysis for four selected old and new generation banks. The results of this study were analyzed using economic a priori criteria, statistical criteria and econometric criteria. The positive and statistically significant relationship between automated teller machine of old and new generation banks in Nigeria indicates that automated teller machine is a major factor that contributes to old and new banks performance in Nigeria. The positive and statistically significant relationship between point of sale of old and new generation bank in Nigeria indicates that point of sale is a major factor that contributes to old and new banks performance in Nigeria. Taiwo and Agwu (2017) examined the roles e-banking adoption has played in the performance of organizations using a case study of commercial banks in Nigeria. Questionnaires were the source of data administered to staff of four selected banks, namely; Ecobank, UBA, GTB and First bank. The study employed Pearson correlation coefficient to analyze the data with the aid of Statistical Package for Social Sciences (SPSS). Findings show that since the adoption of electronic banking, there is improvement on banks' operational efficiency in Nigeria. It was concluded that the introduction of new channels into their e-banking operations drastically increased bank performances, since the more active customers are with their electronic transactions the more profitable it is for the banks. Obiekwe and Mike (2017) investigated the effect of Electronic payment Methods (EPM) on the profitability of commercial banks in Nigeria. In order to achieve the broad objective, the study specifically investigated the effect of Automated Teller Machine (ATM), Point of Sale (POS) and Mobile Payment (MPAY) on the profitability of commercial banks in Nigeria. A total sample of five (5) banks was considered for the period 2009 to 2015 and the study adopted the Panel Least Squares (PLS) estimation technique as the analytical tool. Findings revealed that Automated Teller Machine (ATM) and Mobile Phone payment have significant effect on the profitability of commercial banks in Nigeria. However, Point of Sale (POS) has an insignificant effect on commercial banks' profitability in Nigeria. Eze and Egoro (2016) study is on the impact of electronic banking on the profitability of commercial banks in Nigeria. The study sought to examine the relationship between different e-banking channels and the profitability of commercial banks in Nigeria. Four e-banking channels (automatic teller machines, electronic mobile banking, internet banking transactions, and point of sales services) were identified and regress against the profit before tax of commercial banks operating in Nigeria between 2006 and 2014. The study used the confirmed ECM model (via residual diagnosis) to test the formulated hypotheses. The results revealed that the over impact of electronic banking on the profitability of commercial banks was significant; whereas, the impact of the individual channels was varied. Ugwueze and Nwezeaku (2016) studied the relationship between electronic banking and the performance of Nigerian commercial banks. Electronic banking was proxied by value of Point-of-Sale transactions while commercial banking performance was proxied by customers' deposits. The results show that POS is not significant with both the savings and time deposits but significant with demand deposits. Akhisar, Tunay and Tunay (2015) investigated the effects of electronic-based banking services on the profitability of 23 commercial banks in both developed and developing countries from 2005 to 2013. The study adopted the panel data analytical methodology. Number of branches to number of ATM ratio, point of sale (POS) and web (internet) banking served as the explanatory variable while return on equity (ROE) and return on assets (ROA) were the dependent variables. Findings revealed that ratio of number of branches to number of ATM have positive and significant effect on banks' profitability in both developed and developing countries. Suberu, Afonja, Akande and Adeyinka (2015) studied the effect of cashless policy, saving and bank credit on Nigerian deregulated economy. Data were collected from annual accounts. Ordinary least square econometric technique was used to analyze the data. Findings from this study revealed that the marginal productivity coefficient of bank credit to the domestic economy is positive but insignificant. The implication is that banks credit did not affect the productive sectors sufficiently for the latter to impact significantly on the Nigerian economy. Ogunlowore and Oladele (2014) empirically investigated the impact of electronic banking on the satisfaction of customers using GTB bank, Lagos as a case study. A sampled of 100 respondents were administered structured questionnaire. Data obtained were analyzed with descriptive measures such as simple tables and percentages. The formulated hypotheses were validated using the chi-square statistical measure. The empirical result from the chi-square analysis revealed that electronic banking has significant relationship with customer satisfaction in GTB bank and general banking customers. The result also revealed that the introduction of electronic banking has enhanced bank profitability level. Finally, the results showed the application of electronic banking has increased the market share of banks in Nigeria. Njogu (2014) determined the effects of electronic banking on profitability of

commercial banks in Kenya. These data were collected from the Central Bank of Kenya and Commercial banks. Regression analysis was done for the period to determine the effects of electronic banking on profitability of commercial banks in Kenya. The study found that there was a strong positive relationship between financial performance of commercial banks and electronic banking, as it was found that there was a strong relationship between financial performance of commercial banks and electronic banking. Abaenewe, Ogbulu and Ndugbu (2013) examined the relationship between electronic banking and bank performance in Nigeria using a descriptive analytical methodology. Four banks were randomly selected using the pre-adoption and post-adoption era of electronic banking in Nigeria as the scope of the study. Return on assets (ROA) and return on equity (ROE) both served as the dependent variables. Findings revealed that electronic banking has a positive and significant effect on return on equity (ROE) of Nigerian banks but has no significant effect on return on assets (ROA). Olasope (2013) investigated the effect of electronic banking on commercial banks' operations in Nigeria using primary data derived from questionnaire and oral interviews. The study employed simple percentages and chi-square as the analytical method. Findings revealed that poor staff orientation, poor infrastructure and high cost of adoption of electronic banking platforms are factors that have affected the profitability of the commercial banks in Nigeria. Nnolim (2013) examined the impact of information and communication technology (ICT) on the banking sector using Access Bank PLC as a case study. The study also made use of the questionnaire research design and adopted the chi-square test as the analytical tool. Findings revealed that ICT has influenced operational costs of banks in terms of personnel management, personnel administration and efficiency thereby increasing the profitability of the banking sector in Nigeria. Shehu, Aliyu and Musa (2013) investigated the effect of electronic banking products on the performance of Nigerian listed Deposit Money Banks (DMB) using 6 Deposit Money Banks (DMB). The dependent variable was return on equity while the independent variables include E-Direct, SMS alert, E-mobile and ATM. Findings revealed that E-Direct has a negative and insignificant relationship with the profitability of Deposit Money Banks (DMB) in Nigeria. However, SMS alert has a positive but insignificant relationship with profitability of DMBs in Nigeria. Finally, E-mobile has a positive and significant relationship with the profitability of DMBs while ATM has a negative and significant relationship with the profitability of DMBs in Nigeria. Adewoye (2013) investigated the impact of mobile banking on service delivery in the Nigerian commercial banks using a sample of 125 respondents. The study adopted frequency tables, percentages, mean score and chi-square test as analytical tools. Findings revealed that mobile banking improves bank service delivery in the form of transactional convenience, savings of time, quick transaction alert and saving of service costs among others. The study concluded that mobile banking has improved customers satisfaction thereby increasing the profitability of the commercial banks in Nigeria. Mohammed, El-maude and Abam (2013) determined e-banking and bank performance: evidence from Nigeria. The study examined the impact of electronic banking on banks' performance in Nigeria. Panel data comprised annual audited financial statements of eight banks that have adopted e-) and retained their brand name banking between 2000 and 2010 as well as macroeconomic control variables were employed to investigate the impact of e-banking on return on asset (ROA), return on equity (ROE) and net interest margin (NIM). Result from pooled OLS estimations indicate that e-banking begins to contribute positively to bank performance in terms of ROA and NIM with a time lag of two years while a negative impact was observed in the first year of adoption. Ogare (2013) study on the effect of electronic banking on the financial performance of commercial banks in Kenya, the study sought to establish whether there exists a relationship between the dependent variable, for example, performance measured by profit after tax and the independent variables consisting of number of ATMS, number of debits and credit cards issued to customers, number of point of sales terminals and the usage levels of Mobile banking, Internet banking and Electronic funds transfer, as components of e-banking. The findings of the study were that e-banking has a strong and significant effect on the profitability of commercial banks in the Kenyan banking industry. Maiyo (2013) examined the effect of electronic banking on financial performance of commercial banks in Kenya. The specific objectives were to determine the extent of e-banking adoption and the effect of this adoption on financial performance of commercial banks in Kenya. Data was collected from published financial statements of the respective commercial banks and central bank of Kenya. Appropriate frequency tables and charts were used, a multiple regression analysis was also used to explain the relationship between the variables and present the findings. The study revealed that fees and commission from debit cards, credit cards and mobile banking has a significant effect on returns on asset whereas fees and commission from internet banking as well as the amount of money that commercial banks invest in electronic banking to install, train staff and maintain the platforms has no or minimal effect on return on assets. The

adoption of e-banking banking has enhanced performance of commercial banks due to increased efficiency, effectiveness and productivity.

Majority of these studies conducted in Nigeria on the effect of electronic banking on profitability of deposit money banks uses survey design. It becomes necessary to use secondary data given the fact that electronic banking has diverse effects on banking system at different periods.

The results from the empirical evidence on the effects of electronic banking and profitability are inconsistent and some are contradictory; ranging from positive, to negative, to statistical insignificant relationship depending upon the choice of methodology. In the light of the above, this present study seeks to investigate the relationship that exists between electronic banking and profitability of in Nigerian deposit money banks using central bank of Nigerian Statistical Bulletin and banks annual reports.

RESEARCH METHODOLOGY

Research Design

Ex-post fact research design and time series data which is the aspect of statistic that involves the various techniques of describing data collections has been adopted for the purpose of this research. This design will also enable the researcher describe and summarize the data collected for the purpose of this study and enable an in-depth knowledge about the objectives and the variables of the study. This population of this study consists of the 15 deposit money banks quoted on the Nigerian Stock Exchange. The study covered ten years annual reports and accounts of these banks from 2009 to 2018. This study applied purposive sampling technique, in this method; the sample is chosen based on what the researcher thinks is appropriate for the study. The banks licence with international authorization was chosen which consist a total of nine (9) out of the fifteen (15) deposit money banks quoted on the Nigerian Stock Exchange which were inevitably excluded during the data collection process.

Method of Data Analysis

The statistical model chosen for the analysis is regression analysis, with the aid of E-view 9.0 software. Three sets of hypotheses were advanced for confirmation in this study.

Decision Rule

The decision for the hypotheses is to accept the alternative hypothesis if the P-value of the test statistic is positive and significant at 5% significant level. P-value less than 5%, reject, P-value greater than 5% then do not reject.

Model Specification

This study adopted Shehu et al (2013) specified a model for the relationship between electronic banking products and performance of DMBs as: ROE = ∫ (ATM, POS, and EMPAY)

Transforming equation (1) into its panel data form:

$ROE_{it} = ai + \beta 1POS_{it} + \beta 2ATM_{it} + \beta 3EMPAY_{it} + \beta 4FRMSZ_{it} + U_{it}$……………. (i)

$ROE_{it} = ai + \beta 1POS_{it} + \beta 4FRMSZ_{it} + U_{it}$ ……………………………………………(ii)

$ROE_{it} = ai + \beta 2ATM_{it} + \beta 4FRMSZ_{it} + U_{it}$ ……………………………………………..(iii)

$ROE_{it} = ai + \beta 3EMPAY_{it} + \beta 4FRMSZ_{it} + U_{it}$ ……………………………………(iv)

Where:

ROE = Return on equity

POS = Point of Sale payment method. It is the total value of POS transactions in Nigeria

ATM = Automated Teller Machine payment method. ATM is the total value of ATM transactions in Nigeria

EMPAY = EMPAY is described as the total value of mobile banking payment transactions in Nigeria.

FBNKSZ = Firm size as the total assets of the banks. (control variable)

i = 9 (number of banks) and t = 10 (number of years)

Ui = firm-specific error term

£it = idiosyncratic error term

RESULTS AND DISCUSSION

Descriptive Statistics

The observation of 90 in descriptive result found the panel data set with the combination of time series data and cross sectional data (10years x 9banks). The average ROE of deposit money banks in Nigeria is 1.53 with a maximum of 2.80, a minimum of 0.60 with a standard deviation of 0.71. The observed average POS is about 220.54 with a minimum of 11.030, a maximum of 0521.08 with a standard deviation of 190.36. The observed degree of the average ATM is 3498.68 with a minimum of 399.71, a maximum of 7601.97 and a standard deviation of 2453.91 percent. The observed average MPAY in the sampled banks is 259.08, with a maximum number of 551.43, a minimum number of 1.27 and a standard deviation of 239.76. The degree of skewness shows that there is a rise in, ROE, POS, ATM, EMPAY and BNKSZ.

Test of Hypotheses

Hypothesis One

Ho_1: ATM payment method does not significantly affect return on equity of deposit money banks in Nigeria.

Table i: Panel Least Square (PLS) Regression Analysis testing the effect of ATM on ROE

Dependent Variable: ROE
Method: Least Squares
Date: 01/15/20   Time: 20:13
Sample: 2009 2018
Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.790510	0.740237	2.418835	0.0462
ATM	-0.000363	0.000747	-0.486307	0.6416
BNKSZ	4.92E-07	1.56E-06	0.314683	0.7622

R-squared	0.211424	Mean dependent var	1.529000
Adjusted R-squared	-0.013883	S.D. dependent var	0.713745
S.E. of regression	0.718683	Akaike info criterion	2.420531
Sum squared resid	3.615533	Schwarz criterion	2.511307
Log likelihood	-9.102657	Hannan-Quinn criter.	2.320951
F-statistic	0.938381	Durbin-Watson stat	0.966763
Prob(F-statistic)	0.435464		

Source: E-Views 9.0 Panel Regression Output, 2020

Interpretation of Regression Result

Table i reveals an R-squared value of 0.211. The adjusted R^2, which represents the coefficient of multiple determinations imply that 1.4% of the total variation in the dependent variable (ROE) of quoted deposit money banks in Nigeria is jointly explained by the explanatory variables (ATM and BNKSZ). The adjusted R^2 of 1.4% did not constitute a problem to the study because the F- statistics value of 0.938381 with an associated Prob.< F = 0.435464 indicates that the model is fit to explain the relationship expressed in the study model and further suggests that the explanatory variables are properly selected, combined and used. The results in table 4.2 illustrated that ATM has a negative and significant relationship with ROE measured with a beta coefficient (β_1) and t- value of -0.000363 and -0.486307 respectively and p- value of 0.6416 which is not statistically significant at 5%: ROE = 1.790510, -0.000363 ATM + μ

This beta coefficient revealed that if ATM increases by one unit, then the sampled banks ROE would increase by 0.04%. In addition, Durbin-Watson test is implied to check the auto correlation among the study variables. The Durbin-Watson value is 0.966763 which is less than 2 provide an evidence of no auto-correlation among the variables.

Decision
Based on the empirical evidence that suggests that ATM has negative effect on ROE of quoted deposit money banks in Nigeria and this effect is not statistically significant at 5% level of significance, thus, the null hypothesis of the study is accepted.

Hypothesis Two
Ho$_2$: POS payment method does not significantly affect return on equity of deposit money banks in Nigeria.
H$^I_2$: POS payment method significantly affects return on equity of deposit money banks in Nigeria.

Table ii: Panel Least Square (PLS) Regression Analysis testing the effect of POS on ROE
Dependent Variable: ROE
Method: Least Squares
Date: 01/15/20   Time: 20:14
Sample: 2009 2018
Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.952143	0.690584	2.826799	0.0255
POS	-0.001126	0.004887	-0.230385	0.8244
FRMSZ	-8.53E-08	7.94E-07	-0.107419	0.9175
R-squared	0.190917	Mean dependent var		1.529000
Adjusted R-squared	-0.040250	S.D. dependent var		0.713745
S.E. of regression	0.727967	Akaike info criterion		2.446204
Sum squared resid	3.709556	Schwarz criterion		2.536980
Log likelihood	-9.231021	Hannan-Quinn criter.		2.346624
F-statistic	0.825885	Durbin-Watson stat		0.809608
Prob(F-statistic)	0.476404			

Source: E-Views 9.0 Panel Regression Output, 2020

Interpretation of Regression Result
Table ii reveals an R-squared value of 0.191. The adjusted R^2, which represents the coefficient of multiple determinations imply that 4% of the total variation in the dependent variable (ROE) of quoted deposit money banks in Nigeria is jointly explained by the explanatory variables (POS and BNKSZ). The adjusted R^2 of 4% did not constitute a problem to the study because the F- statistics value of 0.825885 with an associated Prob.< F = 0.476404 indicates that the model is fit to explain the relationship expressed in the study model and further suggests that the explanatory variables are properly selected, combined and used. The results in table 4.3 illustrated that POS has a positive but not significant relationship with ROE measured with a beta coefficient (β_1) and t- value of 1.952143 and 2.826799 respectively and p- value of 0.8244 which is not statistically significant at 5%: ROE = 1.952143, -0.001126 POS + μ

This beta coefficient revealed that if POS increases by one unit, then the sampled banks ROE would increase by 0.01%. In addition, Durbin-Watson test is implied to check the auto correlation among the study variables. The Durbin-Watson value is 0.809608 which is less than 2 provide an evidence of no auto-correlation among the variables.

Decision

Based on the empirical evidence that suggests that POS has positive effect on ROE of quoted deposit money banks in Nigeria and this effect is not statistically significant at 5% level of significance, thus, the null hypothesis of the study is accepted.

Hypothesis Three

Ho3: E-Mobile payment does not significantly affect return on equity of deposit money banks in Nigeria.
HI3: E-Mobile payment significantly affects return on equity of deposit money banks in Nigeria.

Table iii: Panel Least Square (PLS) Regression Analysis testing the effect of MPAY on ROE

Dependent Variable: ROE
Method: Least Squares
Date: 01/15/20   Time: 20:16
Sample: 2009 2018
Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.304799	0.620351	3.715313	0.0075
MPAY	0.001756	0.002950	0.595279	0.5704
FRMS	-6.00E-07	6.04E-07	-0.994459	0.3531

R-squared	0.224062	Mean dependent var	1.529000
Adjusted R-squared	0.002366	S.D. dependent var	0.713745
S.E. of regression	0.712901	Akaike info criterion	2.404375
Sum squared resid	3.557590	Schwarz criterion	2.495151
Log likelihood	-9.021877	Hannan-Quinn criter.	2.304795
F-statistic	1.010670	Durbin-Watson stat	0.750435
Prob(F-statistic)	0.411523		

Source: E-Views 9.0 Panel Regression Output, 2020

Interpretation of Regression Result

Table iii reveals an R-squared value of 0.220. The adjusted R^2, which represents the coefficient of multiple determinations imply that 0.2% of the total variation in the dependent variable (ROE) of quoted deposit money banks in Nigeria is jointly explained by the explanatory variables (MPAY and BNKSZ). The adjusted R^2 of 0.2% did not constitute a problem to the study because the F- statistics value of 1.010670 with an associated Prob.< F = 0.411523 indicates that the model is fit to explain the relationship expressed in the study model and further suggests that the explanatory variables are properly selected, combined and used. The results in table 4.4 illustrated that MPAY has a positive but not significant relationship with ROE measured with a beta coefficient (β_1) and t- value of 2.304799 and 3.715313 respectively and p- value of 0.5704 which is not statistically significant at 5%: ROE = 2.304799, 0.001756 MPAY + μ

This beta coefficient revealed that if MPAY increases by one unit, then the sampled banks ROE would increase by 0.01%. In addition, Durbin-Watson test is implied to check the auto correlation among the study variables. The Durbin-Watson value is 0.750435, which is less than 2 provide an evidence of no auto-correlation among the variables.

Decision

Based on the empirical evidence that suggests that EMPAYS has positive effect on ROE of quoted deposit money banks in Nigeria and this effect is statistically significant at 5% level of significance, thus, the null hypothesis of the study is accepted.

Based on the analysis, the result from hypothesis one revealed that Automated Teller Machine (ATM) payment method has negative effect on return on equity of deposit money banks in Nigeria and this effect is not statistically significant. This finding therefore supports our aprori expectation and the findings of Shehu, Aliyu and Musa, (2013) and negates the view of Obiekwe and Mike (2017); Ogunlowore and Oladele (2014).

Based on the analysis, the result from hypothesis two shows that Point of Sales (POS) payment method has positive effect on return on equity of deposit money banks in Nigeria and this effect is not statistically significant. This finding therefore supports the finding of Obiekwe and Mike (2017); Ugwueze and Nwezeaku (2016) and negates our aprori expectation and the view of Ogunlowore and Oladele (2014).

Based on the analysis, the result from hypothesis two revealed that E-Mobile Payment (EMPAY) has positive effect on return on equity of deposit money banks in Nigeria and this effect is statistically significant. This negates the findings of Shehu, Aliyu and Musa (2013) and affirms the findings of Okon and Amaegberi (2018); Obiekwe and Mike (2017).

CONCLUSION

This study assessed the effect of electronic banking on profitability of deposit money banks in Nigeria. In order to achieve this objective, the study specifically investigated the effect of ATM, POS and EMPAY on the return of equity of the banks in Nigeria. The results revealed that ATM and POS have not statistically significant on banks' profitability (ROE) in Nigeria, though ATM has a negative effect on bank's profitability. However, E-Mobile payment (EMPAY) method has positive and statistically significant on the profitability of deposit money banks in Nigeria. Meanwhile, electronic banking service provides convenience to customers as well save cost, and cause banks to develop interest in expanding their market through internet banking services.

Based on the result, this study recommended that there is need for Nigerian banks to increase the awareness about ATM usage through media campaign, seminars and symposia. This is against the backdrop that increased usage of ATM payment method increases the profitability of banks in Nigeria. Also Point of Sale (POS) payment method should be encouraged in Nigeria for the purpose of transactions to beep up cashless economy. Hence, banks should organize seminars and workshops on the benefits of using POS for both customers and traders. This would boost its impact on banks profitability in Nigeria as well reduced criminal tendencies and attack.

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Factors Affecting Bad Debt in the Vietnam Commercial Banks

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Abstract

The paper examines the factors affecting bad debts of Vietnamese commercial banks in the period of 2012-2018. On the basis of theory and previous empirical studies on the factors affecting NPLs, in combination with the use of GMM method, the author has built a model of eight variables affecting NPLs. However, the research results show that there are five variables affecting bad debt. Statistically significant variables are business performance, bank size, credit growth, gross domestic product growth and inflation rate. The final estimation model is effective because the defects have been tested so there is not any deficiencies in the model. Based on the research results, the author proposes a number of related recommendations to manage and control bad debts and improve business performance of Vietnamese commercial banks.

Keywords: Bad Debts, Business Performance, Bank Size, Credit Growth, Commercial Banks

1. Introduction

Credit growth in recent years has also led to a rapid increase in the NPL ratio at banks. When the bad debt increases will adversely affect many entities in the economy, firstly the banks themselves and the borrowers, then affect the whole economy. Banks can assess, measure, and understand bad debt first of all to understand what factors will affect bad debt. With the purpose of understanding as well as contributing theoretical and practical contributions, the authors studied the factors affecting NPLs at Vietnamese commercial banks.

Regarding the bad debt settlement results determined under Resolution 42, from 2012 to the end of March 2019, the entire credit institution system has handled VND 907.33 trillion of bad debts, of which in 2018, the whole credit institution system has handled VND 163.14 trillion of bad debts, the ratio of bad debts in the balance sheet to the end of March 2019 was 2.02%. Accumulated from August 15, 2017 to the end of March 2019, the whole credit institution system handled VND 227.86 trillion of bad debt determined in accordance with Resolution 42, of which the settlement NPLs off balance sheet is 117, 8 trillion. (Vietnam State Bank Information Page, Results of operating monetary policy and banking activities in the first months of 2019, orientation for the last months of 2019, visit https://sbv.gov.vn). Thereby we see Vietnam's efforts to resolve and limit the rise of bad debts, but the rate is still relatively high compared to the world.

Determining the factors affecting bad debt in banks as well as the level of impact of each factor will help banks' administrators to make effective decisions to maintain bad debt ratio at low, ensure the stable economic development.

2.   Theoretical basis and experimental researches

Shrieves and Dahl (1991), two authors conducted a study of 1800 bank data sets in the US between 1984 and 1986. The authors studied the relationship between equity and bad debt, empirical evidence showed a positive relationship between the ratio of equity to total assets and non-performing loans. Keeton (1999), using data from commercial banks in the US from 1982 to 1996, authored a study on the relationship between credit growth and bad debt. The study shows a strong relationship between credit growth and non-performing loans. Specifically, Keeton said that rapid credit growth but low credit standards will contribute to higher bad debt in some states in the United States.

Hu et al (2006) through a table data set with 40 Taiwanese commercial banks during 1996-1999 to empirically analyze the factors affecting bad debt. In 1991, 18 Taiwanese governments issued a decree to promote the establishment of a commercial bank to reduce legal barriers to penetrate its banking market. Banks established after 1991 have a different culture and / or business strategy than those established before 1991. Moreover, the older the bank, the more bad debt accumulates over the years. Therefore, this study includes a dummy variable to show whether the bank was established before or after 1991. Based on the Hausman test, the random effect model has been shown to be better than the fixed effect model. The main empirical findings in this paper are: (1) the ratio of non-performing loans decreases as the government's share in a bank increases (up to 63.51%), when the share of government shares exceeds the upper level will start to increase bad debts; (2) bank size is negatively related to the bad debt ratio; (3) diversifying revenue sources can significantly reduce the ratio of bad debts; (4) NPL ratio increased steadily from 1996 to 1999; and (5) banks established after deregulation, on average, have lower NPL ratios than banks established before deregulation.

Khemraj and Pasha (2009) studied the determinants of NPL ratios for banks in Guyana, research conducted on Guyana commercial banks in the period 1994 - 2004 using FEM model to show factors affecting bad debt. The two authors have pointed out that the real exchange rate has a positive effect on bad debts, meaning that when the local currency appreciates, the portfolio of commercial banks may be higher. Meanwhile, GDP growth has a negative relationship with bad debts, which shows that improving the economy will reduce the bad debt ratio.

Misra and Dhal (2010): based on a sample of 27 banks in India from 1996 to 2008, they conducted a periodic analysis of the banking indicators, focusing on bad debts of banks. Indian public sector goods. Empirical analysis proves that interest rates, bank size, bad debts of the previous year were positively affected with bad debts. The loan term is opposite to the bad debt, the reason explained by the author is that the parties believe in each other more, so they can lend for a long time, leading to less bad debt. The ratio of 19 credits to mobilized capital is higher than the industry average, which will increase bad debt.

Louzis et al. (2011) conducted research on the factors affecting NPLs of the Greek banking system through 9 largest banks of Greece in the period from Q1 2003 to Q3 2009. The impact of macro and internal factors on the bank's bad debt. From studying the data collected by the GMM estimation method, the author shows that the GDP growth rate is negatively correlated with the bad debt ratio, while the unemployment rate and real interest rate RIR has a positive correlation with bad debt ratio. In addition, empirical results indicate that the quantitative effects of various NPL determinants vary depending on the type of loan. In particular, consumer lending is most sensitive to changes in lending rates, business loans fluctuate much with real GDP growth, while mortgages are least affected by the macroeconomic development. From the results, the authors provide some policy and regulatory implications. In particular, there is evidence that ineffective implementation measures may be the leading cause of problem loans in the future. This suggests that regulators should focus on management performance to detect banks with increased NPL ratios. Furthermore, regulators should focus on the relevant risk management systems and processes to avoid future financial instability.

Makri et al. (2014) studied the factors affecting bad debts of 17 European countries in the period of 2000-2008. The study identified a negative relationship between the ratio of bad debts to GDP growth, ROE and credit risk provision; positive relationship with unemployment rate, previous year bad debt and public debt. The negative correlation between public debt and bad debt is explained by the problematic fiscal policies of the countries that lead to an increase in bank bad debts.

Ekanayake (2015) conducted a study on the determinants of NPLs in Sri Lanka commercial banks on the data set of 9 commercial banks in Sri Lanka from 1999 to 2012. The study shows that NPLs are due to the impact of both macro factors and specific factors within the bank. Two indicators, the loan-to-asset ratio and loan loss ratios used to measure banks' exposure, show a positive correlation with non-performing loans. Contrary to expectations, high credit growth is negatively correlated with bad debt. This inverse relationship indicates that banks that are more active in the credit market are less likely to suffer from bad debt. In addition, the bank's business performance and size have the opposite effect on bad debts. Among the macro factors, GDP and inflation have the opposite effect of 21 to non-performing loans (according to this study, in the situation of high inflation, the bad debt ratio is lower than other times) and interest rates. Lending has the same effect as bad debt. Nguyen Thi Hong Vinh (2015), the author studies the factors affecting bad debts of Vietnamese commercial banks, research sample: 22 Vietnamese commercial banks in the 2007-2014 period. Experimental results show the specific factors effecting bad debts such as bank efficiency, equity, credit growth are the main factors that have the opposite effect on the bad debts of the Vietnamese commercial banking system. Meanwhile, bad debt in the past, bank size, outstanding loans on mobilized capital have positively impacted on bad debts. Macro factors such as economic growth, inflation rates, interest rates, exchange rates, real estate prices also have a significant impact on bad debt.

In the world, there have been many studies on the factors affecting bad debts of commercial banks. Specifically, Fofack (2005) analyzes causality based on dynamic table data using GMM method to find out the factors that cause bad debt in Sahara countries. The results of the study show that real interest rate, GDP growth rate, inflation index, total assets income (ROA), and marginal interest income (NIM) affect bad debt.

Argaw (2016) studies the factors affecting bad debt: cases at commercial banks of Ethiopia. The author used the mixed research that was applied to carry out this study. Secondary time series data are collected from audited annual reports and bank performance reports; and the required ratios have been calculated. In addition, 12 credit experts from related departments and functional departments responsible for lending issues in the bank were interviewed. The results obtained from the regression output indicate that of the variables studied, the loan / deposit ratio; Financial performance is measured on return on equity; and capital adequacy is determined to be a statistically significant determinant of bad debt. On the other hand, loan growth, cost effectiveness and bank size are not statistically significant in affecting bad debt. The results from the interview show that the variables such as credit risk assessment are poor, focusing on lending based on collateral, poor loan monitoring, and debt handling skills of banks, poor lending products, short loan periods and lack of credit advisory practices are also specific factors affecting bad debt. Research shows that focusing on these bad debt ratios can further reduce the likelihood of defaulting while expanding credit in the future. Further studies are recommended by including macroeconomic and other bank-specific variables and increasing sampling time.

Do Quynh Anh and Nguyen Duc Hung (2013) studied the factors affecting the bad debt of Vietnamese commercial banks in the period 2005–2011. The research results show that inflation and GDP growth have an impact on bad debt and bad debt affects bad debt of the following year and bank size has a positive relationship with bad debt. Nguyen Thi Hong Vinh (2015) conducted a study on the factors affecting bad debts of Vietnamese commercial banks in the period of 2007–2014, the study results showed that both specific and macro factors have an impact to bad debts of Vietnam commercial banking system. In which profitability and economic growth are the main factors that negatively impact on NPLs, NPLs in the past, bank size, credit growth have a positive effect with NPLs, only evidence of equity and inflation have a significant impact on the bad debt ratio of commercial banks.

Nguyen Duy Tung and Dang Thi Bach Van (2015) analyze the impact of intrinsic factors on bad debts of Vietnamese commercial banks by the data of table and analysis method in the period of 2004-2014. Research

results show that bad debts of Vietnamese commercial banks are affected by internal factors such as quality of governance, moral hazard, and there is no evidence to show that diversification of operations can reduce NPL ratio.

From studies in the world and in Vietnam, the author found that there have been many studies on bad debts and factors affecting bad debts in banks. Each study has produced different results and relationships between the factors and bad debt. Most studies have used macro and micro factors to examine the influence of these factors on the bad debts of commercial banks. In the context and scope of the study, the author finds that depending on the characteristics of each bank, each country, the research model will have different factors affecting the bad debt and the correlation among variables to bad debt.

3.   Research methods and research models

3.1.   Research model and research hypotheses

3.1.1.   General model

$$Y_{it} = \propto + \beta_k X_{kit} + u_{it}$$

In which:

Y_{it} The value of the dependent variable corresponding to the business i at time t.

$X_{ki}t$ The value of the independent variable k represents the factors that affect the dependent variable of firm i at time t.

u_{it} The random error of business i at time t.

3.1.2.   Research hypotheses

Hypothesis H1: Profitability (ROA) negatively impacts on NPLs

Some financial indicators show the profitability of the bank used in previous studies such as: ROA - profitability over total assets, the author uses ROA as the index representing bank profit because this index shows the ability to create bank profits on the overall capital source, regardless of which capital source that has a more comprehensive view. Besides, based on ROA, it is possible to compare the performance of banks with the same risk level, because this index eliminates the difference in tax policy as well as the financial leverage that the bank is using (Kupiec & Lee, 2012), as well as Messai and Jouini (2013).

Hypothesis H2: The rate of credit growth (CRE) has a positive effect on bad debt

Fast credit growth is often associated with low credit quality due to loosening loan conditions. This index is used to compare the growth of outstanding loans over the years, to assess the bank's lending situation. The competition in the lending market makes banks racing for credit growth and high credit growth which often lead to economy crisis, banks are at risk of bad loans. Keeton (1999) studied the impact of credit growth on overdue debt in the United States from 1982 to 1996. The study showed a close relationship between credit growth and bad debt, credit growth is associated with lower credit standards, contributing to higher NPLs in some states in the United States. As the same result, Salas and Saurina (2002), through a study of NPLs of Spanish banks between 1985 - 1997, showed that credit growth was significantly positively associated with non-performing loans.

Hypothesis H3: Provision for credit losses (LLR) has a positive effect on non-performing loans

To ensure safety in credit operations of commercial banks, international accounting standards stipulate the following specific measurement indicators: (i) Measuring liquidity by the ratio of loans / mobilized capital; (ii) Measuring capital adequacy by equity / total risk weighted assets (CAR) and (iii) Measuring the ability to offset loan losses: Proportion of risk provision / total debt. When commercial banks incur bad debts, to ensure safety in credit activities, managers must increase costs related to managing bad debts while accounting for high-risk assets. This makes the risk provisioning ratio to total outstanding loans increase when bad debt increases. Messai and Jouini (2013) reported that non-performing loans (NPLs) had a positive impact on the provision for credit

losses. However, in the opposite direction, through empirical research on the factors affecting bad debts of 17 European countries in the period of 2000-2008, Makri et al. (2014) showed that provision for credit losses had a negative impact on bad debt.

Hypothesis H4: The ratio of equity to total assets (ETA) has a positive effect on bad debt
The ratio of equity to total assets shows the sufficient capital status as well as the safety and health of a bank. This low ratio proves that the bank uses high financial leverage, which contains a lot of risks and can make bank profits lower when loan costs are high. Nguyen Thi Hong Vinh (2015) uses three estimation models: FEM, GMM and the systematic GMM to study the topic: Factors affecting NPLs in commercial banks during 2007-2014. By GMM system, the results showed that equity had an opposite effect on the bad debt ratio. In the opposite direction, Shrieves and Dahl (1991) through empirical research of nearly 1800 banks in the US from 1984 to 1986, the two authors concluded that the ratio of equity to total assets had positive relationship with bad debt. The above correlation is explained by the fact that banks are subject to the government's control mechanism on the ratio of capital and the allowed level of risk, so usually the higher the capital rate, the higher the allowed risk. Another reason to mention that the high ratio of equity to total assets proves that the bank is using low leverage, but the use of low leverage equals less risk and will not be able to achieve the desired returns. Therefore, to achieve the desired profits, banks tend to increase leverage, access to more risky sources of loans, leading to bad debt ratios higher. Another basis for explaining the positive relationship mentioned by the author is that when the bank receives high risk investment, it will want to increase the capital ratio to reduce bankruptcy costs. Therefore, when taking high risks to increase the bankruptcy fee, the bank wants to increase the capital ratio to reduce this expense. In addition, the motivation of the bank's management is that not want the bank to go bankrupt, the risk level is lower than that of the shareholders, so when the bank is at high risk, the management will want to increase the capital ratio.

Hypothesis H5: Bank size (SIZE) has a positive effect on bad debt
Total assets will represent the size of that bank. According to the regulations of the State Bank, when the size of commercial banks increases, banks must increase equity. Therefore, the increase in total assets will increase the ability of commercial banks to provide credit. On the other hand, large scale commercial banks will have a strict credit process and customers are often large, reputable and stable enterprises, so this debt asset management is usually better than small commercial banks. Thus, the size of a commercial bank can positively or negatively affect the NPL ratio, depending on the choice of asset structure and the bank's ability to manage assets. According to the 'scale effect' hypothesis, Salas and Saurina (2002) suggest that large-scale banks allow more diversification opportunities, the author provides empirical evidence showing that the size of bank is bigger, the bad debt ratio is bigger. Contrary to the above hypothesis, the "too large for bankruptcy" hypothesis that large banks accept excessive risk by increasing the use of loan capital so there is more bad debt. Through empirical evidences on 27 banks in India from 1996 to 2008, Misra and Dhal (2010) have shown that bank size has a positive impact on bad debt. This same relationship is also explained by small banks have higher management efficiency leading to better loan approval and better loan management, resulting in lower NPLs.

Hypothesis H6: Economic growth (GDP) has the opposite effect on bad debts
The relationship between GDP and bank bad debt is considered in specific conditions of the economy. Louzis et al. (2011) explained that when the economic crisis occurred, the financial situation of companies, business households and individuals in the economy were in difficulty, thus increasing the bad debt ratio. On the contrary, when the economy is growing strongly, the bad debt ratio is reduced due to the improvement of income of companies and households. Salas and Saurina (2002) show a significant negative effect of GDP growth on NPLs and infer the rapid spread of macroeconomic factors to the ability of economic actors to lend. Khemraj and Pasha (2009) used table data and FEM model to conduct research on factors affecting NPLs of Guyana's commercial banks between 1994 and 2004. The two authors also has same result as previous studies, GDP growth has a significant negative relationship with non-performing loans.

Hypothesis H7: Unemployment rate (UER) has a positive effect on bad debt
Unemployment rate is a direct impact on individual credit channels of commercial banks. It is easy to realize when the rising unemployment rate means the number of unemployed people increases, fewer jobs lead to lower

income of workers. This affects the ability to repay loans at commercial banks, leading to high probability of credit risk and high risk of bad debts, especially in consumer loans. According to Louzis et al. (2011) conducted research on factors affecting NPLs of the Greek banking system through 9 largest Greek banks in the first quarter of 2003 to the third quarter of 2009. The study showed the impact of macro factors and banking characteristics on bad debt. From studying the data collected by the GMM estimation method, the author showed that the GDP growth rate was negatively correlated with the bad debt ratio, while the unemployment rate and real interest rate RIR had a positive correlation with bad debt ratio.

Table 1: Description of variables in the model

	Variables	Symbol	Measure	Expected sign
	Dependent variable			
1	NPL ratio	NPN_{it}	$\dfrac{NPL_{it}}{Total\ loan_{it}}$	
	Independent variable			
2	Profitability	ROA_{it}	$\dfrac{Profit\ after\ tax_{it}}{Total\ asset_{it}}$	-
3	Credit growth rate	CRE_{it}	$\dfrac{Loan_{it} - Loan_{i,(t-1)}}{Loan_{i,(t-1)}}$	+
4	Provision for credit risk	LLR_{it}	$\dfrac{Provision\ for\ credit\ risk_{it}}{Total\ loan_{it}}$	+
5	Equity ratio to total assets	ETA_{it}	$\dfrac{Equity_{it}}{Total\ Asset_{it}}$	+
6	Size	$SIZE_{it}$	$Logarit\ _{10}\ (Total\ Asset)$	+
7	Economic growth	GDP_t	Collect data source of WB, IMF	-
8	Unemployment rate	UER_t	Unemployment rate $_t$	+
9	Real interest rates	RIR_t	Real interest rate $_t$	+

Source: Summary of the author

3.1.3. Research data

The data study was from 2012 to 2018 with the assumption to ignore the impact of the global financial crisis. The results from quantitative analysis in the modeling of the main factors affecting NPLs in Vietnamese commercial banks with the observed samples are commercial banks including 16 joint stock commercial banks in Vietnam as a basis for comparison, analyze, collect data and information. The data is represented by table data, financial data is collected from financial statements and annual reports, macro data is taken from the database of the General Statistics Office, the report of State Bank and World Bank.

3.1.4. Estimation method

Pooled OLS model is a model that does not control each individual characteristics of each research object. Linear estimation is an estimate using the least squares method (OLS) on the data set of time objects, so this estimate considers all coefficients to be constant between objects and does not change over time. Accordingly, the use of table data has two major advantages such as: i) Table data gives the results of the estimation of parameters in a more reliable model; ii) Table data allows us to identify and measure impacts that cannot be identified and measured using cross and time data. However, the study data is panel data and there is the presence of the lag variable of the dependent variable which is bad debt of the previous year, the estimation of OLS and other methods will be skewed and unstable, so the author will use the GMM method to handle the existence of lag variables.

GMM was first presented by Lars Peter Hansen in 1982 in the article "Large Sample Properties of Generalized Methods of Moments Estimators". Overall, GMM is the general method of many popular estimation methods such as OLS, MLE, FE, RE, GLS, IV, 2SLS .... Even in the context of endogenous assumptions violated, the

GMM method produces robust, non-biased and efficient estimates. It can be said that OLS or Maximum Likelihood ... is just a special type of GMM equation because GMM works with very few assumptions and many researchers think that GMM is most effective for experimental financial researchers (Nguyen Doan Man, 2016). Therefore, the author will use the GMM method to overcome endogeneity in the presence of tool variables.

The tests in the model involve multicollinearity, autocorrelation, variance change and endogenous phenomena. The study will perform tests to ensure the model has no deviations and the efficient estimate.

4. Research model results and discussion

4.1 Model estimation results

Table 2 presents descriptive statistical results of the variables. The average value of the bad debt ratio is 0.033; minimum value is 0.01 and maximum value is approximately 0.6. Profitability on equity has average value, minimum value and maximum value respectively: 1.7%; 0.1% and 2.6% respectively. Credit growth rate ranges from 10.32 to 15.11 and the average value reached 14.25. Provisions for credit losses -0.04 to 0.16 with an average of 0.07. The ratio of equity to total assets is from 0.04 to 0.18, the average value is 0.07. Bank size varies from 13 to 15 with an average of 14. GDP ranges from 0.054 to 0.070 with an average of 0.063. The unemployment rate ranges from 0.0215 to 0.0233 and the average is 0.0219. The real interest rates have average value, minimum value and maximum value: 0.05; 0.028 and 0.073 respectively.

Table 2: Statistics describe variables related to the sample

	Variables	Number of observations	Mean	Standard deviation	Min	Max
1	NPL	112	0,0339304	0,0109194	0,0163368	0,0691208
2	ROA	112	0,017745	0,0052655	0,001346	0,0263997
3	CRE	112	14,25793	0,4327835	10,32984	15,11828
4	LLR	112	0,0792591	0,0242286	-0,0406177	0,1626305
5	ETA	112	0,079952	0,1728178	0,046283	0,182034
6	SIZE	112	14,25793	0,4327835	13,32984	15,11828
7	GDP	112	0,0636395	0,005601	0,0542188	0,0707579
8	UER	112	0,0219167	0,0011497	0,0215489	0,0233137
9	RIR	112	0,0502731	0,0140425	0,0286467	0,0732226

Source: Results from Stata software

Correlation coefficient matrix (Correlation) in Table 3 shows the correlation coefficient between variables in the regression model. The correlation coefficients are smaller than 0.8, so the research model has no multi-collinear phenomena.

Table 3: Correlation coefficient matrix

	NPL	ROA	CRE	LLR	ETA	SIZE	GDP	UER	RIR
NPL	1								
ROA	0,181	1							
CRE	-0,631	-0,284	1						
LLR	0,018	-0,005	0,067	1					
ETA	0,283	0,242	-0,561	-0,010	1				
SIZE	0,218	-0,024	-0,381	-0,131	0,323	1			
GDP	-0,379	0,196	0,243	-0,225	-0,156	0,106	1		
UER	-0,034	-0,232	-0,045	-0,067	0,219	0,042	-0,109	1	
RIR	0,021	-0,202	-0,126	0,159	0,16	-0,006	-0,233	0,269	1

Source: Results from Stata software

The results of Table 3 show that the correlation coefficients between the independent variables in the research model are low (absolute value <0.5) so the selection of these independent variables to study is perfectly appropriate. The GMM method is used to estimate the presence of the lag variable (which is the one-year delay of bad debt).

Table 4: Regression model by GMM method

NPL	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
ROA	*-0,737715*	0,030	4,360	**0,000**	0,073	0,193
CRE	*0,0010972*	0,001	-3,860	0,531	-0,004	-0,001
LLR	*0,2634946*	0,057	0,140	**0,000**	-0,104	0,120
ETA	*0,1496335*	0,006	4,460	**0,000**	0,014	0,037
SIZE	*0,0044441*	0,004	0,950	0,340	-0,004	0,010
GDP	*-0,656748*	0,018	2,930	**0,003**	0,018	0,089
UER	*-0,498941*	0,263	2,940	0,150	0,259	1,292
RIR	*-0,104148*	0,075	-0,650	0,765	-0,763	0,654
Lnplr	-0,013	0,061	-0,210	0,831	-0,133	0,106
_cons	0,033	0,030	1,090	0,275	-0,026	0,093

Source: Results from Stata software

The estimated results by the GMM regression model showed that the independent variables with Prob value <0.1 are statistically significant. In the regression model, there are 4 statistically significant variables: profitability (ROA) negatively impact the ratio of bad debt, equity to total assets (ETA) impact the non-performing loan ratio, provisions for credit losses (LLR) is positively impacted with the bad debt ratio and the economic growth rate (GDP) has the opposite effect with the bad debt ratio. From the estimation results, the regression model measures the impact of factors on bad debts of commercial banks on Vietnam's stock market as follows:
NPL = 0.339864 - 0.737715 ROA + 0.2634946 LLR + 0.1496335 EAT - 0.656748 GDP

4.2 Discuss the results

Return on assets (ROA)
According to research results, ROA has a negative impact on bad debt. This result coincides with the original expectations of the author as well as the research results of Messai and Jouini (2013). The results show that when the bank has good business results, it shows that the bank has good business management ability, good quality control of credits leading to a decrease in the ratio of bad debts. This could be explained as follows: the more profitable banks are less motivated to engage in risky activities because they are less pressured by making profits. At the same time, the more profitable banks will have the opportunity to select customers with good financial ability and low risk. Therefore, as banks' profits increase, the probability that bank executives engage in risky investment projects will decrease and thus the probability that bank loans turn to bad debt will also decrease accordingly.

Provision for credit losses (LLR)
The ratio of LLR has a positive correlation with the ratio of bad debts in the same period. This result coincides with the original expectation of the author as well as the results of Boudriga et al (2009). A positive correlation shows that when the bank has a high provision rate, the bad debt ratio is high. This result is explained by the high provision which shows that the bank has not high professional qualifications of staff, supervision of commercial banks in credit provision and debt management is not good, so the bad debt ratio is high.

Equity (EAT) The ratio of equity to total assets impacts in the same direction of non-performing loans. The ratio of equity to total assets shows the sufficient capital status as well as the safety and health of a bank. This low ratio proves that the bank uses high financial leverage, which contains a lot of risks and can make bank profits lower when loan costs are high. Therefore, in order to ensure the profit target, banks have to lend at a higher risk to increase the bad debt ratio. This result coincides with the study of Shrieves and Dahl (1991).

Economic growth (GDP) When the economy grows stably and sustainably, it will have positive effects on production, business and import-export activities of enterprises, thereby helping to generate profits and increase the ability to repay loans to commercial banks. At the same time, the author's research evidence has similar results with previous studies of the authors Louzis et al. (2011), Salas and Saurina (2002), Khemraj and Pasha (2009). The negative trend between GDP growth and non-performing loan ratio is evident in the remaining period from 2013-2015. In the context of the economy facing many difficulties, challenges and world economy instability, this is still a relatively good increase. Inflation is controlled by well-performing, synchronized credit and fiscal monetary solutions as well as flexible coordination mechanisms between fiscal and monetary policies. In the monetary market, interest rates are flexibly operated, basically in line with macroeconomic and monetary developments, especially inflation in each period. Specific macroeconomic policies have helped the economy to stabilize growth, paving the way for profitable businesses and increasing the ability to repay loans of commercial banks, thus reducing bad debt risk.

Conclusions and recommendations

Firstly, improve profits and profitability: Diversify investment channels to increase revenue for banks. Improve the quality of products and services, diversify non-credit products that can be traded by electronic means on the network environment with high safety and security features in order to save transaction costs at the counter. Publicizing on the website the procedures of providing services to customers, improving service processes to reduce costs, shorten the time of providing services to customers. Continuously review the determination of fees for each type of service, and eliminate unreasonable fees. Strengthen inspection and monitoring of service quality through secret customer to improve service quality. Strengthen strict control over operating expenses of the bank in order to reduce the ratio of operating expenses to net operating income. In particular, building human resources in accordance with the operating scale of each business unit to promote maximum multi-labor productivity of employees.

Secondly, the common goal is to develop business operations, the commercial banks on the stock market of Vietnam need to consider credit growth carefully and sustainably coupled with improving credit quality, increasing the rate of guaranteed loans with assets production. Particularly, outstanding debts has been dealt with by risk provisions, it is necessary to actively seek all measures to recover. Improving the portfolio, give priority to expand lending to small and medium enterprises; non-state enterprises; gradually reduce the proportion of loans to businesses that are underperforming. Continue to diversify components customers in the direction of increasing the proportion of customers with collaterals, especially for customers belonging to non-state economic sectors and retail loans. Open to loans to customers who are doing business in key economic sectors, trading goods with stable consumption market; Prudent lending to goods that there are many fluctuations in the market price. To prevent high NPLs in the future, banks need to have a strict supervision and management system on credit activities to minimize the risks in providing loans and the macroeconomic policies.

Thirdly, the bank's equity can be used to offset the temporary payment shortage, to prevent operational risks. It can be said that the size of Vietnamese banks is smaller than banks in regional countries like China, Malaysia, India, Thailand and Indonesia. As a result, Vietnamese banks are under increasing capital pressure to ensure operational safety indicators. It can be seen that the increasing capital is an essential element to improve competitiveness in the current financial market context. In developed countries, Basel IV treaty is being launched. However, in major developing countries, including Vietnam, Basel III standards are being applied. One of the criteria mentioned in the Basel III standard is CAR. Therefore, banks are struggling to raise capital. This means that joint stock commercial banks on the stock market of Vietnam must simultaneously increase the

equity (in order to achieve the minimum capital adequacy ratio as prescribed in Circular 41) and increase mobilized capital.

Fourthly, proposing Government maintains the stable GDP growth, proactively and flexibly manage monetary policy instruments, coordinate closely and synchronously with fiscal policy. At the same time, focusing on removing difficulties for production and business, developing markets, increasing purchasing power, promoting commodity consumption. It is necessary to increase the priority of credit capital to promote production and business effectively for small and medium-sized enterprises. Supporting to boost export sector: Promoting trade promotion and developing export markets. In addition, the government needs appropriate solutions to mobilize public investment capital for the construction of a comprehensive infrastructure system - one of three breakthroughs identified in the socio-economic development strategy. Organize the implementation of public investment plans, strengthen inspection and examination to ensure the use of this capital source for the right purposes, in an efficient, economical and anti-wasteful manner.

Fifthly, during the period of economic growth decline, falling inflation will promote an increase in bad debt. Thus, in these periods, bank managers need to pay more attention to measures to control bad debts. In order to do well this task, the author recommends that administrators enhance monitoring of macroeconomic indicators, inflation, unemployment in the General Statistics Office reports, the average lending rate at the state bank; especially in the forecast reports on the situation of economies in IMF and World bank, thereby developing appropriate macroeconomic forecasting methods.

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Coronavirus (COVID-19): Effect and Survival Strategy for Businesses

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Abstract

Coronavirus (COVID-19) is a public health emergency and a serious threat to the economy of both developed, developing, and underdeveloped nations. This paper identifies the adverse effect of such a virus to businesses across the globe. It also attempts to devise a strategy for survival in the presence of the pandemic. Scientific literature and technical reports were reviewed systematically as a methodology to find and classify related studies for the research. Such studies were examined and synthesized in a manner that gives new insights into the effect of the new pandemic for businesses across the globe. The study reveals that coronavirus known as COVID19 has negatively affected a lot of businesses across the globe. Specifically, the values of the stock market fall to negative, while that of gold and oil tumbled significantly. Additionally, the study confirmed that transportations and travel companies, businesses in the hospitality industry, and industrial production companies experience a significant drop in patronage. The paper is one of the important studies taken in the context of Coronavirus or COVID-19, Business Survival, and strategy. Especially now that the virus has posted a global challenge to not only the life and health of people but businesses and the economy of many nations. This is a pioneering effort in the research of this nature. Other researches concentrated on the prevention and management of the pandemic. So, the paper is original in context as well as in research terms. Recommendations were given as a step forward.

Keywords: Businesses, Capability development, Core competencies, Coronavirus, COVID-19, Survival strategy

I. Introduction

The coronavirus (COVID-19) outbreak, which originated in China, has infected tens of thousands of people. Its spread has left businesses around the world counting costs. The virus is posing a growing threat to the economy of many nations as the pandemic is moving from travel restrictions of individuals to that of business organizations (Davidson, 2020). That extends the pandemic's reach into nearly every corner of commerce as many consumers avoid large gatherings of people in commercial places and beyond.

Commercial activities or businesses form part of the pillars of growth to many nations, bee it developed, developing and underdeveloped but the presence of coronavirus has made the operational environment hostile.

This makes some leading economists forecasting a recession this year 2020 which is in line with the view of the Bank of America, that global economy already in recession.

Businesses are canceling trade shows and business conferences with a lot of them canceling trips. At the begging of the year 2020, first quarter to be precise, the International Air Transport Association (IATA), which represents global airlines, boosted its estimates of the global financial hit of COVID-19 from $29.3 billion to $63 billion to $113 billion as the bookings keep falling beyond the china and Asia at large. That would place businesses of airlines in their most unsafe situation since after the situation of Sept. 11, 2001 attacks. So also, the services of ships and trains are on the decrease. Shepardson (2020) reported that the senior executive vice president and chief operating and commerce officer of the National Railroad Passenger Corporation, known as Amtrak, Stephen Gardner, said in a memo to employees "Our ridership and revenue have declined sharply over the past few weeks, both on the Northeast Corridor and the National Network. These reductions have accelerated in recent days and will likely continue for some time." We believe that we will likely suffer the loss of several hundred million dollars in revenue during this fiscal year, and we might lose more, Gardner added. Additionally, events and programs that have a direct effect on the operations of many businesses are suspended. For example, world events football, Basketball and other games and social activities are suspended because of the virus COVID 19. Such a sudden and sharp drop in footfall and other events that assemble different personalities and organizations will significantly decrease retail takings and will drive numerous retailers into a complex situation.

Furthermore, Davidson (2020) reported that Diane Swonk, chief economist at Grant Thornton, says that if the pandemic keeps spreading, most likely it will result in recession. She added that it is more diligent to get the economy moving again in this manner anticipating a huge number of staff layoffs. In a similar development, Davidson (2020) also reported Gray and Christmas saying that the virus has led to about 630 virus-related job cuts at the time of his report which include but not limited to about 145 drivers and other supporting staff at the Port of Los Angeles due to slowed down shipments from China. Similarly, Tempe (2020) reported a survey conducted yearly 2020 by leading not-for-profit professional supply management organization worldwide, Institute for Supply Management (ISM), that seventy-five percent (75%) of business organizations revealed serious interruptions and disturbances in their operations as a result of the spread of the coronavirus. They further reported a shortage of consumables items, tools and parts in some pharmaceuticals and medical devices industries. Some have reduced staff traffic at work.

With the foregoing issues and a string of deaths, some heart-stopping plunges in the stock market and an emergency rate cut by the apex bank of many nations, there is reason to be concerned about the ultimate economic impact of the coronavirus on the businesses of different kinds. Therefore, this paper examined the adverse effect of COVID-19 to the businesses and attempts to devise a strategy for survival in the presence of the said virus.

II. Related Study

A. Coronavirus

The concept of the Virus Corona originated from the Latin to means crown. The infamous Coronavirus got its name from a spiky crown of glycoproteins on its surface. The World Health Organisation (WHO) explained Coronaviruses as a large family of viruses that cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV).

The most recent Coronavirus disease which was officially tagged by the Chief Scientist at WHO in Switzerland, Soumya Swaminathan, as COVID-19 to mean coronavirus disease of the year 2019, is a new strain that was discovered in 2019 and has not been previously identified in humans. The virus whose genome consists of a single strand of ribonucleic acid is zoonotic that transmitted between animals and people. The virus was originated from a Chinese city, Wuhan, in December 2019 as reported by WHO.

Most of the literature on coronavirus was documented and published in science and medical journals. Van der Hoek, Pyrc, Jebbink, Vermeulen-Oost, Berkhout, Wolthers, & Berkhout, (2004) report the identification of a new

human coronavirus, HCoV-NL63, sometimes in the year 2004 in addition to those in existence which includes human coronavirus 229E (HCoV-229E), HCoV-OC43 and severe acute respiratory syndrome (SARS)-associated coronavirus (SARS-CoV). Similarly, in the year 2012, Zaki, Boheemen, Bestebroer, Osterhaus, and Fouchier (2012) reported the isolation of a novel coronavirus from a man with pneumonia in Saudi Arabia. Coronaviruses have the potential to cause severe transmissible human disease, as demonstrated by the severe acute respiratory syndrome (SARS) outbreak of 2003. Bermingham et al. 2012 described the clinical and virological features of a novel coronavirus infection causing severe respiratory illness. Due to the zoonotic nature of coronavirus, it transmits easily with people, it keeps spreading among human and animals, Abroug et al. (2013) reported that in 2013 in every 3 persons in a family were found to be infected with MERS-CoV in Tunisia.

In December 2019, Zhu et al. (2020) reported in research (Funded by the National Key Research and Development Program of China and the National Major Project for Control and Prevention of Infectious Disease in China), that a cluster of patients with pneumonia of unknown cause was linked to a seafood wholesale market in Wuhan, China which was later confirmed to be COVID-19. Different from both SARS-CoV and MERS-CoV, COVID-19 is the seventh member of the family of coronaviruses that infect humans. Presently, it has been established that human-to-human transmission of COVID-19 has occurred among close contacts since the middle of December 2019 (Li et al., 2020). The new virus infection caused clusters of severe respiratory illness similar to severe acute respiratory syndrome coronavirus and was associated with ICU admission and high mortality (Huang et al., 2020).

This paper appreciates the contributions of the forgoing literature in the body of knowledge by the identification, isolations, and the descriptions of the nature and behavior of coronaviruses in the world. This serves as a basis for this research. The literature needs to be extended to go beyond the effect of the most recent coronavirus on the health and life of people but to the businesses as well.

B. Businesses Survival and Performance with Coronavirus

The literature on the issues surrounding the relationship or effect of coronavirus on/and business survival or performance is quite limited. The one identified, highlighted the impact of coronavirus outbreak on the global economy, where the emphasis was made on the role of social network sites in sharing the customers' and businesses' information and concerns about the coronavirus outbreak (Ahani, & Nilashi, 2020). Other scholars ware more concerned about the survival of businesses through inventions and innovation, for example, Cefis, and Marsili (2019), Ortiz-Villajos, Sotoca (2018) and Wojan, Crown, and Rupasingha (2019).

On the contrary, direct disaster assistance was said to have a significant impact on business survival during a crisis (Haynes, Danes, Schrank, & Lee, 2019). In another development, Casillas, Moreno-Menendez, Barbero, and Clinton (2019) reported a positive relationship between retrenchment strategies and family involvement in business survival. Therefore, with the trends of things nowadays on how businesses shut down across the globe on the ground of the coronavirus. There is a need to study the effect of such pandemic on the performance and survival of many businesses.

C. Theory and Strategy

Let's start this section with an inquiry. Is there any existing theory or strategy that can best be applied to address the current issue of COVID 19 and how it affects businesses across the globe? Let begin by looking at the popular Porter's generic strategies.

Michael Porter developed strategies on how a company pursues competitive advantage that gives superior performance across its chosen market scope. These are known as Porter's three generic strategies and can be applied to any size or form of business (Porter, 1980). Porter claimed that a company must only choose one of the three or risk that the business would waste precious resources. Porter's generic strategies detail the interaction between cost minimization strategies, product differentiation strategies, and market focus strategies of the company. Though these strategies have been successfully tested in numerous companies the question here is, can

it work in a crisis situation just like what businesses are currently facing with the development of COVID 19? Never can tell unless it is analyzed and carefully tested.

Looking deep into the literature on the issues to do with addressing rapidly or sudden change in the environments, Teece, Pisano and Shuen (1997) developed Dynamic capability theory. The theory described the company's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments (Teece et al., 1997). Now, can this theory fit into the current situation of COVID 19? Teece et al. (1997) described dynamic capabilities and strategy with an emphasis on the three dynamic capabilities that are necessary to meet new challenges. Organizations and their employees need the capability to learn quickly and to build strategic assets. New strategic assets such as capability, technology, and customer feedback have to be integrated within the company as well as transforming and reconfiguring existing strategic assets. Can this be the way-out? Intensive study, observation, and proper analysis are required to confirm it.

III. Methodology

The method proposed by Webster and Watson (2002) was adopted for this research for the systematic literature reviews in the field in question. Initially, a systematic search to accumulate a relatively complete body of relevant scientific literature was made. Towards this end, the information in form of articles and reports was searched and collected with popular and most reliable quality journals, data management organizations and reputable media organizations using the keywords Coronavirus, COVID-19, Businesses, and Survival strategy. Thereafter, the collected documents were carefully studied and filtered using the following inclusion and exclusion criteria:

  a) Included all articles and report on Coronavirus, COVID-19, and Business Survival strategy
  b) Included all articles and report on Coronavirus, COVID-19, and the global/country (any nation) economy
  c) Included all articles and report that present and predict the effect of Coronavirus (COVID-19) with businesses or economy
  d) Excluded all articles and report that did not relate Coronavirus (COVID-19) with businesses or economy
  e) Excluded all purely theoretical articles

The resulted set of articles was synthesized and the accumulated knowledge is presented in the next section as findings.

IV. Findings

Intensive reading, research, and review of related documents provide a situational report on the recent performances of businesses across different industries. Such a report is presented in this section in graphs adopted from the work of Jones, Brown, and Palumbo (2020). Such graphs and charts will help in understanding the impact seen on different businesses, industries, and economies so far.

Starting with the global stock indexes, Bloomberg, a company that provides financial software tools and enterprise applications such as analytics and equity trading platform, data services, and news to financial companies and organizations in the world, presented a graphical impact of coronavirus on stock markets since the start of the outbreak which was published by BBC News.

The impact of coronavirus on stock markets since the start of the outbreak

Nikkei: -28.7%
Dow Jones: -31.1%
FTSE 100: -34.1%
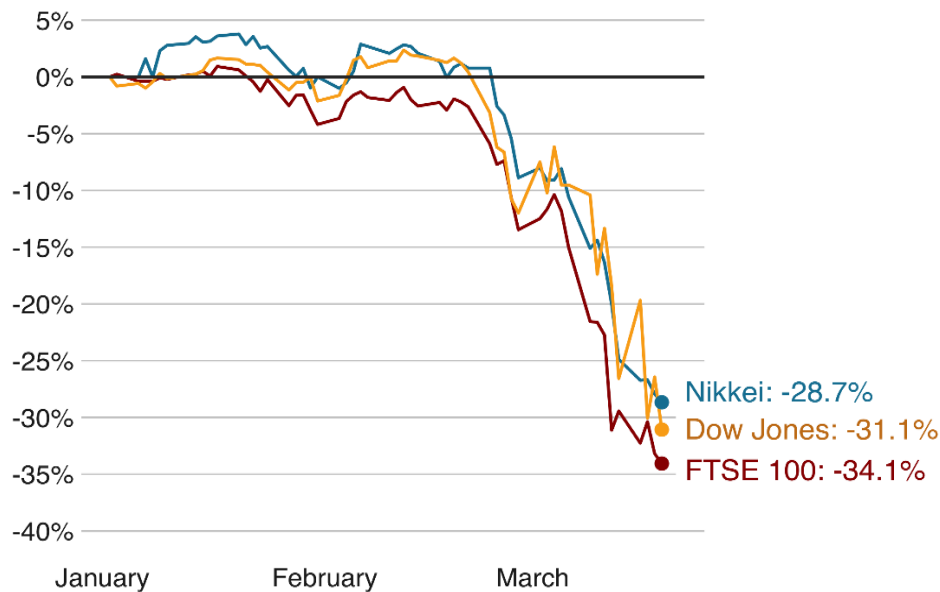
Source: Bloomberg, 19 March 2020, 13:00 GMT   BBC

The FTSE, Dow Jones Industrial Average and the Nikkei have all seen sharp falls since the outbreak began.

Secondly, a lot of businesses across the globe depend on transportations and travel for their smooth operation. The travel industry has been badly damaged, with airlines cutting flights and tourists canceling business trips and holidays.

The trade association for the world's airlines, known as the International Air Transport Association (IATA) which represents some 290 airlines or 82% of total air traffic. Reported that more than 100 countries have travel restrictions because of coronavirus.

The European Union (EU) has put movement restrictions from outside the coalition for 30 days in an extraordinary move to seal its borders against the spread of the pandemic. So also, in different countries. The analytics firm Forward Keys has assessed that up to 48,200 flights with 10.2 million seats could be influenced by the restriction enforced by the EU.

Airlines most at risk from EU travel ban

Total number of seats on scheduled flights between EU and
non-EU countries in the 30 day period

Airline	Seats
Air France	815,000
Lufthansa	573,000
Emirates	544,000
KLM	507,000
Wizz Air	468,000
Qatar Airways	372,000
Ryanair	369,000
Turkish Airlines	354,000
Delta Air Lines	338,000
Aeroflot	322,000
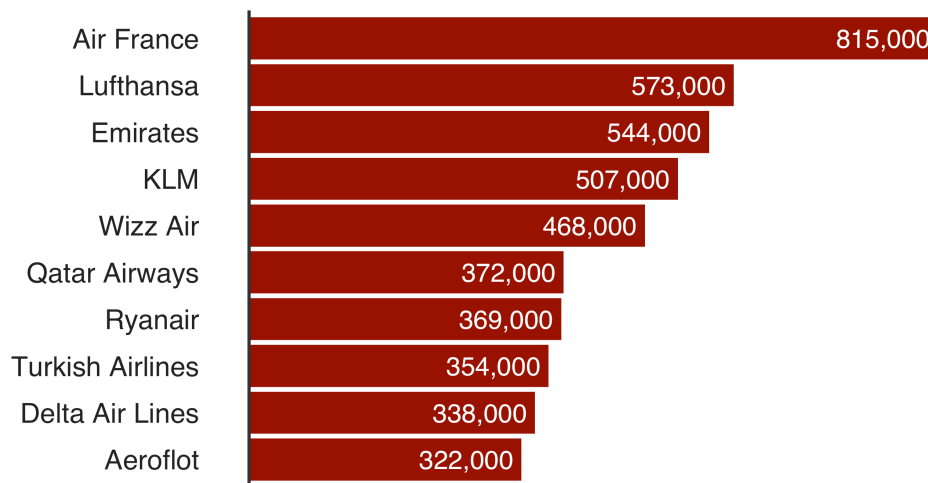
Note: EU restrictions envisage some skeleton services may continue to operate

Source: ForwardKeys   BBC

The above chart is developed by the travel analytics company that provides global flight reservations known as ForwardKeys, and published by the BBC News. From the chart above the airline with the biggest impact falling is Air France. Followed by Emirates, KLM, Wizz Air, Qatar Airways, Ryanair, Turkish Airlines, Delta Air Lines and Aeroflot

Thirdly, we look more into the hospitality industry, due to the fear of the virus governments of many countries put a restriction on movement. This has a devastating impact on restaurants and hotel businesses. Below is a BBC published graphical presentation of restaurant bookings in several countries by Open Table, a popular online restaurant-reservation service company.

Restaurant bookings in several countries have almost completely collapsed

Reservations compared with the same day last year

UK -82%
US -84%
Ireland -86%
Germany -90%
Canada -94%
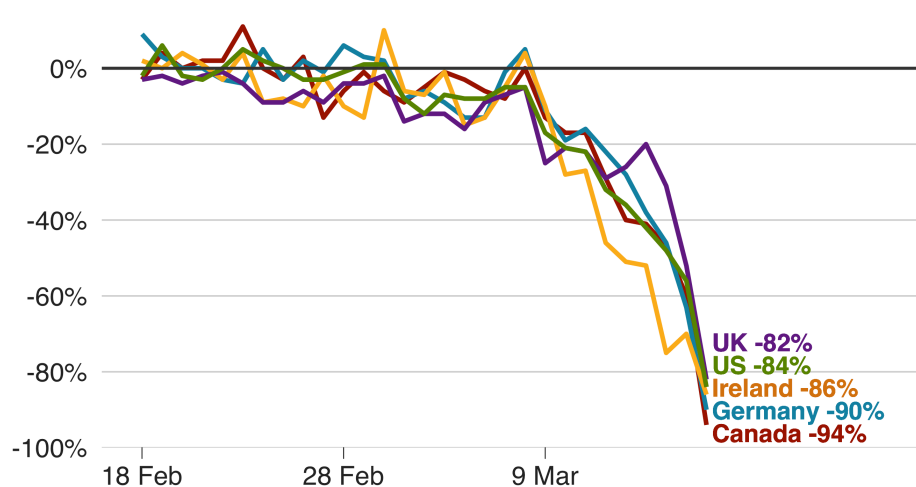
Source: OpenTable   BBC

The graph shows how restaurant booking falls in several countries like the UK, the US, Ireland, Germany, and Canada. The restaurant bookings collapsed below the zero lines from those countries.

Additionally, The National Aeronautics and Space Administration (NASA) is an independent agency of the United States federal government responsible for the civilian space program, as well as aeronautics and aerospace research together with European Space Agency (ESA), a European space agency is an intergovernmental organization of 22 member states dedicated to the exploration of space with headquartered in Paris, reported that pollution-monitoring satellites had detected a significant drop in nitrogen dioxide in china. Shreds of evidence connect it to the economic slowdown caused by the coronavirus outbreak. Again, the BBC published a chart developed by the China Bureau of Statistics on the fall of industrial production in China as shown below.

Chinese industrial production fell by 13.5% in the first two months of the year
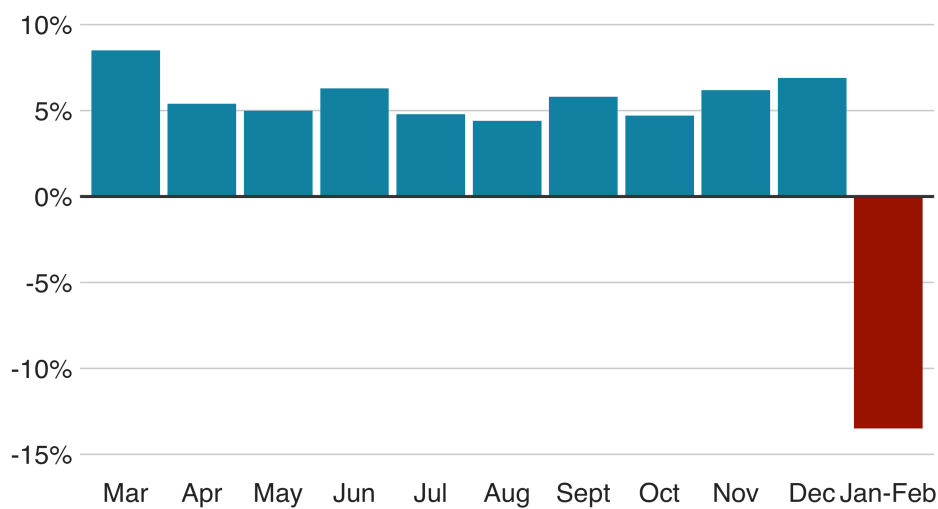
Source: China National Bureau of Statistics   BBC

The above chart shows a clear drop in the industrial production of china with close to -15% in February 2019. This is of great concern to businesses that rely on China for their part and material of operations.

Again, Even the less risky investments in the gold business fall. Normally it is considered a less risky investment amid uncertainties. However, the value has fallen as presented in the graph developed by Bloomberg. Presently the investors are becoming more afraid with the spread of coronavirus which properly may lead to a global recession.

The value of gold is now plummeting
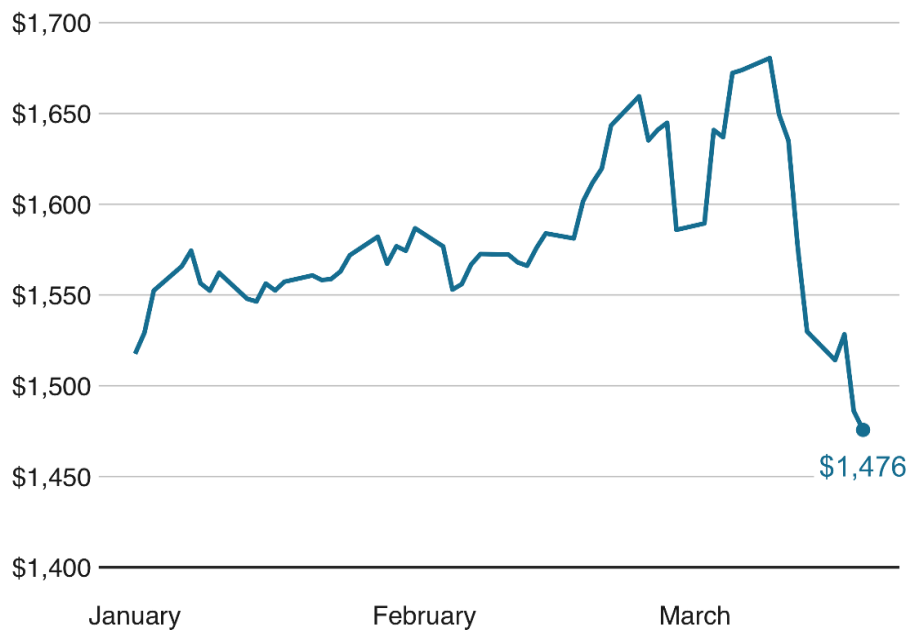
Source: Bloomberg, 19 March 2020, 13:00 GMT   BBC

From the graph, though the present value of Gold is still above $1000 it has declined below its original value as of January this year.

Likewise, the oil industry, Investors are worried that the spread of the virus around the globe will further reduce the demand for oil. Presently, oil is at its lowest price since 2001 as presented below:

Oil is at its lowest price since June 2001
US dollars per barrel
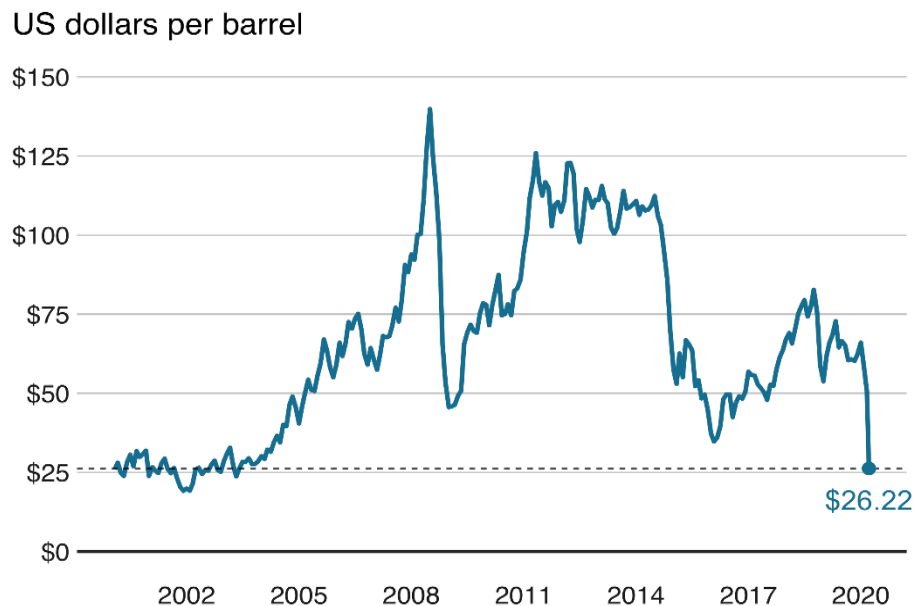
Source: Bloomberg, 19 March 2020, 13:00 GMT   BBC

The above graph is a presentation of the oil price developed by Bloomberg. The price is currently below $30 per barrel.

V. Discussion and Implications

This paper examined the concept and nature of coronavirus known as COVID19 concerning how it affects businesses across the globe intending to provide a strategy for survival in the presence of the pandemic. On the general note, the finding as presented above has revealed that the pandemic has negatively affected a lot of businesses across the globe. Specifically, the values of the stock market fall to negative, while that of gold and oil tumbled significantly. Additionally, the study confirmed that transportations and travel companies, businesses in the hospitality industry, and industrial production companies experience a significant drop in patronage.

Investors are sceptical and worried about the impact of the pandemic as it spreads outside of China. Therefore, investing more in the capital market is not a good idea rather rushing to dispose of. The FTSE, Dow Jones Industrial Average and the Nikkei are a good example of companies that have all observed sharp falls since the pandemic started. The Dow and the FTSE have seen their greatest one-day decrease since 1987. The dread is still on the virus spread which will adversely affect the economic growth of many nations. The governments of many countries are taking some steps to reduce and if possible, stop the impact of such pandemic on businesses, however, such actions may not be sufficient to prevent the negative impact. For example, some countries' apex bank which includes the United States, England, that of India from Asia and even some African countries like Nigeria are among those that slash interest rates. That should, in principle, attract borrowing and boost spending to support the economy.

The restrictions in many countries have directly affected transportations companies and that in the hospitality industry. This has implications on a lot of businesses as the pandemic is turning the world to stand still. Additionally, in China where the coronavirus first appeared, operations of factories have slowed down. Unlike the previous year, the first quarter of 2020, the country recorded a decrease in commercial activities like investments, sales, and industrial production. This has a multiplier chain effect on businesses across the globe considering the position of China in the global economy as the largest exporter of goods.

There is no doubt that the present pandemic is so serious to the extent it adversely affect the gold business. The gold business is normally considered as business wilt a very less risk and investors do invest in it even a time of uncertainty. But this pandemic has caused a significant drop in the value of gold. Similarly, the price of oil has also dropped below the lowest recorded sometimes in the year 2001. Various stakeholders particularly the investors, the dread that the worldwide spread of the pandemic will additionally hit the economy worldwide and oil demand. It has been established already that recently, the price of oil has been affected by the market mechanism. The pandemic is now worsening the situation.

These findings imply that the wider the spread of such pandemic the more it will continue to affect the operations of almost all businesses across the globe. This is so because many businesses are interdependent of each other, above all, they rely on customer patronage which is now difficult with the present pandemic. People and organizations are restricted which leads to a drastic reduction in operations and consumption.

Based on the foregoing findings and the implications, reliance on support from outside especially the government will not yield any fruits as the government of many countries are more concerned about the prevention and cure of the virus – COVID 19. Therefore, business organizations need to look inwards. In that direction, the following suggestion is formulated as a survival strategy amidst the present pandemic situation.

Focus on Core Competencies and Capability Development. Despite several scholarly articles on diversification as a strategy for business success at different circumstances, looking at the present pandemic situation, diversification may not be a strategy rather a distraction or even a waste of time and resources. If care is not taking, it may damage the core business. Therefore, the suggestion here is to drop the extras and focus on what you do best that is most profitable to the business.

This is in line with the argument of Teece et al. (1997) on dynamic capabilities and strategy, businesses and their employees need to develop the capability to learn quickly and to build new strategic assets that can address the new environmental challenge of COVID 19. Such strategic assets should include capability, technology, and customer feedback more especially now that the pandemic has created physical distance among organizations and people. There is a need for technology adaptation for continuous operations. Even if not because of the present pandemic, already the world is moving digital. Again, the issue of customer feedback is very essential at this moment, a medium of having reliable customer reactions need to be integrated within the company.

VI. Conclusion

This paper examined the adverse effect of Coronavirus (COVID-19) to the business across the globe. The paper concludes that coronavirus known as COVID19 has negatively affected a lot of businesses across the globe. Specifically, the values of the stock market fall to negative, while that of gold and oil tumbled significantly. Additionally, the study confirmed that transportations and travel companies, businesses in the hospitality industry, and industrial production companies experience a significant drop in patronage. Thus, the paper recommends that business organizations should focus on core competencies and capability development strategy for survival in the presence of such pandemic.

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Analyzing Long-Term Records of Global Average Sea Level Change Using ARIMA Model

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Abstract

The purpose of this study was to demonstrate the role of time series model in predicting process and to pursue analysis of time series data using long-term records of global average sea level change from 1880 to 2013 extracted from the U.S. Environmental Protection Agency using data from Commonwealth Scientific and Industrial Research Organization, 2015. Following the Box–Jenkins method, ARIMA(0,1,1,) model was the best fitted model in prediction for the data, Global Average Absolute Sea Level Change, 1880-2013, in this study. Forecasting process with ARIMA(0,1,1) model for prediction indicated global average sea level change at a constant increasing rate in the short-term. Understanding past sea level is important for the analysis of current and future sea level changes. In order to sustain these observations, research programs utilizing the resulting data should be able to significantly improve our understanding and narrow projections of future sea level rise and variability.

Keywords: Sea Level Rise, Long–Term Records, Time Series Analysis, ARIMA

1. Introduction

Climate change is the long term change that occurs in the average weather patterns of the earth. It is primarily triggered by human activities like burning of fossil fuels, deforestation, etc. or natural events like volcanic eruptions. National Oceanic and Atmospheric Administration (NOAA) 2019 Global Climate Annual Report summarized that the global annual temperature has increased at an average rate of 0.07°C (0.13°F) per decade since 1880. To make it worse, this rate (+0.18°C/ +0.32°F) of increase has doubled since 1981 (https://www.ncdc.noaa.gov/sotc/global/201913).

Sea level rise is caused primarily by two factors related to climate change: the added water from melting of land ice (ice sheets and glaciers) to the world's oceans and the thermal expansion of seawater temperature rise. The potential impacts of sea level rise include, but not limited to, increasing coastal flooding and erosion, damages on

agricultural land cover and crops, damages on coastal/urban settlements and infrastructures, damages on coastal flora and fauna ecosystems, increasing environmental sanitation problem, and increasing public health problem. According to Climate.gov, global average sea level has risen about 8–9 inches (21–24 cm) since 1880 (https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level). Church et al. (2004) used TOPEX/Poseidon satellite altimeter data and combined with historical tide gauge data to estimate monthly distributions of large-scale sea level variability and change over the period 1950–2000. The computed rate of global average sea level rise from the reconstructed monthly time series was 1.8 ± 0.3 mm year^{-1}.

After that, Church and White (2006) indicated that a larger rate of sea level rise after 1993 and other periods of rapid sea level rise but no significant acceleration over this period using tide-gauge data from 1950 to 2000. They extended the reconstruction of sea level back to 1870 and found a sea level rise from January 1870 to December 2004 of 195 mm, a 20th century rate of sea level rise of 1.7 ± 0.3 mm yr^{-1} and a significant acceleration of sea level rise of 0.013 ± 0.006 mm yr^{-2}.

In 2011, Church and White (2011) found that the estimated rate of sea level rise was 3.2 ± 0.4 mm year^{-1} from the satellite data and 2.8 ± 0.8 mm year^{-1} from the in situ data. The global average sea level rise from 1880 to 2009 was about 210 mm. The linear trend from 1900 to 2009 was 1.7 ± 0.2 mm year^{-1} and since 1961 was 1.9 ± 0.4 mm year^{-1}. They also documented that there was considerable variability in the rate of sea level rise during the twentieth century but there has been a statistically significant acceleration since 1880 and 1900 of 0.009 ± 0.003 mm year^{-2} and 0.009 ± 0.004 mm year^{-2}, respectively.

The Intergovernmental Panel on Climate Change (IPCC) (2014) estimated that the sea level has risen by 26–55 cm (10–22 inches) with a 67% confidence interval. If emissions remain very high, the IPCC projected sea level could rise by 52–98 cm (20–39 inches). In its Fourth National Climate Assessment Report (2017) the U.S. Global Change Research Program (USGCRP) estimated that sea level has risen by about 7–8 inches (about 16–21 cm) since 1900, with about 3 of those inches (about 7 cm) occurring since 1993 (very high confidence). Relative to the year 2000, sea level was very likely to rise by 1.0–4.3 feet (30–130 cm) in 2100, and 0.3–0.6 feet (9–18 cm) by 2030.

There had many studies pointed out that sea level is rising at an increasing rate (Church et al., 2008); Cazenave and Llovel, 2010; Cazenave and Cozannet, 2013; Horton et al., 2018; Kulp and Strauss, 2019; Haasnoot, 2020). Thus, understanding past sea level is important for the analysis of current and future changes. Modeling sea level change and understanding its causes has considerably improved in the recent years, essentially because new in situ and remote sensing observations have become available (Foster and Brown, 2014; Visser et al., 2015; Bolin, 2015; Srivastava et al., 2016). Despite the importance of sea level rise and its consequences, there is a lack of studies in the technical literature available on forecasting schemes.

The purpose of this study is to demonstrate the role of time series model in predicting process and to pursue analysis of time series data using long-term records of global average sea level change from 1880 to 2013. Time series analysis comprises methods for analyzing time series data in order to extract meaningful statistics and other characteristics of the data, while time series forecasting is the use of a model to predict future values based on previously observed values. Time series forecasting is one of the most applied data science techniques in business, used extensively in finance, supply chain management, production and inventory planning. It has a well-established theoretical grounding in statistics and dynamic systems theory. It is important because there are so many prediction problems that involve a time component. These problems are neglected because it is this time component that makes time series problems more difficult to handle.

2. Materials and Methods

The data, Global Average Absolute Sea Level Change, 1880-2013 (Figure 1), used for this study is available to the general public from the US Environmental Protection Agency (http://www3.epa.gov/climatechange/images/indicator_downloads/sea-level_fig-1.csv) using data from CSIRO

(Commonwealth Scientific and Industrial Research Organization), 2015, (http://www.cmar.csiro.au/sealevel/GMSL_SG_2011_up.html).

The data contains "*cumulative changes in sea level for the world's oceans since 1880, based on a combination of long-term tide gauge measurements and recent satellite measurements. It shows average absolute sea level change, which refers to the height of the ocean surface, regardless of whether nearby land is rising or falling. Satellite data are based solely on measured sea level, while the long-term tide gauge data include a small correction factor because the size and shape of the oceans are changing slowly over time. (On average, the ocean floor has been gradually sinking since the last Ice Age peak, 20,000 years ago.)*" (Quoted from https://datahub.io/core/sea-level-rise#readme).
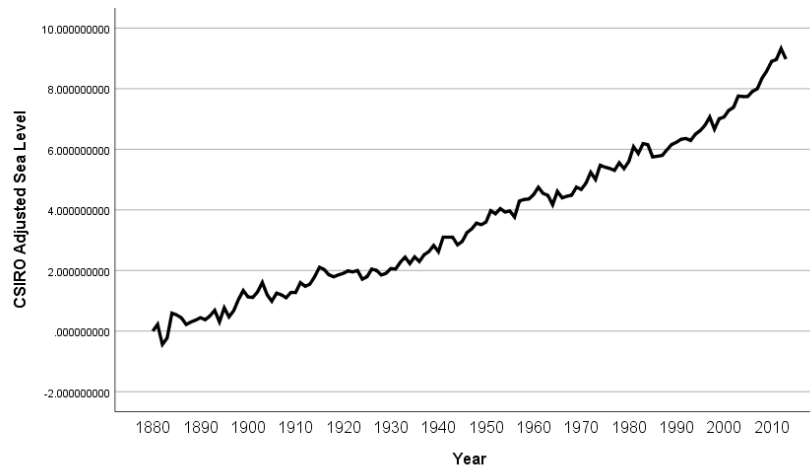
Figure 1. Time Series Plot of Global Average Absolute Sea Level Change, 1880-2013

A common approach in the analysis of time series data is to consider the observed time series as part of a *realization* of a *stochastic process*. In time series analysis and its various applications, a common assumption is that the data are stationary. Intuitively, *stationarity* means that the statistical properties (i.e., mean and variance) of the process do not change over time. In mathematics and statistics, **stationarity is a property of a stochastic process.**

ARIMA models are regression models that use lagged values of the dependent variable and/or random disturbance term as explanatory variables. In ARIMA model, the Autoregressive Process (AR) part of ARIMA indicates that the evolving variable of interest is regressed on its own lagged (i.e., prior) values; the Moving Average Process (MA) part indicates that the regression error is actually a linear combination of error terms whose values occurred at various times in the past; and the I (for "integrated") indicates that the data values have been replaced with the difference between their values and the previous values (and this differencing process may have been performed more than once). The purpose of each of these features is to make the model better fit to predict future points in a time series data as well as possible (Montgomery et al., 2008).

The general form of ARIMA model of order (p,d,q) is

$$Y_t = \phi_0 + \phi_1 Y_{t-1} + \phi_2 Y_{t-2} + \cdots + \phi_p Y_{t-p} + \varepsilon_t - \theta_1 \varepsilon_{t-1} - \theta_2 \varepsilon_{t-2} - \cdots - \theta_q \varepsilon_{t-q} \qquad (1)$$

where p = order of time lags, d = order of differencing, q = order of moving average, Y_t is value of the series at time t, Y_{t-1}, Y_{t-2}, …, Y_{t-p} are dependent on the past values of the variable at specific time points, ϕ_0, ϕ_1, ϕ_2, …, ϕ_p are the regression coefficient, θ_1, θ_2, …, θ_q are the (weights) coefficients applied to ε_{t-1}, ε_{t-2}, …, ε_{t-q} previous forecast errors and εt is error part (not explained by model).

In time series analysis, the Box–Jenkins method, named after the statisticians George Box and Gwilym Jenkins (Box and Jenkins, 1970), applies ARIMA models to find the best fit of a time series model to past values of a time series. The Box–Jenkins method refers to a systematic method of identifying, fitting, checking, and using ARIMA

models (Box et al., 2016), which is the process for estimating ARIMA models based on the autocorrelation function (ACF) and partial autocorrelation function (PACF) as a means of determining the stationarity of the variable in question and the lag lengths of the ARIMA model. Thus, the Box–Jenkins method starts with the assumption that the process that generated the time series can be approximated using an ARMA model if it is stationary or an ARIMA model if it is non-stationary.

For ARIMA model, there are four important steps, including identification, estimation, diagnostic checking and forecasting, should be put in consideration to apply it. ARIMA models rely heavily on the autocorrelation pattern in the time series data. Identification step applied to achieve stationarity and to build a suitable model using ACFs, PACFs, and transformations (differencing). If the time series is not stationary, it needs to be stationarized through differencing. Stationarizing a time series through differencing is an important part of the process of fitting an ARIMA model. In practice, it is almost not necessary to go beyond second difference, because real data generally involve only first or second level non-stationarity.

In the estimation step, plots and summary statistics can be used to identify trends and autoregression elements to get an idea of the amount of differencing and the size of the lag that will be required for model identification. The following estimation step is to use a fitting procedure to find the coefficients of the model. In order to discover good parameters for the model, Akaike's Information Criterion (AIC) or Bayesian Information Criterion (BIC) can be used to determine the order p and q of an ARIMA model. Good models are obtained by minimizing the AIC or BIC.

Diagnostic checking step is primarily to use plots and statistical tests of the residual errors to determine the model fitting, and to evaluate the fitted model in the context of the available data and check for areas where the model may be improved. The process is repeated until a desirable level of fit is achieved, and non-significant parameters can be removed from the model. There are many accuracy metrics applied after model identification and estimation helping in choosing the best fitted model. The commonly used accuracy metrics to judge forecasts are: Mean Square Error (MSE) = $(1/n)\Sigma(Y_t - \hat{Y}_t)^2$, Root Mean Square Error (RMSE) = $\sqrt{MSE}$, Mean Absolute Percentage Error (MAPE) = $(1/n)\Sigma(|Y_t - \hat{Y}_t| / |Y_t|) * 100$, and Mean Absolute Error (MAE) = $(1/n)\Sigma|Y_t - \hat{Y}_t|^2$ (Montgomery et al., 2008).

The last step is forecasting step that can be applied in prediction process after checking the model in the previous steps. The Forecasting Module of IBM SPSS Statistics 26 was used as the tool to estimate the model parameters to fit the ARIMA models in predicting global average sea level change to achieve the purpose of this study.

3. Empirical Results

3.1 Identification of ARIMA Model

By looking at the time plot of the data, ACF plot is useful for identifying non-stationary time series. For a stationary time series, the ACF will drop to zero relatively quickly, while the ACF of non-stationary data decreases slowly. The ACF plot of the data, Global Average Absolute Sea Level Change, 1880-2013, used for this study (Figure 2) showed strong positive statistically significant correlations at up to 16 lags that never decay to zero. This suggested that the time series is non-stationary and should be differenced. As a result, there is no need yet to examine the PACF for the time series.
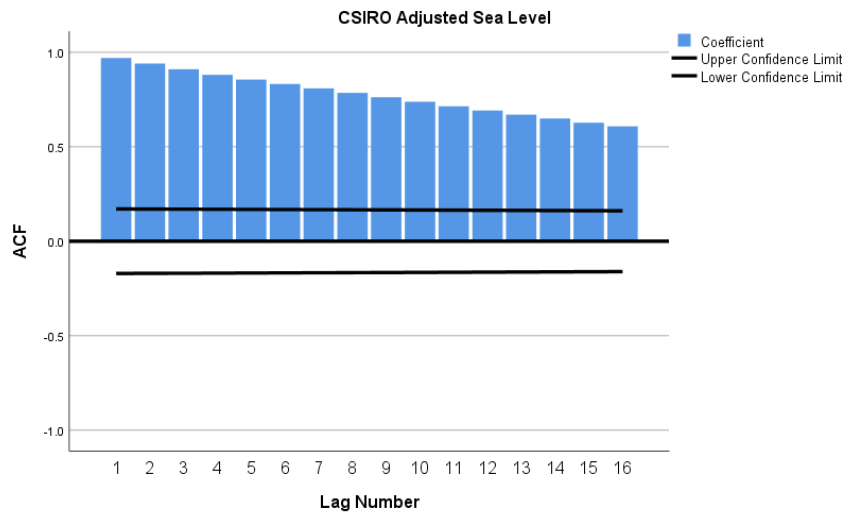
Figure 2. ACF Plot of Global Average Absolute Sea Level Change, 1880-2013

In terms of non-stationary time series, differencing can be used to transform a non-stationary time series into a stationary one. The first difference of a time series is the time series of changes from one period to the next. Notice that the graph of the first difference of the data, Global Average Absolute Sea Level Change, 1880-2013, looked approximately stationary (Figure 3).

Transforms: difference(1)
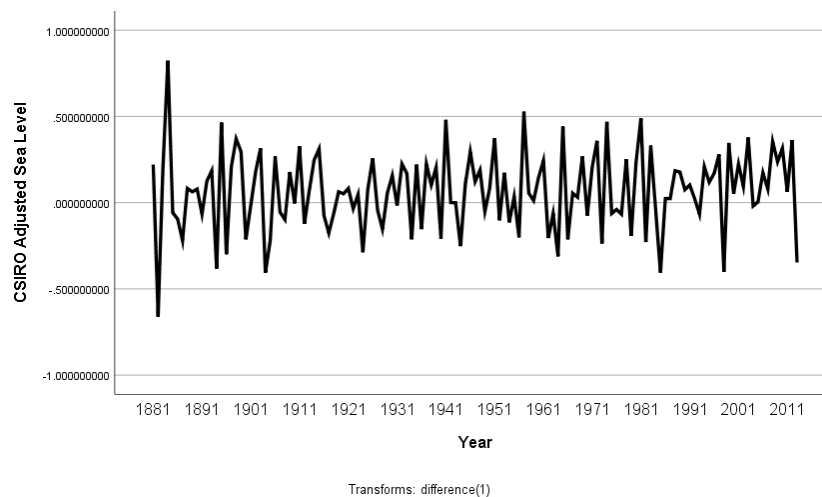
Figure 3. Time Series Plot for First Difference

Figures 4 and 5 presented the ACF and PACF, respectively, of first difference of the data, Global Average Absolute Sea Level Change, 1880-2013. The ACF in Figure 4 and the corresponding PACF in Figure 5 showed a similar pattern that looked mostly like a steady decay toward zero after the first few lags. Together, this could suggest that the time series of first difference followed a first-order moving average process. Further analysis of the data, Global Average Absolute Sea Level Change, 1880-2013, should be conducted by estimating an ARIMA model.
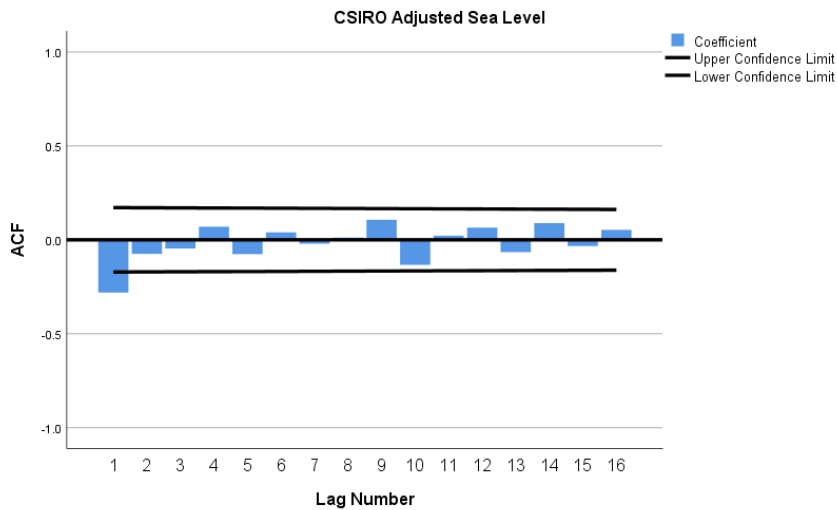
Figure 4. ACF Plot for First Difference
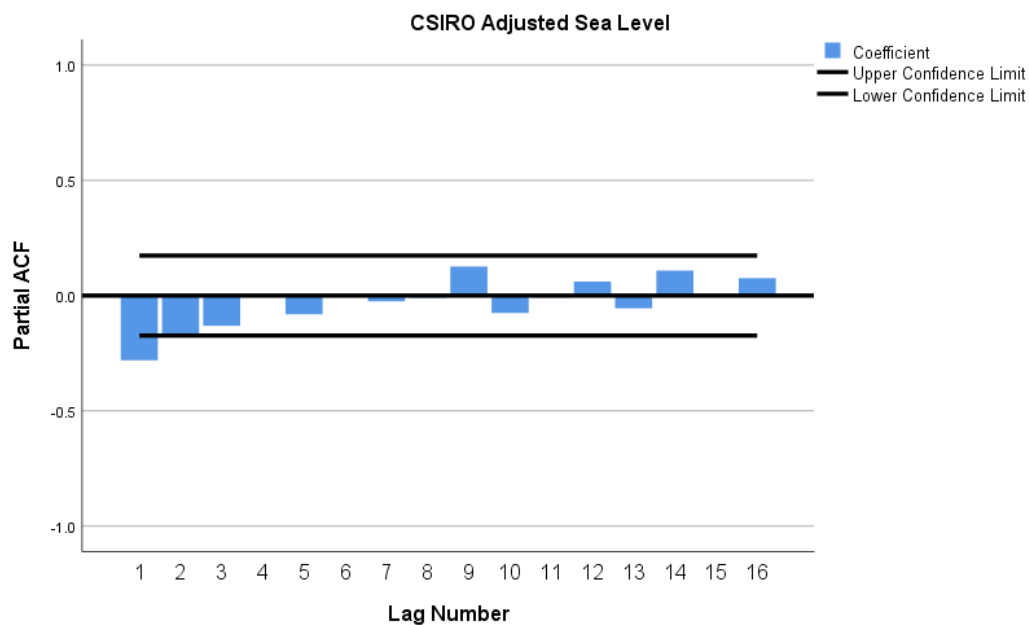
Figure 5. PACF Plot for First Difference

There were many time series models suggested to represent the data with the normalized BIC values as in Table 1. The most fitted model was with the smallest normalized BIC value (-3.002). The most suitable model was Holt's exponential smoothing method. Also, ARIMA model with ordering (0,1,1) is good in prediction process with BIC value (-2.994), followed by (1,1,0), (0,1,2) and (1,1,1) of BIC values (-2.961), (-2.957), and (-2.957), respectively. The other model statistics which indicated fitting of the model to the data were higher MAPE value with the lowest normalized BIC and lower RMSE value. All these measures were a good indicator of fitting of the model to the data well.

Table 1. Comparison of Different ARIMA Models

Model	Normalized BIC	RMSE	MAPE	MAE
Holt's Exponential Smoothing	-3.002	0.215	11.887	0.168
ARIMA(0,1,1)	-2.994	0.216	12.014	0.169
ARIMA(1,1,0)	-2.961	0.219	12.042	0.171
ARIMA(0,1,2)	-2.957	0.216	11.708	0.168
ARIMA(1,1,1)	-2.957	0.216	11.724	0.169

ARIMA(2,1,0)	-2.943	0.217	11.967	0.170
ARIMA(2,1,1)	-2.913	0.217	11.683	0.168
ARIMA(0,1,3)	-2.913	0.217	11.685	0.168
ARIMA(1,1,2)	-2.912	0.217	11.696	0.168
ARIMA(1,1,3)	-2.879	0.216	11.655	0.168
ARIMA(2,1,2)	-2.877	0.216	11.737	0.169
Simple Exponential Smoothing	-2.875	0.233	12.166	0.183
ARIMA(2,1,3)	-2.834	0.217	11.670	0.168
ARIMA(0,2,2,)	-2.736	0.241	13.832	0.183
ARIMA(2,0,0)	-1.656	0.414	12.837	0.215
ARIMA(2,0,3)	-1.508	0.422	12.159	0.212
ARIMA(1,0,0)	-1.496	0.456	12.949	0.220
ARIMA(2,0,1)	-1.469	0.446	12.147	0.215
ARIMA(0,0,3)	-0.460	0.738	38.585	0.567
ARIMA(1,0,1)	-1.421	0.465	12.124	0.217
ARIMA(3,0,0)	-1.389	0.464	12.865	0.220
ARIMA(1,0,2)	-1.366	0.469	12.204	0.217
ARIMA(1,0,3)	-1.359	0.463	12.335	0.216
ARIMA(2,0,2)	-1.322	0.471	12.078	0.217
ARIMA(0,0,2)	0.344	1.124	72.435	0.915
ARIMA(0,0,1)	0.745	1.399	90.279	1.188

3.2 Estimation of the Model Parameters

The parameters of Holt's Exponential Smoothing Method were presented in Table 2. Even Holt's exponential smoothing method was the most suitable model for the time series data, but the smoothing parameter for the trend (α_2) had a very small value (= 0.00001951), which means that the slope hardly changes over time, and also was not significant statistically. Thus, in this case, Holt's exponential smoothing method is identical to the simple Exponential Smoothing method.

Table 2. Parameters of Holt's Exponential Smoothing Method

Parameter	Estimate	SE	t	Sig.
α_1 (Level)	0.601	0.083	7.232	0.000
α_2 (Trend)	1.951E-5	0.032	0.001	1.000

Given this option, ARIMA(0,1,1) was chosen for further forecasting process, and the parameters of ARIMA(0,1,1) model were presented in Table 3. The ARIMA(0,1,1) model for the data, Global Average Absolute Sea Level Change, 1880-2013, can be expressed as follows:

$$\hat{Y}_t = 0.069 + Y_{t-1} + 0.395\varepsilon_{t-1} + \varepsilon_t \tag{2}$$

Table 3. Parameters of ARIMA(0,1,1) Model

Parameter	Estimate	SE	t	Sig.
Constant	0.069	0.011	6.029	0.000
Difference	1			
MA Lag 1	0.395	0.081	4.891	0.000

3.3 Diagnostic Checking of the Model

The Ljung–Box Q–test (Ljung and Box, 1978) is a diagnostic tool used to test the lack of fit of a time series model. The test statistic of the Ljung–Box Q–test was Q = **9.216** with 17 degrees of freedom and the p-value of the test was **0.933**, which is much larger than 0.05. Thus, the null hypothesis that autocorrelations up to lag k equal zero (that is, the data values are random and independent up to a certain number of lags) was accepted. It concluded that the model was correctly specified.

Figure 6 illustrated the ACF and the PACF, respectively, for the residuals resulting from the estimated ARIMA (0,1,1) model. Reading from the bottom up, both figures showed no pattern in the correlations reported among the residuals nor did any of the correlations extend beyond the vertical 95% confidence intervals included in the plots. This, combined with the Ljung–Box Q–test statistic, suggested that the ARIMA (0,1,1) model appropriately modeled the dynamics for this time series.
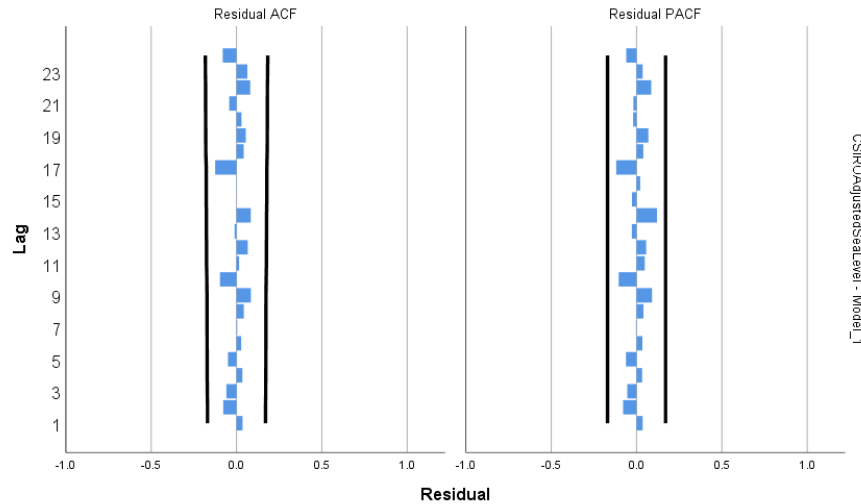
Figure 6. Residuals of ACF and PACF

3.4 Using the Model in Forecasting Process

The actual and predicted values of Global Average Absolute Sea Level Change were shown in Table 4 and Figure 6. Forecasting process with the ARIMA(0,1,1) model for prediction, i.e., 10 years of future Global Average Absolute Sea Level Change indicated a good fitting of the model for prediction at a constant increasing rate in the short term.

Table 4. Statistics for Prediction of Global Average Absolute Sea Level Change

Year	Forecast	95% Lower Control Limit	95% Upper Control Limit
2014	9.159	8.732	9.585
2015	9.227	8.729	9.726
2016	9.296	8.734	9.857
2017	9.364	8.746	9.982
2018	9.433	8.763	10.102
2019	9.501	8.784	10.219
2020	9.570	8.807	10.333
2021	9.638	8.833	10.444
2022	9.707	8.861	10.553
2023	9.776	8.891	10.660
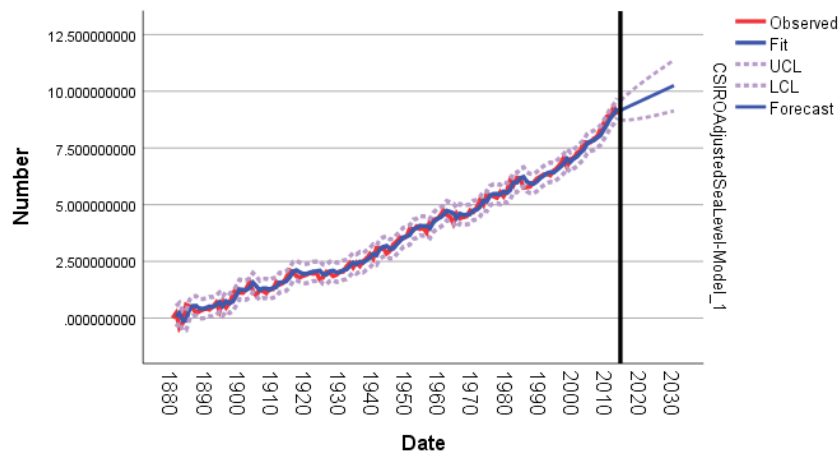
Figure 7. Actual and Predicted Global Average Absolute Sea Level Change

4. Conclusion

In this study the best choice time series model was ARIMA(0,1,1,) model as its high R-squared and the lowest BIC values among other models. It was noticed that global average sea level would increase as this ARIMA(0,1,1) model gave evidence about future global average sea level rise. This model also provided information which are important in decision making process related to the future sea level rise impacts. Also, ARIMA model is a good time series model in forecasting the future performance not only for regional but also for national sea level rise outcomes.

There were many studies revealed that sea level is rising at an increasing rate. Thus, understanding past sea level is important for the analysis of current and future changes. Tides, for example, are predictable because they are produced by a combination of forces that are predictable. These forces are determined by the movements and positions of objects in our solar system, particularly the earth and the moon in relation to the sun. To understand tides, therefore, it is important to understand the movements of the earth and the moon relative to the sun. However, most of the time, and in most places, tides are much more complex.

Sea level rise is a relatively slow process, and the majority of impacts, with the exception of seasonally flooded low-lying coastal areas, are predicted and modeled for the future. In order to sustain these observations, research programs utilizing the resulting data should be able to significantly improve our understanding and narrow projections of future sea level rise and variability.

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Budget Absorption Performance in Financial Education and Training Agency

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Abstract
This study focused on analyzed the effect of Synergy and Competence of Human Resources on the performance of budget absorption, both directly and through organizational commitment as a moderating variable inside the Financial Education Training Institution. The research used a quantitative approach. The data used are primary data. Samples were 87 respondents. The respondents are state financial managers, namely the Head of the Work Unit as the Budget User Authority, Commitment Making Officer, Signing Officer, Spending Treasurer and Procurement Officer involved in the budget management process in each work unit of 20 (twenty) Work Units within the Financial Education Training Agency. Data collection was carried out through a survey using a questionnaire that was distributed to respondents. Data were analyzed using multiple regression analysis (moderated regression) and moderated regression analysis (MRA) with statistical package for the social sciences (SPSS). The research results indicated that the synergy and competence of human resources had a positive and significant effect on the level of budget absorption performance. The organizational commitment variable unable to moderates the relationship of synergy with budget absorption performance and also unable to moderates the relationship of human resource competencies to budget absorption performance.

Keywords: Budget Absorption Performance, Human Resource Competencies, Organizational Commitment, Synergy

1. Introduction

1.1 Introduce the Problem

The State Revenue and Expenditure Budget functions as a tool to support national development strategies, for instance increasing economic growth, creating jobs, improving people's welfare, and environmentally-sound development, can run effectively if supported by effective budget absorption. However, until now the budget absorption still has a non-ideal pattern, which tends to accumulate at the end of the fiscal year, where the budget realization is low until the second quarter, but sharply increased in the fourth quarter. This condition is caused by the fact that the State Institution is still not optimal in preparing plans for the implementation of activities as

outlined in the plan for withdrawing funds and receiving funds, including in supervising their implementation. The problem of delays and uncertainty of budget absorption will cause a large amount of cash idle in government accounts, if this cannot be handled, then the management of excess cash this will pose a risk and conflict with the principles of effective cash management. Cash management in the government aims to finance expenses in a timely manner, by paying attention to cost effectiveness, efficiency, and risk reduction and keeping cash idle in a minimum position (Herriyanto, 2012).

The implementation of the central government expenditure budget is almost certain that in the last several months of the fiscal year there is a sharp increase in terms of the realization of its absorption performance. The trend is that the past three months have always jumped dramatically, and some even think it seems rather forced. This means that the withdrawal plan listed in the Budget Implementation Entry List that has been planned by the Budget User and approved by the Minister of Finance is not carried out as planned. The implementation of the central government budget is not as planned as possible due to the unrealistic planning process or the efficiency in the implementation of the central government budget (Widhianto, 2010).

To encourage the acceleration of budget absorption, the government has prepared several strategic steps. These steps include enhancing the capacity of the Work Unit financial managers in preparing the Fund Withdrawal Plan, perfecting regulations specifically related to the procedure for revision of the budget that gives greater authority to the Budget User Authority in completing the budget revision and the procedure for issuing multiple year contract licenses, and enhance the role of the Government Internal Oversight Apparatus in the Ministry and the quality control units in each Ministry in monitoring the implementation of activities by each work unit.

The implementation of activities carried out according to the plan will have an impact on the formation of a regular absorption pattern, so as to provide certainty in the time and amount of withdrawals of funds in the context of good cash planning by the Minister of Finance as the State General Treasurer. This can support the implementation of development and equitable economic growth, and can be used as material for monitoring and evaluation of the implementation of an activity to then be used as material for improvement of the next implementation phase. Furthermore, based on the planned implementation of the activity, the Work Unit compiles a Fund Withdrawal Plan consisting of Monthly RPD and Daily RPD. Based on the size of the fund withdrawal plan, the Minister of Finance as the State General Treasurer must prepare a number of funds to meet the needs of the budget users. If the funds available in the State General Treasury Account are insufficient for the needs of budget users, the State General Treasurer will conduct business including issuance of Government Securities, sale of state assets, liquidity loans from the Central Bank, community loans through banks or other businesses. So when the government has obtained a number of funds and at that moment the government bears the burden of interest. If the funds are not used due to delays in budget absorption by budget users, then this will cause idle cash in government accounts. If the idle cash amount is very large, this is very contrary to the principles of good government cash management.

In the past, the main objective of cash management was to provide sufficient funds for spending so that since the beginning of the year the government was ready to carry out its tasks. The lack of projections for receiving and withdrawing funds, plus the lack of awareness of the concept of time value of money, causes many opportunity costs because money is not utilized. Many opportunities are lost to earn interest or remuneration for unemployed money, and the high cost of funds due to the accumulation of debt obtained and must be paid interest, but not absorbed. Various attempts have been made by the government, including placing state money in the central bank to get remuneration. However, this amount does not correspond to the interest paid to the public for ownership of state securities. This is in accordance with the theory that cash management implies managing the company's money in such a way that when maximum cash availability and maximum interest income from idle cash are achieved.

The Directorate General of the Treasury recommends that ministries and agencies work units regulate the implementation of their activities so that their distribution is evenly distributed, improving monthly and weekly withdrawal patterns, not all withdrawals in Quarter IV which could result in an unhealthy state economy. Developing countries such as Indonesia have a uniform problem in absorbing budgets called slow back-loaded, meaning that absorption is low at the beginning to the middle of the fiscal year, but jumps towards the end of the

fiscal year. The accumulation of funds disbursement in Quarter IV is a reflection that the absorption of the budget is not in accordance with the planned activities that have been set (Syarah, 2016).

The low achievement of budget absorption, is very contrary to the principles of the Three Es (Economical, Efficient, and Effective) in public sector budget theory (Jones and Pendlebury, 2010). In addition, this will also have an impact on the national economy in general. First, the functioning of fiscal policy is not functioning in order to effectively increase economic growth. Second, the loss of expenditure benefits due to the budget allocated has not all been utilized which means there has been an idle money. Third, the late implementation of government programs related to poverty reduction. Fourth, the accumulation of bills at the end of the fiscal year is very unhealthy for government cash management (Seftianova and Adam, 2013). Especially for the types of goods and capital expenditure. These expenditures can improve the quality of life and welfare of the community by increasing the value of consumption, increasing labor productivity, reducing poverty and creating macroeconomic stabilization (David, 2010).

1.2 Explore Importance of the Problem
To support the implementation of the expenditure budget of the State Ministries and Institutions in an orderly manner, obeying the laws and regulations, effective, efficient, economical, transparent, and responsible, and in order to improve the pattern of budget absorption which is supported by optimal state revenue, a Regulation is prepared regarding Fund Withdrawal Plans, Fund Planning Plans and Cash Receipts through the Minister of Finance Regulation No. 197/PMK.05/2017 on December 20, 2017. The Minister of Finance Regulation confirms the existence of obligations and duties between the Minister of Finance as Chief Financial Officer (CFO) and the Minister and The Head of the Institution as the Chief Operational Officer (COO). The Minister of Finance as the CFO is responsible for making cash plans and the Minister and the Chair of the Institution are required to submit projections of revenues and expenditures.

Minister of Finance Regulation number 197/PMK.05/2017 concerning Fund Withdrawal Plans, Fund Planning Plans and Cash Receipts emphasizes the fulfillment of the ministry's and agency's obligations to submit cash planning data. The main focus is on the methods used by line ministries and agencies in order to deliver accurate and timely data. This is based on several reasons, among others, expenditure projections related to the main obligation of the finance minister to provide funds for the expenditure of Work Units, the implementation of idle cash optimization other than at Bank Indonesia must be based on certainty that all state expenditure obligations can be met, and expenditure projections based on work plans are expected improve the quality of the implementation of the Work Unit budget. Accurate expenditure projection data must come from the work units of ministries and agencies because they are the most aware of the time and amount of expenditure to be carried out. Projections for Work Unit expenditures are pursued based on work plan or work plan activities, not baseless estimates.

1.3 Describe Relevant Scholarship
In carrying out the process of preparing budget planning along with improving the quality of budget absorption performance, human resource capacity (HR) is also a major element in budget management. HR is the design of formal systems in an organization to ensure effective and efficient use of human talent to achieve organizational goals (Mathis and Jackson, 2006). HR becomes the main element in every activity carried out, with competence in the form of experience and motivation that has made HR as a key factor in budget management (Zarinah et al., 2016). HR competence is absolutely necessary so that budget management can be carried out properly because poor HR makes budget management bad and results in delayed budget realization (Sudarwati et al., 2017).

In line with that, (Rifai et al., 2016) found that the factors that influence the slow absorption of finance, one of which is caused by the quality of human resources involved in management is inadequate and not evenly distributed according to regional needs. Conditions like this can be seen from the presence of officials who are not careful in planning and budgeting. The official only proposed a development program, but did not know the actual situation on the ground. When the budget is approved, there are difficulties in realizing it because there are various field constraints. This is confirmed by the results of the study (Muthohar, 2012) which stated that one of the factors that influenced the effectiveness of cash planning was the quality of Human Resources. The official or employee

who handles cash planning is the main subject of cash planning in the Work Unit. The ability that must be possessed to produce accurate expenditure projections is the ability to draw up a work plan, the ability to master technology (the application used is quite complicated), and the ability to coordinate between sections within a Work Unit. The Work Unit is not enough to only assign an operator or treasurer of the Work Unit to deal with this problem, because the expenditure projection is not only based on the estimation or estimation of the officers but based on the work plan and its implementation, which requires managerial skills. Projections based on the work plan will be more accurate, compared to the estimation or estimation of officers alone without a solid foundation. A good work plan is the basis for an accurate budget.

Another factor that is thought to influence the performance of budget absorption is the synergy between stakeholders. In the work unit communication forum within the scope of the Ministry of Finance in the Regional Office of the Directorate General of Banten Province, it was conveyed that the communication forum was expected to become one of the coordination forums that could become a misinformation of the appropriate coordination forum to synergize strategic steps, in improving the performance of the implementation of the Work Unit's budget. Ministry of Finance in 2019 to the maximum (Setiaji, 2019).

As stated by (Iqbal, 2018), there are other situational factors that interact with each other in influencing a particular situation. Where these factors can strengthen or weaken the relationship or explain the position of other factors. One factor that is believed to be able to influence this relationship is organizational commitment. Organizational commitment does not moderate the relationship between budget planning and budget absorption. This means that the high or low level of organizational commitment the government has as the manager of the budget will not affect the relationship between budget planning and the level of budget absorption. Organizational commitment moderates the relationship between human resource competencies and budget absorption. This means that organizational commitment can strengthen the influence of human resource competencies on budget absorption. In other words, the higher organizational commitment, the effort to manage the budget in an effort to increase budget absorption will also increase.

However, (Meyer and Allen, 1991) defines organizational commitment as a psychological condition that describes the relationship of organizational members with the organization and has implications for the individual's decision to continue or not have membership in the organization. Organizational commitment is also the identification and involvement of someone who is relatively strong towards the organization and is willing and striving for the achievement of organizational goals.

Meanwhile, in the concept of public sector budgeting it is mentioned that one of the characteristics that must be owned by the government as the manager of the budget is a high commitment to the values, objectives and functions of government organizations. With commitment, public sector budget theory believes it will make it easier to achieve government targets. While (Merchant, 1981) stated that the level of good organizational commitment possessed by the budget manager, will greatly enable managers to more easily communicate, disclose and provide local (personal) information that is known to be included in the standard or as a basis for evaluating a budget.

The results of study by (Nouri and Parker, 1998) concluded that the higher the organizational commitment of an individual, the higher the willingness to optimize their potential. And (Ratifah and Ridwan, 2012) also stated that the trust of a person towards organizational values, and one's willingness to support in realizing organizational goals and loyalty to remain part of the organization are elements that are the basis of organizational commitment. Members of the organization will feel happy at work if they feel bound by the values and goals of the organization, this will have an impact on the responsibilities and awareness of members in running the organization.

1.4 Hypotheses Development
Synergy and Budget Performance Absorption
The State Budget is according to a very important instrument in development so it is important to continue to improve synergy, both internal and external of the Ministry of Finance, the sectoral egos of the Work Units are not in the Ministry of Finance dictionary. By working together, the results will be greater, the whole is much

greater than the sum of its parts. On previous study by (Roestel, 2016) implied that States management and operations must work together, in collaboration (synergy), to create a reliable and meaningful budget. Therefore, Management and operations must work together, in collaboration, to create a reliable and meaningful budget. Collaboration (synergy) during the budget process is active, alternative approaches to the budget that can help the process. Collaboration is a superior alternative to budgeting because the process will be more inclusive for employees who are responsible for the financial results of an organization. Collaboration can provide better budget documents, make employees feel like part of a team, and possibly benefit the organization. Collaboration will work.

Hypothesis 1. The Stronger the Collaboration (Synergy) will significantly increase Budget Absorption Performance.

Human Resource Competencies and Budget Absorption Performance
One of the professional principles set out in public finance theory requires that budget management is handled by skilled personnel. Therefore, the government as an organizational unit in managing its organization effectively and efficiently requires qualified human resources in order to be able to support the regional government in carrying out its functions, in the management of regional finances that must be done properly and correctly. According to (Yunita et al., 2016) human resources are indeed an important element in organizations. The quality of human resources owned by the organization will determine the ability of the organization towards achieving its goals. In an organization, human position is the main element that has characteristics such as abilities, personal beliefs, expectations, needs, and experience. These characteristic components that then shape a person's behavior and will move and bring the organization to achieve organizational goals (Thoha, 2011). Prior study (Musgrave and Musgrave, 1991) also state that as an organization that has a noble goal, government organizations need competent human resources to achieve and optimize revenue and realize it in the form of spending to the maximum for the realization of prosperity. Competent human resources will be a distinct advantage for government organizations as well as supporting competitiveness in the era of globalization in dealing with the environment and social conditions of people who are constantly experiencing dynamic changes (Putri, 2014). Resource competence does have an important role on the level of budget absorption. The more competent human resources, the better the performance in realizing the budget, so that the budget can be realized proportionally and the budget objectives can be achieved (Zarinah, 2016).

Hypothesis 2. Greater HR Competencies will significantly increase Budget Absorption Performance.

Organizational Commitment Moderates Synergy and Budget Absorption Performance
One of the basic principles of organizational behavior theory states that, individuals who know the condition of the surrounding environment and know the needs that exist in that environment, that person will try to do what will benefit their environment (Thoha, 2011). Can be interpreted that someone who has a high commitment in himself, will strengthen his intention to act for the achievement of the goals and needs of the environment. Strong organizational commitment in individuals will cause individuals to strive to achieve the goals and interests of the organization and the willingness to exert effort on behalf of the organization so that it will improve organizational performance (Nouri and Parker, 1998). As prior study by (Sardjito and Muthaher, 2007) stated that in planning various programs and activities, there is a high commitment from the local government apparatus capable of producing program or activity planning and budget allocation that is good and in accordance with the wishes of the community. And (Testa, 2001) states that organizational commitment has a positive influence on employee desires in providing services. Likewise, (Malhotra and Mukherjee, 2004; Chong and Chong, 2002) stated that organizational commitment had a positive influence on good service quality.

Hypothesis 3. Organizational Commitment significantly moderates Synergy and Budget Absorption Performance.

Organizational Commitment Moderates Human Resource Competencies and Budget Absorption Performance
In organizational behavior theory, a person's different behavior is influenced by the ability he has. Someone who has more ability towards the goals set by the organization will increasingly highlight his ability to achieve those goals. Conversely, if someone does not have sufficient ability, it will show different behavior (Wexley and Yukl, 2005). While (Porter et al., 1974) suggest that organizational members who have organizational commitment will work to do their best by making maximum efforts for the benefit of the organization, assuming that what is important must be achieved is the achievement of tasks within the organization and the desire to maintain

membership in the organization. Prior study by (Sardjito and Muthaher, 2007) stated that organizational commitment had a positive influence on the performance of local government officials. Likewise (Alumbida et al., 2016) conclude that Organizational commitment influences every budget manager in each of the Talaud Islands Regency by giving their utmost efforts to the organization to achieve its goals. That result was supported by (Wentzel, 2002; Puspitawati, 2013; Juliani, 2014; Wardhana et al., 2015) which generally concludes that with a commitment to the organization makes the members of the organization always try their best for the organization.

Hypothesis 4. Organizational Commitment significantly moderates Human Resources Competencies and Budget Absorption Performance

Based on four hypothesis above, the conceptual model of this study is as follow:
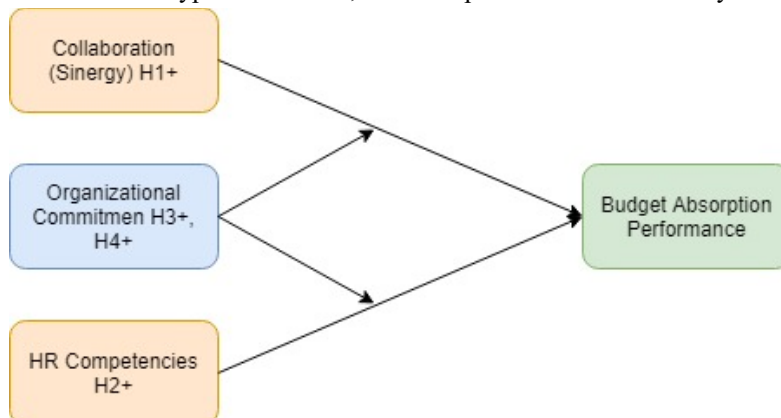
Figure 1. Conceptual Model

2. Method

Based on existing problems, this study uses a quantitative research approach with primary data in the form of survey results. To get relevant, complete and mutually perfect data, researchers also use secondary data. Quantitative research to describe the phenomena that occur in the Financial Training Agency that are related to each other. This study was designed with the aim of being able to understand, explain and analyze using correlative studies to find out the correlation between independent variables and dependent variables and will be analyzed using appropriate statistical data to test existing hypotheses. Broadly speaking, the design of this study includes the determination of subjects (population and sample), the development of instruments to obtain empirical data, data acquisition, analysis preparation and data analysis.

2.1 Data Source
In research using primary data which is data collected by researchers directly from the main source, collecting this data requires time in the form of a questionnaire to be given to employees of the Financial Education and Training Agency. While secondary data can be obtained from the results of other people's research made for different purposes but can be utilized, secondary data can be obtained quickly through libraries, data centers and information and book stores, secondary data can also be obtained from data available at the Training Board Secretariat Jakarta's finance in the form of the realization of the absorption of the 2019 Budget Year budget. Data and information collection is carried out through indepth interviews and surveys by distributing questionnaires that are distributed directly by the researchers themselves to employees who are directly involved in managing the budget of the Financial Training Board Work Unit. The questionnaire provided contained a number of requests for filling out the questionnaire to the respondents accompanied by a list of questions or structured statements submitted to the respondent for response according to the conditions experienced by the respondent concerned. In this questionnaire the closed question model is used. The closed form is a question that has been accompanied by alternative answers before, so that respondents can choose one of the alternative answers. Answer chocies ranged for each questionnaires on a scale 1 to 5.

2.2 Sample Selection

The population is the whole subject of research. If someone wants to examine all elements in the research area, then the research is a population study or population study or census study. The population and sample in this study is Employees of the Financial Education and Training Agency in all regions of Indonesia who are directly involved in the management of the Work Unit with a total of 100 employees obtained from 5 employees multiplied by the number of Work Units (20) consisting of the Central Office, Education and Training Center in Jakarta and the Regional Education and Training Center in the area.

2.3 Variable Measurement

Researchers take measurements of existing variables using research instruments. The research instrument is a measuring instrument developed with reference to the characteristics of the research variables that are set to be studied. Variables in this research are Budget Absorption Performance, Synergy, HR Competency and Organizational Commitment. Furthermore, indicators are determined to be measured through a number of statement items in the research instrument. Budget Absorption Performance is the dependent variable based on respondent's degree of under or over budget performance including Annual Performance Achievement Level, Quarterly Performance Achievement Level, and Performance Level Consistency. Synergy is one of the independent variable in this study, that based on respondent's view of how well each Unit work together in order to achieve budget performance in a certain level that. Human Resource Competencies the other independent variable in this study, this variable is based on hard skill and soft skill needed in order to achieve peak performance of Budget Absorption. While Organizational Commitment is moderating variable that based on respondent's view of loyalties, emotions, and other psychological factor that could affect each working unit's commitment.

2.4 Models and Analysis

This study use linear regression analysis to test our hypotheses. Regression models enable us to examine the added explanatory variance of each independent variable by controlling for the other main effects. Interaction terms among the variables of interest are utilized to investigate the moderation effects, and are tested for significance after all first-order effects have been entered into the regression equation.

3. Results and Findings

3.1 Descriptive Statistics

Table 1 presents the descriptive statistics all variables. In order to capture any possible multicollinearity problems among study variables, we also checked all variance-inflation factors (VIFs). This study found that mean value is greater than the standard deviation value for each variable indicating that the value of the data deviation is small, the mean value can be used as a representation of the whole data. That is because the standard deviation is a reflection of a very high deviation so that the spread of data shows normal and unbiased results. Meanwhile, if the average value is smaller than the standard deviation (SD) value, indicating poor results, then the spread of data is considered abnormal and causes bias. This study also found that individual VIFs are less than 10, which can be seen as no sign of multicollinearity in the regression model (Ghozali, 2018). Alpha Cronchbach for individual variable is more than 0,6; thus it can be concluded that the research instrument has met the valid and reliable requirements, so that the data obtained from the research instrument (questionnaire) can be used for analysis at a later step.

Table 1. Descriptive Statistics, VIF, and Alpha Cronbach

Variable	Mean	S.D.	Min	Max	VIF	A.C.
1. Synergy	31,97	2,97	24,0	35,0	1,576	0,887
2. HR Competencies	36,43	4,04	22,0	45,0	1,313	0,720
3. Organizational Commitment	25,51	3,17	17,0	30,0	1,667	0,854
4. Budget Absorption Performance	32,47	4,10	19,0	40,0	N.A.	0,850

3.2 Hypothesis Testing

Table 2 depicts the estimates (regression model) on Budget Absorption Performance. Model 1 and model 2 is the basic model, contains only independent variable on each model and will be used to test hypothesis 1 and hypothesis

2. Model 3 and model 4 includes the moderator variable Organizational Commitment and will be used to test hypothesis 3 and hypothesis 3. The comparison of explanatory power of models are depicted by the adjusted R-squared terms.

Hypothesis 1 examines the effect of Synergy on Budget Absorption Performance, based on the significant and positive result ($p < 0,001$; $\beta = 0,681$), hypothesis 1 is supported. Hypothesis 2 examines the effect of Human Resource Competencies, and based on the significant and positive result ($p < 0,001$; $\beta = 0,551$), hypothesis 2 is also supported. Hypothesis 3 and 4 explore the moderating influence of Organizational Commitment on the relationship between Synergy and Budget Absorption Performance, and HR Competencies and Budget Absorption Performance, respectively. Based on the result of the interaction terms between Synergy and Organizational Commitment ($p > 0,05$; $\beta = -0,018$), hypothesis 3 is not supported. Likewise, based on the result of the interaction terms between HR Competencies and Organizational Commitment ($p > 0,05$; $\beta = 0,015$), hypothesis 4 is also not supported.

Table 2. Regression Estimates of Budget Absorption Performance

Variable	Model 1	Model 2	Model 3	Model 4
Main Variable:				
1. Synergy (H1)	0,681***		0,745	
2. HR Competencies(H2)		0,551***		-0,039
3. Organizational Commitment			1,166	-0,008
4. Synergy x O.C. (H3)			-0,018	
5. HR Competencies x O.C. (H4)				0,015
Interaction Variable:				
Constant	11,806	12,389	-5,474	20,178
R-squared	0,218	0,295	0,365	0,417
Adjusted R-squared	0,209	0,287	0,342	0,396

Notes:
* $p < 0,05$
** $p < 0,01$
*** $p < 0,001$

4. Discussion

The result of hypothesis 1 indicates that synergy can produce better or greater output. With the synergy between financial managers, it is expected that budget planning that has been prepared at the beginning of the fiscal year can be carried out properly according to plan, so that the accumulation of the budget at the end of the year can be avoided. This result is also supported by prior study (Wati et al., 2013; Setiawan, 2003).

The result of hypothesis 2 is in accordance with professional principles set out in public finance theory that requires budget management to be handled by experts. Then from the side of the main objectives of public finance, namely determining the allocation of resources and knowing the effect of these placements on the needs of individuals as well as the needs of the community and government such as regulating important sectors of government, facilitating economic activities of the government and the private sector, providing basic services to the community, providing social services, ensuring economic stability and achieving levels of development. In relation to the large role of the government in ensuring optimal public welfare and government policies must be aimed at achieving an efficient allocation of economic resources, redistribution of community income and economic stability, the government's problems are so complex that not only look at the budget but also influence directly and indirectly from aggregate economic activity. Therefore the government is required to have competent human resources in managing government activities such as determining policies and managing budgets. The competence possessed by the government apparatus, in the form of knowledge, skills, and behavioral attitudes is needed in supporting the implementation of tasks in his position. This result is supported by prior study as well (Herriyanto, 2012; Zarinah et al., 2016; Rifai et al., 2016; Putri, 2014; Dinapoli, 2016; Arif, 2011).

Hypothesis 3 is in line with prior study (Mongeri, 2013; Sopiah, 2008) which concluded that organizational commitment does not have a significant positive effect on the relationship between budgeting participation and local government performance. The results of this research cannot prove that organizational commitment is a moderating variable that affects the relationship between budgeting participation and local government performance. The results of this study indicate that budgetary participation has a significant positive effect on budget disparities. Strategic certainty can directly moderate the relationship between budgetary participation and budget gaps, while leadership style, organizational commitment, environmental uncertainty, and budget sufficiency indirectly moderate the relationship between budgetary participation and budgetary gaps. Organizational commitment in the study proved unable to moderate the effect of synergy on the performance of budget absorption in the Financial Training Board Work Unit. This could happen because in carrying out the task of achieving budget absorption performance it is not because they have high organizational commitment, but because the organizational structure forces them to participate or is only a task. In addition, the lack of organizational commitment variables in moderating the relationship between synergy and budget absorption performance may be caused by the lack of oversight of structural officials in carrying out their duties and functions as well as a lack of understanding and emphasis on organizational goals and objectives. In addition, work load on work units that are too heavy causes not optimal performance.

Hypothesis 4 in line with one of the basic principles of human behavior that is explained in the theory of organizational behavior that every human being behaves according to an understanding of his environment. Someone who has more knowledge and understands the goals set by the environment or organization will always highlight the advantages and increase the capacity and capabilities possessed for the achievement of organizational goals. Conversely, if someone does not have enough understanding about what and how the environment or organization works, it will show different capacities, such as the tendency to ignore the goals set by the organization. Therefore, a position of strong commitment to the organization that is in everyone, will trigger that person to strive to achieve organizational goals and have a positive outlook and more trying to do the best for the interests of the organization. Conversely, someone with low organizational commitment will have low attention to achieving organizational goals and tend to try to fulfill their personal interests only. While conceptually, if an individual is highly committed to the goals of the organization, this will affect his actions and performance, namely using his competence to produce quality budget absorption performance. Vice versa if an individual does not have a high commitment to the organization, then his competence will not produce quality budget absorption performance. Organizational commitment in this study proved unable to moderate the influence of human resource competency on the performance of budget absorption in the Financial Training Board Work Unit. Based on the results of indepth interviews with respondents, this could have happened because in the implementation of the task of achieving the performance of the absorption of the budget not because of having high organizational commitment, but because of the organizational structure that forced them to participate or was just a task. In addition, the organizational commitment variable in not moderating the relationship between human resource competency and budget absorption performance is also caused by oversight that is too tight on financial managers so that it can lead to demotivation in running the task of managing state finances. Besides that, there were still several officials who signed the Payment Order in carrying out their duties and functions as well as a lack of understanding and emphasis on the organization's goals and objectives. So in terms of awareness there are still shortages that need to be improved.

5. Conclusion

There is a significant positive effect of synergy factor on budget absorption performance. This means that the better the level of synergy, the better the level of budget absorption performance. This means that the synergy of the government apparatus as the manager of state finances is very important in the achievement of the planned budget absorption performance, therefore hypothesis 1 is supported. There is a significant positive effect on the competence of human resources (HR) on the performance of budget absorption. This means that if the government apparatus managing the budget is supported by high competence, it will affect the work behavior of government officials who will then affect its performance and organizational performance in general. That is, the higher the competency of budget managers (HR), will further improve the performance of the organization which in this case is the target of budget absorption performance, therefore hypothesis 2 is also supported. Organizational

commitment does not moderate the relationship between synergy and budget absorption performance. This means that the organizational commitment of the government as the manager of state finances does not affect the relationship of synergy with the level of performance of budget absorption. Likewise, organizational commitment does not moderate the relationship between human resource competencies and budget absorption performance. This means that organizational commitment is not able to strengthen the effect of human resource competence on budget absorption. In other words, organizational commitment has no effect in efforts to improve budget absorption performance, therefore hypothesis 3 and 4 are not supported, respectively.

Acknowledgments

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Appendix A

Full Result of Hypothesis Testing H1

In appendix A there are the results of the output of hypothesis 1 as a whole

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Sinergitas[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Kinerja Penyerapan Anggaran

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.467[a]	.218	.209	3.644

a. Predictors: (Constant), Sinergitas

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	315.221	1	315.221	23.744	.000[a]
	Residual	1128.458	85	13.276		
	Total	1443.678	86			

a. Predictors: (Constant), Sinergitas

b. Dependent Variable: Kinerja Penyerapan Anggaran

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	11.806	4.259		2.772	.007
	Sinergitas	.681	.140	.467	4.873	.000

a. Dependent Variable: Kinerja Penyerapan Anggaran

Figure A. Result of Hypothesis 1 testing

Appendix B
Full Result of Hypothesis Testing H2
In appendix B there are the results of the output of hypothesis 2 as a whole

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Kompetensi SDM[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Kinerja Penyerapan Anggaran

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.543[a]	.295	.287	3.460

a. Predictors: (Constant), Kompetensi SDM

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	425.940	1	425.940	35.574	.000[a]
	Residual	1017.739	85	11.973		
	Total	1443.678	86			

a. Predictors: (Constant), Kompetensi SDM

b. Dependent Variable: Kinerja Penyerapan Anggaran

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	12.389	3.387		3.657	.000
	Kompetensi SDM	.551	.092	.543	5.964	.000

a. Dependent Variable: Kinerja Penyerapan Anggaran

Figure B. Result of Hypothesis 2 testing

Appendix C
Full Result of Hypothesis Testing H3
In appendix C there are the results of the output of hypothesis 3 as a whole

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.604[a]	.365	.342	3.323

a. Predictors: (Constant), Sinergitas*Komitmen Organisasional, Sinergitas, Komitmen Organisasional

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	526.928	3	175.643	15.902	.000[a]
	Residual	916.751	83	11.045		
	Total	1443.678	86			

a. Predictors: (Constant), Sinergitas*Komitmen Organisasional, Sinergitas, Komitmen Organisasional

b. Dependent Variable: Kinerja Penyerapan Anggaran

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-5.474	33.241		-.165	.870
	Sinergitas	.745	1.100	.511	.677	.500
	Komitmen Organisasional	1.166	1.356	.903	.860	.392
	Sinergitas*Komitmen Organisasional	-.018	.044	-.669	-.418	.677

a. Dependent Variable: Kinerja Penyerapan Anggaran

Figure C. Result of Hypothesis 3 testing

Appendix D
Full Result of Hypothesis Testing H4
In appendix D there are the results of the output of hypothesis 4 as a whole

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.646[a]	.417	.396	3.185

a. Predictors: (Constant), Kompetensi SDM*Komitmen Organisasional, Kompetensi SDM, Komitmen Organisasional

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	601.806	3	200.602	19.777	.000[a]
	Residual	841.872	83	10.143		
	Total	1443.678	86			

a. Predictors: (Constant), Kompetensi SDM*Komitmen Organisasional, Kompetensi SDM, Komitmen Organisasional

b. Dependent Variable: Kinerja Penyerapan Anggaran

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	20.178	19.247		1.048	.298
	Kompetensi SDM	-.039	.542	-.038	-.071	.943
	Komitmen Organisasional	-.008	.778	-.006	-.010	.992
	Kompetensi SDM*Komitmen Organisasional	.015	.021	.683	.695	.489

a. Dependent Variable: Kinerja Penyerapan Anggaran

Figure D. Result of Hypothesis 4 testing

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Developing Model of Logistics Costs in Indonesia's Cement Projects: A Literature and Empirical Study Approach

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Abstract

This research aims to disclose yearly Pandora boxes to determine precisely variable costs that drawing up of logistics model in Indonesia's cement projects. It begins caused by difficulties to plan an effective projects at the stage of deployment of costs allocation at the preliminary phase. The research period taken was 2010 to 2018 of 8 cement projects in Indonesia by quarterly and had been tested with a statistical tool EVIEWS10.00 to develop robust model. This research employs literature study to assess model previously developed and then reconfirmed by empirical. The model developed is synthesized of 4 dependent variables accordingly defined as foreign logistics costs, domestic manufacture, domestic logistics costs, and total investment costs. Each adjusted R-squared that representing confidence level is consecutively 72.54%, 67.12%, 65.16% and 67.65% or bigger portions are in the model while smaller other in outside model. A 10-variable independent is a new novelty of developing logistics model for executing cement's projects in Indonesia and a concerning significant findings that variable of foreign logistics costs took big portion of the model and therefore must be prior carefully anticipated. This research is giving contribution for planning projects carefully and precisely to avoid budget exceeded generally in every projects.

Keywords: Foreign Logistics Costs, Domestic Manufacture, Domestic Logistics Costs, Total Costs of Investments, Cement Projects, Indonesia

1. Introduction

Indonesia today is entering a phase where large of projects were being built massively. Infrastructure projects are becoming the highest attention of Indonesian people as the projects is a hope and a dignity of future Indonesia. It was about US$ 310.34 billion funding prepared by Indonesia government to finance the projects for period of 2014-2019, but it likely does not adequate as generally every project executions is always experiencing of budget exceeding. The costs analysis is predominantly being caused of the inaccuracy to determining of project costs.

Abdallah (2004) was advised that conducting costs analysis at the projects should neither be expert nor high quality of scientist. In the terms of logistics –as focus on this paper– the general approaches must be prior understandably before going into detail. Abdallah (2004) proposed 7 guidelines which is consecutively (1) define fixed and variable (or running) costs related to logistics systems; (2) calculate unit cost measurements; (3) describe factors that drive the cost of fixed and variable costs, (4) identify information sources and approaches for measuring fixed and variable costs. Furthermore; (5) define what constitutes logistics-related costs relative to other distribution functions, and define logistics costs in the context of this model; (6) understand the different approaches for defining costs and choose the appropriate one, and (7) describe the general approach for conducting cost analyses. The other ways to approach model of logistics costs is by performing network analysis (Lukinskiy and Dobromirov, 2016). The logistics networks advised by Lukinskiy and Dobromirov (2016) is synthesizing based on the classical model of Harris-Wilson. The classical model of a six-version obtained for a simple supply network showing; particularly, additional value added to the product price stemming from the previously performed by logistic operations. The choice of an optimum version of the supply network is made based on the criterion of minimum total costs.

Almohsen and Ruwanpura (2011) stated that model of logistics costs for construction or projects could be defined as flow of raw materials, equipment, machineries, and other goods that have related to the projects from the point of demolition to the point of installation. Being able to coordinate these factors are the main key to the success carrying of the project(s). Conversely, because mismanagement will cause conflicts between factors and will cause project delay or uncontrolled costs. The importance of logistical to support project construction is due to the portion of material distributed reaching 60% to 70% of the total project values generally.

2. Literature Review

2.1. The Important of Logistics Model

Handling projects are task that neither simple nor easy. Determining costs especially are becoming the hardest phase since at the beginning stage. For every project's planner or project manager, budget allocations are imperative as it will be reported to the project owner and becoming main preference to be evaluated periodically. Project officials will be challenged at the case, either excess budgets are indicating not professional or even more shortage of budgets.

Shakantu *et al*., (2003) had warned that transportation costs are matter that must be considering during construction at the projects. This statement is not quite progressive as traditionally, delivering materials for construction are mandatory tasks or projects will be incomplete as materials had not been assembled or installed yet. But Shakantu *et al*., (2003) advised that supplier selection must be tended on the basis of the lowest prices to anticipate surprise additional costs later. Further research is being raised by Sobotka and Czarnigowska (2005) that starting to elevate logistics problems within projects. Supply systems, logistics have been described with suggests for creating new logistic guidelines for the purpose of integrated logistics services with the goal of making construction projects more effective and efficient.

Logistics issues then taking big portions of attentions. Logistical analysis of construction are frequently being assessed by researchers. Impact to the performance of projects are measured with the results to develop a conceptual logistics model (Vidalakis *et al*., 2011). At this stage, the term of transportation costs is gaining to become popular. But so far, defining costs and or logistics model at the projects remain unanswered.

Engblom *et al*., (2012) began to state a quantitative of their findings that logistics costs at the generally projects often exceeding of 10% total project's costs. Variables determining of logistics then have been introduced that consisting of six individual components: transport, warehousing, inventory, logistics administration, transport packaging, and indirect costs of logistics. The study employs a statistical tool of generalized linier mixed model (GLMM) to examine several variables of time, the number of employees, turnover, industry, and level of internationalization that resulting all of them statistically significant explanatory variables of logistics costs. Beside

Engblom *et al*., (2012) who estimated a certain number logistics contribution at the projects, Guerlain *et al*., (2019) follows by a bigger proportion of 30% logistics costs contribution during construction.

Further research to bolster Shakantu *et al*., (2003), construction materials again are becoming issues in the projects. Research conducted by Fang and Thomas (2011) is concerning flow of construction materials that corresponding tightly with logistics. The materials intended is bulky components like precast concrete units, fabrication, and also rebar. Fang and Thomas (2011) employs of the activity based costing (ABC) approach to identify the model with the purpose to help managers or project planners to minimize logistics costs during construction. Matouzko and Methanivesana (2012) strengthened findings of Fang and Thomas (2011), they found a reduce the costs at the certain project in Sweden of 65 SEK/m2 and also shorten lead time by 3.3%. Matouzko and Methanivesana (2012) at their paper remain that logistics model is often underestimated but proper logistics planning is promising benefits for every projects.

The important of developing logistics model at the projects has been presented at the recent study by Bengtsson (2019). Bengtsson (2019) reveals logistics is mandatory to improve efficiency in construction projects, though this qualitative study is rather distinctive as inserted variable of commitment, communication and cooperation when implementing the logistics model. But Bengtsson (2019) is accompanied by Papadopoulos *et al*., (2016) who earlier presented qualitative research studying effective management of the construction logistics.

To be aware of gradually increasing logistics costs about 10% to 30% previously stated by Engblom *et al*., (2012) and further by Guerlain *et al*., (2019), the construction is undergoing to be customize as modular systems that easily handling in a simple logistics (Hsu *et al*., 2018). This new model project execution is changing a conservative ways to bring almost all construction materials within project environment. The component of constructions as like plate-works or fabrication is now at the adjacent of location of installation with only less logistical needed. The way is automatically decreasing costs of logistics.

2.2. Factors Influencing Logistics

2.2.1.   Foreign Factors

In this sector, expanding and enhancing businesses are key. According to Zeng and Rossetti (2003) due to encourage in advancing technology and increasingly power of competition, developing business operations throughout worldwide are urgently needed. The most challenge with this strategy is more complexes because there are distance factor presented, currency differences, culture, and other factors that must be consider into account carefully. The logistics portion of this aspect takes a significant portions of the total logistics costs came from foreign. Furthermore; Carana (2004) said that factors affecting foreign was a distance, cargo size, type of container, and the number of multi-modal transports required. Gkonis and Psaraftis (2012) stated factors that must be taken into account for efficient logistics are price of oil, exchange rate, distance, and size of cargos shipped.

2.2.2.   Oil Prices

Research by Beverelli (2010) who examined effect of oil prices on sea freight costs showed a fairly high level of elasticity. It found that logistics costs for container escalated 0.19-0.36 each of 1% increase of oil price. According Beverelli (2010), the OECD explained level of elasticity between 0.018-0.150. The other researchers found relationship elasticity between oil price and sea freight costs are about 0.232-0.327 (Hummels, 2007), while Mirza and Zitouna (2009) found the elasticity at 0.008-0.103.

Because oil as a source of ship engine fuel, the cost of oil is dominant factor in the structure of freight costs. Some literatures state that oil makes up nearly 60% of the structure of freight costs (Gkonis and Psaraftis, 2012) to 75% (Polo, 2011) called the bunker adjustment factor (BAF). The BAF component became part of unit cost (surcharge) in which already considered to anticipate oil price uncertainty. The BAF is always varying and determined by each ship provider. The BAF as a constanta, for example in 2007, was 5.4 times the international crude oil price in ton, 2008 (5.3 times), 2009 (6.1 times), 2010 (5.9 times), and 2011 (6.3 times).

Type of ship engines on the other hands also determine important role of the BAF consumption in regard of speed. According to Gentle and Perkins (1982) a ship with a diesel engine requires 201 grams/kWh of marine fuel oil (MFO) type, while ships with steam turbine engine type require higher of 292 grams/kWh. For illustration, a ship with a class of 8,200 teus in 2006 requires 230 tons to 250 tons of MFO per day (Eljardt, 2006) worth US$99,000 from the loading port of Hamburg, Germany to the Tanjung Perak, Indonesia which is about 10,051 Nautical Mile (NM) distance.

2.2.3. Exchange Rates

Based on Agenor (2000) increasing integration of global finance required a comprehensive study in international exchange rate performance. Samuelson and Nordhaus (2004) saw a positive side post World War I (1914-1918) and World War II (1939-1945) in the terms of exchange rates. The world has been enjoying development of cross-border economic cooperation that has a positive impact such as trade relation, the money market integrated systems, developing democracy, and rapid economic growth. According to Samuelson and Nordhaus (2004) to enter international trading system, necessary translational and equivalency value of currency called exchange rate system is required. This exchange rate is a point equilibrium of value of the country's economic representation in the global international trade's scope.

Research Ma and Cheng (2005) calls that integrated currency systems have eventually impacted both positive and negative affect against currencies in other countries. Negatively, there has been a significant prone in a crisis transmissions from countries within trade relations. Joyce (2012) stated negative impact of global economy is very open, for example in terms of exchange rate, currencies from developed countries have bigger opportunity to suppress currencies in other developing countries. According to Mishkin (2007) there were two exchange rate transactions, each a spot transaction and the other is a forward transaction. Spot transactions accommodate short term, while forward transactions employ for a certain period longer. Exchange rate transactions are not traded but operated with operational mechanism of hundreds of dealers connected by integrated computers in an information platform systems. The exchange rate equilibrium occurs if variables supply and demand matched together. The point of balance does always change depending on the trigger future.

2.2.4. Distances

Based on Gkonis and Psaraftis (2012) the factor of distance is an important variable in logistics systems. The distance makes consume of bunker adjustment factor (BAF) bigger and travel time becomes longer. The factors along with the speed of ships make total accumulation of logistics costs structure to be higher and expensive. These factors are a major concerning for logistics researchers, because it makes usage of bunkers un-economical consumption. In order to reduce the use of bunkers, ships are campaigning to lowering speed from originally 24 knots to 26 knots to only 15 knots to 18 knots (Gkonis and Psaraftis, 2012). This is also intended to reduce tariff of logistics costs in terms of sea freight costs and to drive global trading between countries higher.

2.2.5. Sizes

Shipping is a different type of business's services of logistics in general. The liner only offers limited chamber in regular scheduled departures on certain routes on a certain destination ports basis (Szmigiel, 1979). Based on Powel (2001) approximately 90% total volume of goods traded internationally using ships. The type of vessels to serve containers is growing rapidly because they enjoy protection and subsidies nationally and internationally due to higher guarantee in terms of safety, security, and environmentally factors than other types of vessels.

The unit of measure of ships stated in deadweight tonnage (DWT) and gross tonnage (GT). The DWT unit describes cargo capacity of ships while unit of GT is volume capacity where 100 cubic feet is equivalent to 1 GT. If a container known as a twenty-foot equivalent unit (TEU) with dimensions of length of 20 feet, width of 8 feet, and height of 8 feet is equivalent to 12,8 GT. This container has a standard capacity of 18 metric tons but is effectively filled with 13 metric tons, depending on the density of the goods.

Christiansen (2007) stated that sending cargos by sea are not a simple tasks. Vessel facilities have limited space and room, therefore users in sea transportation services must comply with strictly liner regulations. Ships included

in the common carrier or regular ship give priority to cargo with standard containers of either 20 feet or 40 feet in either normal size or in high cube (HC) category. The basis of these provisions are considering speed and practicality in cargo management and handling in ships as well as for cargos' safety. Cargo dimension that is not in standard size of the container or in breakbulk type, will be measured based on the unit of freight-ton or FRT. This unit is a combination of weight of cargo in tons and/or based on dimensions of packages in cubic meters (CBM), where the largest unit is taken. Cargos in breakbulk with FRT unit should be serviced by vessels categorized as Non-Vessel Operating Common Carrier (NVOCC) or called ship tramper. Nowadays, there are more multi purposes vessels (MPV) that can accept both in containers and in breakbulk types of cargos at once in a vessel.

Cargo packaging is also concerning. The handling arrangement of cargo packaging forms great affects the amount of sea freight costs. Research Manzanero and Krupp (2009) concerned that efficient logistics only achieved if as much as possible size or dimensions and weight of the cargo should be to put in a container's size. This reason considers that costs of sea freight will be much efficient and economical because scheduled vessels are easily found and therefore will be cheaper. Cargo in containerization is now the best alternative for shipping of goods by ships in terms of security of cargos, avoiding and protecting damage, and the cheapest tariff in freight costs.

Today recent update, dimension of the containers have also developed quickly. United Nation (1990) defined that there are seven types of containers commonly used and have been varied now. The latest development, the length of container has reached 45 feet instead of previous 40 feet. This will have effect of changing specifications in international logistics modes and subsequently to affect in feeder transportation. Previously, the dimensions of a relatively standard container were length, width, and high consecutively 12,190 mm x 2,435 mm x 2,590 mm, with a maximum cargo capacity of 35 net tons.

Table 1.   Container Type

No	Generation	Container Type
1	Part I	General Cargo Container
2	Part II	Thermal Container
3	Part III	Tank Containers
4	Part IV	Bulk Container
5	Part V	Container Platform
6	Part VI	Collapsible Container
7	Part VII	Air Mode

Source: UN (1990)

2.2.6.   Insurance

Research by Whittle (1987) states that insurance protection industry has existed since 400 BC when administrator of the city government of Rhodes, Greece decided on matters that included the general average in commercial law. General average is an elementary principle result from the sea law, justice, and public policy. Since the discovery of the American continent in the XV century, the demand for protection against the loss of trade goods has increased. Several mechanisms were tested to obtain a best protection system for both merchandise and crew members and the result we have known today is marine insurance.

Marine insurance currently provides protection for ships (hull and machinery) and protection for cargos that can be selected based on needs (Nieh and Jiang, 2006; Skuld, 2009). Based on Carana (2004) the factors that encourage consideration of premiums insurance are labor, terrorism threats, packaging techniques, shipping methods, age of the ships, until sabotage.

Based on the main points of the definition, insurance is a financial institution whose line of its business is to accept transfer of risk from each individual or entity by accepting a premium and has obligation to pay compensation or claim if the customer suffers financial losses due to an event occurred which is promised. Insurance is part of

financial institution because it collects premiums from third parties to pay compensation if the customer experiences risk or loss.

2.2.7.   Customs

Based on Ballou (2004) there are six mandatory types of documents applied in field of international transportation, namely bill of lading (B/L), freight bill, freight claim, commercial invoices, packing lists, and certificate of origin. These documents become mandatory when dealing in international trade and must be presented.

Customs is a matter of country level in order to better evaluate and meeting target according the Trade and Transport Facilitation (TTF) policy efforts over time and across countries. Lowering mandatory costs for logistics reduce the cost of delivering products, thereby encouraging sales, increasing trade, opening new markets and generally encouraging business. Performance evaluation also helps to improve the efficiency of supply chains and the functioning of related infrastructures, services, procedures and regulation. This factor has been researched by Rantasila and Ojala (2012).

2.3. Domestic Logistics

According to Ran (2009) after the goods have passed through customs clearance gate, the logistics activities are still needed upto the customer's point. Logistics in this region are called hinterland logistics consisting of a combination of lands, rails, and water in certain country. These hinterland logistics are very important in the whole distribution chains and become a competitive factor of a nation (Zondag, 2008). The combination of ports with integrated hinterland lines will be the nation's main competitiveness in reducing total costs of the whole chains logistics. Baan (2015) explained in his study that domestic logistics in Indonesia has a number of very serious challenges related to the limited infrastructure facilities for transportation. Using the Nagurney-Qiang model, Baan found logistical disparities between the eastern and western parts of Indonesia. These disparities drive logistics costs to be expensive in the eastern Indonesia compared to the western side. In the Nagurney-Qiang model, each port is ranked and found with a Julius-Peterson-Mattson network analysis that Tanjung Perak Port is the most strategic port for maintaining entire logistics chains in Indonesia. The Tanjung Perak and Tanjung Priok routes are important routes while the Sorong and Makassar at the eastern routes are next.

2.3.1.   Feeder

Feeder transportation is a part of short-distance sea transportation services that plays an important role for maintaining connectivity (Kotowska, 2014). According to Yuwono (2014) in Indonesia has a national connectivity structure according to Figure 3. Domestics ports which are already meeting international standard according International Ship and Port Facility Security Code (ISPS) consecutively Belawan, Tanjung Priok, Tanjung Emas, Tanjung Perak, and Makassar Port. All five ports placed as the main Indonesia's ports, while other ports as feeder.
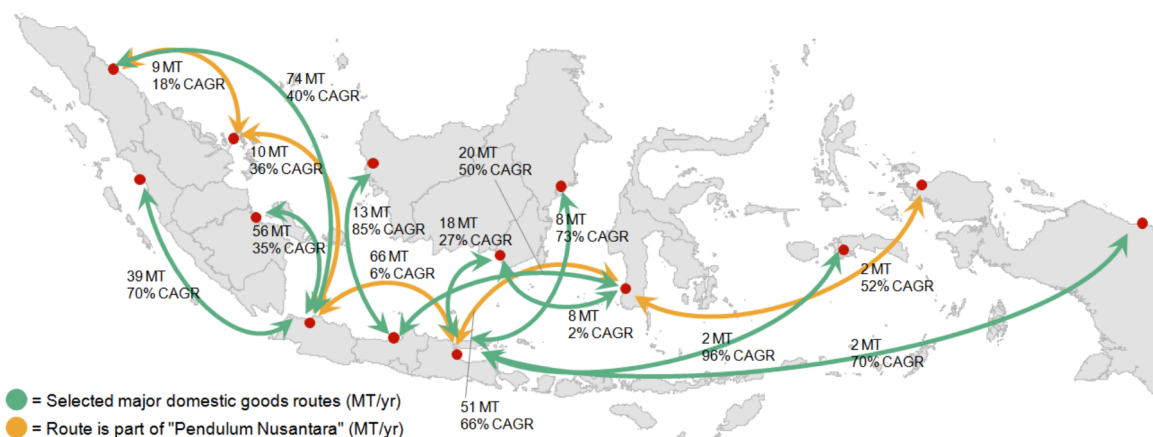
Figure 1. Indonesia Sea Connectivity

Source: Baan (2015)

Baan (2015) states that geography of Indonesian archipelago that is separated by water and seas are absolutely depending majority in sea transportation. The tools that play important is ferries under regulatory of the Directorate General of Sea and the roll-on roll-of (roro) ships under supervise of the Directorate General of Land Transportation. Ferries are intended to serve shorter distances under 150 kilometers while roro's ships are to serve longer shipping distances. Figure 4 shows a map of Indonesia's domestic shipping served by ferries and roro ships. Ferries is intended for passengers while roro's ships for goods.
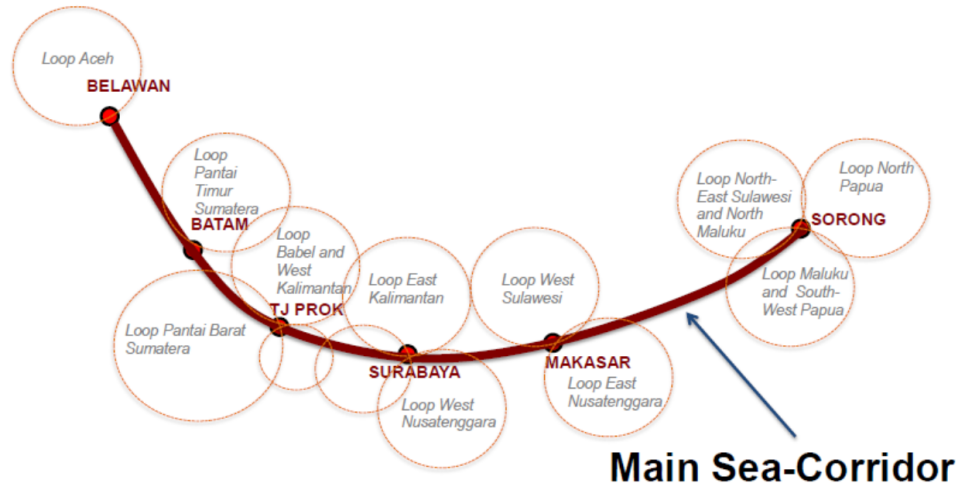
Figure 2. Feeder Transport Structure
Source: Yuwono (2014)

2.3.2. Inland Transport

According study by Carana (2004) road infrastructure in Indonesia would potentially increase costs in logistics, due to time required becomes longer due to limited infrastructure and uncertainty transports. The physical size of road and capacity are very limited and worsen substantially during rainy season. The inadequate road capacities made several times handlings at several points, created excess charges and frequently broke the logistics chain. Limited infrastructure has been worsen with weak regulation and uncertainty laws. The result is high tariff and sacrificing quality. Carana (2004) mentions that poor of maintenance and poor quality of road have pressured inland transport to be higher and expensive. Repairs are often done than build a new and resulting delays in logistics because frequency of damages increased.

3. Methodology

This paper is researching a certain logistics costs in projects instead to discuss all associates within projects that complexed and complicated. Determining variables that developing model of logistics costs in projects are especially in quest as the findings is not yet immediately found. The methodology is based-on literature by tracer studies. Literature research is selected by tracer study to enroute model of logistics model early developed. In this study, the oldest literature that presenting associate models is since 1976 while at the recent is 2019.

The findings, advices, recommendations are all reconstructed into nearest possibly associated with origin literature to get comprehensive figure and understanding. After reformulated, the model then be tested with empirical data taken from 8 cement projects in Indonesia within period of 2010-2018. Results from statistical tests are the best given to give appropriate comments that the model is fit or not-fit.
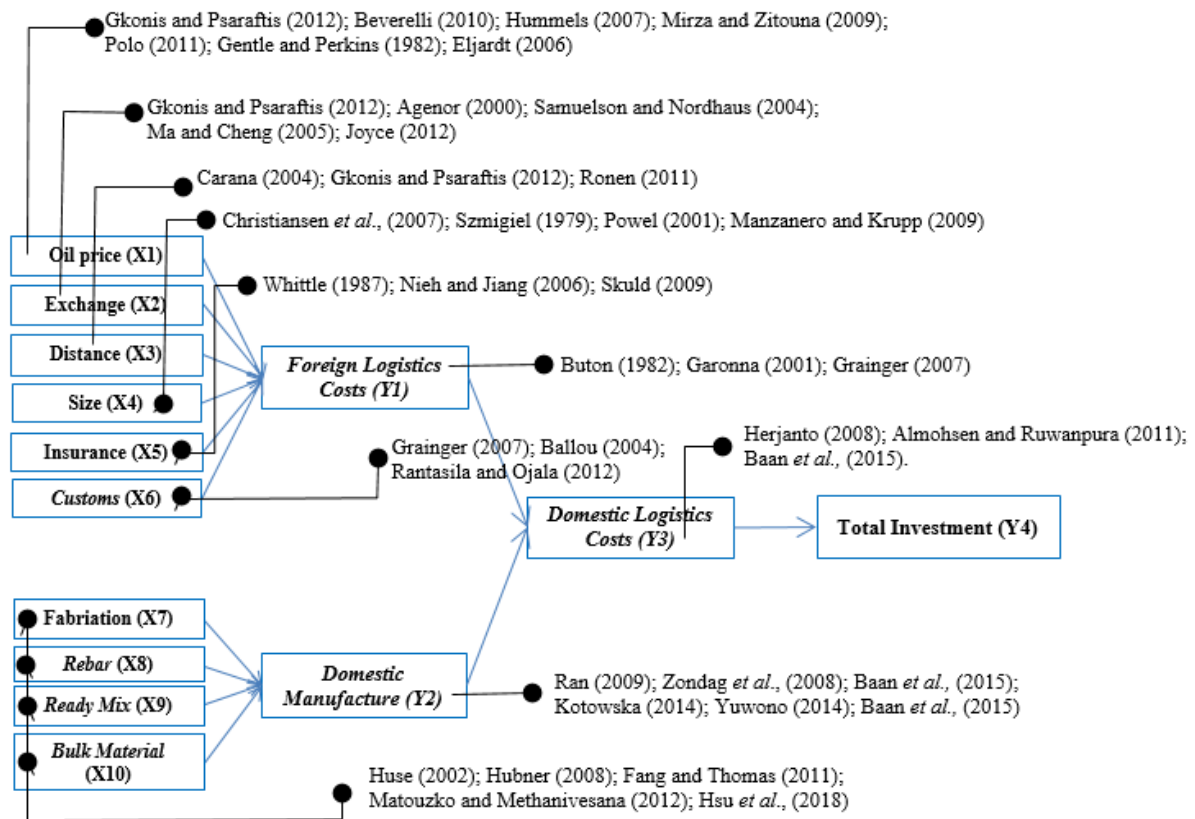
Figure 3. Determining Model of Logistics Costs

Based on Figure 3 after reconstruction several literature studies, it can be seen that model of logistics costs at the projects is predominantly consisting of foreign logistics costs (Y1) and domestic manufacture (Y2). The two main sources variables determining model of logistics costs is a network analysis results advice by Abdallah (2004) and Lukinskiy and Dobromirov (2016).

The independent variables that contribute to the formation of variable foreign logistics costs is oil price, currency of exchange rate, distance, size, insurance, and customs. Gkonis and Psaraftis (2012) states that oil price and distance are combinations that determining consumption bunker adjustment factor (BAF). Based on Jabara (2009), the variable of exchange rate is considered; while Christiansen (2007) revealed the importance of variable size. According Nieh and Jiang (2006) and Skuld (2009); variable insurance becomes a factor that must be taken into account, added by Grainger (2007) and Hubner (2008) the next variable will be customs. The effect of these variables to the variable of foreign logistics costs is formulated in hypothesis 1.

In the second model formulated independent variables of fabrication, rebar, ready-mix and bulk material are all the components to form of variable domestic manufacture. Based on Huse (2002) states that type of projects' execution has experienced a significant change to an EPC contract that provides a greater portion of domestic resources than the type of turn-key contract. Research by Hubner (2008) states that components of capital goods that can be produced domestically are primarily becoming domestic portion. Based on SMGR (2012) which carried out the implementation of the 4th Tuban new cement plant project, components of capital goods domestic's categories are fabrication, rebar, ready-mix, and bulk materials. This second model best describing of hypothesis 2.

In hypothesis 3, it is formulated effect of variable foreign logistics costs and variable domestic manufacture altogether and partially influencing to the variable of domestic logistics costs as a moderating variable. Based on Hubner (2008); Garonna (2001); Grainger (2007) induced by the decision of the World Trade Organization (WTO) on the General Agreement on Tariffs and Trade (GATT) in 1947 stated that international trade activities absolutely require customs activities. Hubner (2008) later suggested that necessary completion costs of compliance is

presented. Based on Huse (2002) due to impact of project contracts with the term engineering procurement construction (EPC), the portion of domestic resources is much greater. Kotowska (2014); Yuwono (2014); and Baan (2015) each mentioned that combination of multi-modal logistics within one island and between islands are important factor for the implementation of logistics in terms of domestic manufacture section.

Hypothesis 4 formulates effect of variable of domestic logistics costs to the variable of total investment that representing total costs for the project. Based on Carana (2004) the variable of domestic logistics costs is called within terminology intra-island logistics. Almohsen and Ruwanpura (2011) stated that logistics for construction can be defined as flow of raw materials, equipment, machineries, and other goods that have a relation from the demolition point to the installation point.

From the explanatory mentioned above in explaining of the relationship of influence between variables based on literature studies and tracer studies, it can be modeled in the conceptual framework as following Figure 4.
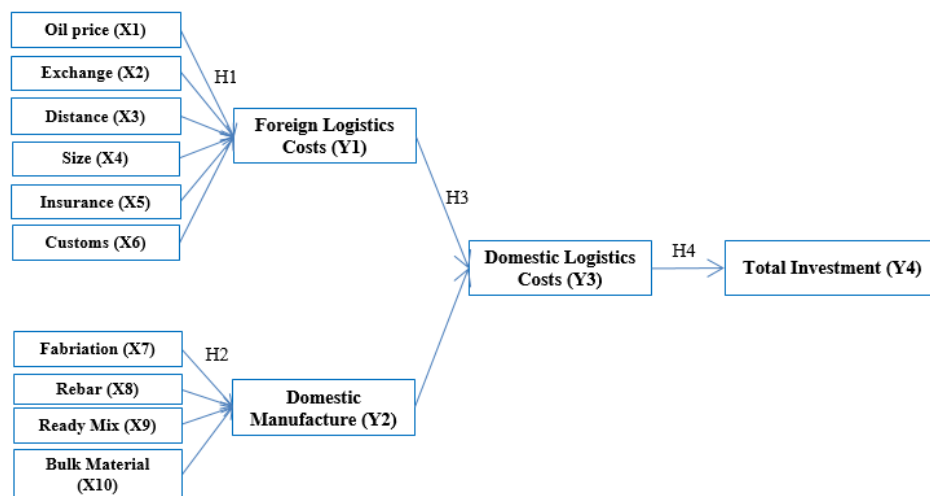
Figure 4. Model of Logistics Costs

Where:

X1 = Oil is the price of international crude oil is an exogenous variable based on WTI index in US\$.

X2 = Exchange is the exchange rate of the US\$ against the Indonesia's rupiah is an exogenous variable in Rp.

X3 = Distance is factor distance from the loading port is an exogenous variable in nautical mile (NM).

X4 = Size is the physical size of the cargo shipped is an exogenous variable in FRT (freight-ton).

X5 = Insurance is the insurance value of the cargo sent is an exogenous variable in US\$.

X6 = Customs is the value of compliance costs consisting of customs formality costs and other charges that are official as exogenous variables in Rp.

X7 = Fabrication is a component of fabrication in the country (plate works) for the construction of construction structures is an exogenous variable in ton.

X8 = Rebar is the component for concrete construction is an exogenous variable in ton.

X9 = Ready-mix is the material to make concrete from the batching plant an exogenous variable in ton.

X10 = Bulk-material is another construction supporting material such as cable, cable tray, grating is an exogenous variable in ton.

Y1 = FLC is a foreign logistics costs component of logistics costs from abroad is an endogenous intervening variable in US\$.

Y2 = DM is the domestic manufacture component of the logistics costs of manufacturing from domestic is an endogenous intervening variable in Rp.

Y3 = DLC is the domestic logistics costs components of logistics in the country is variable endogenous intervening in Rp.

Y4 = TI is the total investment or total project costs. The total investment cost is an endogenous variable in Rp.

H1, H2, H3, H4 are hypotheses

Based on Figure 4 it can be seen that proposed model is combining variables of oil (X1), exchange (X2), distance (X3), size (X4), insurance (X5), customs (X6), fabrication (X7), rebar (X8), ready-mix (X9), bulk material (X10), foreign logistics costs (Y1), domestic manufacture (Y2), domestic logistics costs (Y3), and the variable total investment (Y4).

Developing models of logistics costs based on hypothesis are then into account. Hypothesis is a temporary answer to the problem at hand or a statement that describes the relationship of variables. In other words, a hypothesis is a preposition that contains a temporary solution to address problems which must be verified using statistical tests. Testing this hypothesis will produce findings of related literature, and empirical which will then become the basis for proposed model. Following model of logistics costs are:

$$Y_1 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon_1 \tag{1}$$
$$Y_2 = \beta_0 + \beta_1 X_7 + \beta_2 X_8 + \beta_3 X_9 + \beta_4 X_{10} + \varepsilon_2 \tag{2}$$
$$Y_3 = \gamma_0 + \gamma_1 \hat{Y}_1 + \gamma_2 \hat{Y}_2 + \mu_1 \tag{3}$$
$$Y_4 = \delta_0 + \delta_1 \hat{Y}_3 + \omega_1 \tag{4}$$

Where:
X1 = Oil price in US$.
X2 = Currency of exchange rate in Rp.
X3 = Distance in Nautical Mile (NM).
X4 = Size in FRT.
X5 = Insurance in US$.
X6 = Customs in Rp.
X7 = Fabrication in ton.
X8 = Rebar in ton.
X9 = Ready-mix in ton.
X10 = Bulk-material in ton.
Y1 = foreign logistics costs in US$.
Y2 = domestic manufacture in Rp.
Y3 = domestic logistics costs in Rp.
Y4 = total investment in Rp.
$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \gamma_1, \gamma_2, \delta_1$ are regression coefficients.
$\beta_0, \gamma_0, \delta_0$ are constants or intercepts.
$\varepsilon_1, \varepsilon_2, \mu_1, \omega_1$ are the coefficient of error.

4. Analysis

4.1. Testing Models

The analysis type used in this research is recursive because the causal relationship is only one-way and not reciprocal. Variable oil prices (X1), exchange rates (X2), distance (X3), size (X4), insurance (X5), and customs (X6) have only one-way relationship that affects foreign variables logistic cost (Y1). Likewise the fabrication variables (X7), rebar (X8), ready-mix (X9), and bulk material (X10) have only one-way causal relationship affecting the variable of domestic manufacturing cost (Y2). Next, the foreign logistics costs variable (Y1) and the domestic manufacture cost (Y2) have only one recursive effect on the domestic logistics costs variable (Y3) and finally the domestic logistics costs variable (Y3) has only single causal relationship to the total Investment (Y4). The prerequisites for interpreting the coefficient in a recursive analysis is considered significant or significant if the value is smaller than $\alpha = 0.05$. Furthermore, the level of significance of the coefficient can be observed in the

influence between variables, both direct effect and indirect effect by looking at the level of significance between the related variables.

4.2.   Test to Find Optimal Lag

Determination of the lag test of each estimation is an important stage because it deals with the most optimal time the influence of the independent variables to the dependent variable. This test is to get a best time effect of independent variables of first estimate to the variable foreign logistics costs, the effect of independent variables of second estimate to the variable domestic manufacture cost, the effect of independent variables of third estimate to the variable domestic logistics costs and the effect of independent variable of fourth estimate to the total investment variable. Criteria the best lag is based on the highest adjusted R-square, the significant number of prob t-test, the significant prob F-stat and values of Durbin-Watson stat that best indicating the absence of autocorrelation. Based on the best criteria of the panel data method, the best lag test results are obtained of lag 2 as following in Table 2.

Table 2.   The Best Lag is 2

Model	Selected Method	Adj R^2	Significant t-test	Prob (F-statistic)	DW- stat
1	PLS	0.725363	4 out of 6	0.000000	2.061981
2	PLS	0.671209	4 out of 4	0.000000	1.938147
3	PLS	0.651626	1 of 2	0.000000	1.897979
4	PLS	0.676480	1 of 1	0.000000	1.934602

Source: processed with EViews 10.00

4.3.   Determining of Estimation Model

The first test conducted in this study was the chow test or the F-Test statistical test to choose the best estimation technique between the pooled least square (PLS) model and the fixed effect model (FEM). The hypothesis is as follows:

H_0 : pooled least square (PLS) model

H_1 : model of fixed effect model (FEM)

Based on the test results if obtained $F_{count} > F_{table}$ or if the value of p-value $< \alpha$ at the confidence level $\alpha = 0.05$ then the hypothesis H_0 stating model of pooled least square (PLS) is rejected, or accept the hypothesis H_1 so that the model chosen must use the fixed effect model (FEM) as an estimation technique in testing this first structural equation. If the chosen model is fixed effect model (FEM), the next test must be performed of Hausman test to select the best estimation technique between models of fixed effect model (FEM) and random effect model (REM). This test is carried out with the following hypothesis:

H_0 : random effect model (REM)

H_1 : model of fixed effect model (FEM)

Based on the Hausman test if the significant value of chi square$_{count}$ > chi square$_{table}$ or a p-value $< \alpha$ with a confidence level $\alpha = 0.05$ or otherwise significant then the hypothesis H_0 is rejected so the model fixed effect model (FEM) is more appropriately used. If the opposite is the case then the hypothesis H_1 is rejected and the hypothesis H_0 accepted then the model of random effect model (REM) are better suited to resolve these estimates. Based on the chi square distribution table with a confidence level $\alpha = 0.05$, the chi square results obtained at the first estimate are 11.07; the chi square for the second estimate is 7,815; then the third estimation chi square is 3.841; while the fourth estimation chi square value is 0 because it only has one independent variable.

Table 3. Selection of Research Model Estimation Techniques

Estimate	Influence Between Variables	Test Type	*Prob*	Selected Estimation Model
1	The effect of crude oil prices, exchange rates, distances, cargo size, insurance costs and *customs* fees on *foreign logistic costs*	*Chow test / Restricted F-test*	0.5898	PLS
		Hausman test	-	
2	Effect of fabrication, *rebar, ready mix* and *bulk material* on *domestic manufacture costs*	*Chow test / Restricted F-test*	0.3588	PLS
		Hausman test	-	
3	The effect of *foreign logistic costs* and *domestic manufacturing costs* on *domestic logistic costs*	*Chow test / Restricted F-test*	0.7681	PLS
		Hausman test	-	
4	The effect of *domestic logistic cost* on total investment	*Chow test / Restricted F-test*	0.2583	PLS

Source: processed with EViews 10.00

Based on Table 3 can be witnessed the results of the *F*-test or *chow* test in the first regression estimation to test the best estimation technique between the *pooled least square* (PLS) and *fixed effect model* (FEM) obtained the significance value of the *F* test is 0.5898 which means it is greater than the value of $\alpha = 0.05$ so the hypothesis H_0 accepted or selected model is *pooled least square* (PLS). In regard to the chosen *pooled least square* (PLS) estimation model, it is not necessary to proceed with the *Hausman* Test so that the estimation that must be used is *pooled least square* (PLS). The other three estimations are also showing the same condition with first regression, hence all estimations will employ the PLS estimation.

4.4. *Identification of Estimated Results First Equation*

To identification of the estimation results of the regression equation in testing the first equation (*foreign logistics costs)* to find out how much influence of the independent variables of oil price (X1), the exchange rate (X2), distance (X3), cargo size (X4), insurance costs (X5) and *customs* (X6) have a significant altogether and partially significant to the dependent variable *foreign logistics costs* (Y1). The estimation results of this regression equation are done using the PLS method according advised in Table 3. The results of the first estimated regression test can be witnessed in Appendix 1. Based on the results, the first estimation regression equation can be formulated as follows:

FLC = - 48193.11 + 1114.324 * OIL - 59.98031 * EXCHANGE - 0.246449 * DIST + 12.06561 * SIZE + 0.507226 * INS + 1.09 * 10^{-5} * CUST

Based on the results of the regression test, it can be explained that the price of crude oil has a positive coefficient which means it has a linear effect to the foreign logistics costs. The same thing happened with the variable cargo size, insurance costs, and customs. The negative coefficient found on the variable exchange rate and distance which means it has the opposite effect to the foreign logistics costs.

In addition based on the results, that the variable of oil price, exchange rates, the size of the cargo, and customs have affected significant to the variable of foreign logistics costs, while variable distance and insurance are not significant to the dependent variable. The dominant factor determining the first model is oil price with a coefficient value of 1114.324 meaning that each increase of oil price of every US$1 per barrel will trigger an increase of

foreign logistics costs by US\$1114.324. the regression coefficient of variable exchange rate is -59.98031 or have a negative relationship means every appreciation of the currency rupiah against the US dollar, it will cause a decrease in the cost of foreign logistics costs of US\$59.98031. The regression coefficient for distance is -0.246449 or having a negative relationship means that every an increase of the distance between ports of one nautical mile (NM), it will cause a decrease in foreign logistics costs by US\$0.246449. Further, the value of regression coefficient for the size of the cargo is 12.06561 or has a positive relationship meaning that every an increase of cargo size by one freight ton (FRT) it will cause an increase in foreign logistics costs by US\$12.06561. The regression coefficient for the insurance variable is 0.507226 or has a positive relationship meaning that every an increase of insurance value of one US dollar, it will cause an increase in foreign logistics costs by US\$0.507226. Finally, the regression coefficient for customs is $1.09 * 10^{-5}$ or has a positive relationship meaning that every increase of customs cost by one rupiah, it will cause an increase in foreign logistics costs by US\$$1.09 * 10^{-5}$.

4.4.1 The Coefficient of Determination (R^2)

The results of the coefficient of determination (R^2) shows the ability of all independent variables were able to explain further variation of the variable. The results based on Appendix 1 obtained the adjusted R-squared (R^2) coefficient value is 0.725363. This shows that the first model of logistics costs of foreign logistics costs as the dependent variable in this model can be explained by 72.5363% by the independent variables mentioned in the model of oil prices, exchange rates, distances, cargo sizes, insurance costs and customs while the remaining 27.4637% are influenced by other variables outside the model.

4.4.2 F-Test (Simultaneous)

Tests to proof of independent variables together have influenced to the dependent variable is done by using test F. Based on result in Appendix 1 obtained value of $F_{arithmetic}$ amounted to 74.51247 with a significance level of 0.000000. This shows that altogether the independent variables, consecutively oil price, the exchange rate, the distance, the size of the cargo, insurance costs and customs significantly have influenced the variable foreign logistics costs. Using other methods by comparing the F test results showed that $F_{count} > F_{table}$ of $74.51247 > 2.70$ then H_0 is rejected or H_1 accepted, so it can be said that the variation of the regression models were able to explain the variations of the model independently.

4.4.3 t-Test (Partial)

Based on Appendix 1 can be used to verify partial regression analysis results in the independent variable on the dependent variable with a degree of confidence level $\alpha = 0.05$. There are 4 (four) variables that have a significant relationship while the other 2 (two) are not significant to the dependent variable. Variables that have a significant regression value are the price of crude oil with prob 0.0439; exchange rate with prob 0.0008; the size of the cargo with prob 0.0008; cost of customs with a prob of 0.0000. The variables that do not significantly affect the variable foreign logistics costs are the distance with prob 0.7304 and insurance costs with prob 0.1728.

Table 4. First Estimated t Test Results

Relationship between Variables			Prob	Information
Crude oil prices	→	foreign logistics costs	0.0439	Significant
Exchange rate	→	foreign logistics costs	0.0008	Significant
Distance	→	foreign logistics costs	0.7304	Not significant
Cargo size	→	foreign logistics costs	0.0008	Significant
Insurance fee	→	foreign logistics costs	0.1728	Not significant
Customs	→	foreign logistics costs	0.0000	Significant

Source: processed with EViews 10.00

Based on Table 4, it can be concluded that the first hypothesis proposed the regression model is unacceptable or rejected which is alleging that the variable of oil price, exchange rate, distance, size of the cargo, the cost of insurance and customs partially effected to the foreign logistics costs.

4.5.   Identification of Estimated Results of Second Equation

Identification equation of the second estimate is to examine the effect of exogenous or independent variables of fabrication (X7), rebar (X8), ready mix (X9) and bulk material (X10) to the dependent variable of domestic manufacture cost (Y2). The results of the regression test can be seen in Appendix 1. Based on the appendix, it can be explained that the variable fabrication, rebar, ready mix and bulk material have a positive and significant influence coefficient which means that every increasing volume weight for fabrication, rebar, ready mix and bulk material will increase the costs in the domestic manufacturing costs. Based on the regression results presented in Appendix 1 then model regression of the second estimation can be structured as follows:

$$DM = -1.74 * 10^8 + 142578.4 * FABR + 42513.57 * REBR + 40660.03 * READYMIX + 227738.3 * BULKM$$

The coefficient of fabrication is 142578.4 or have a positive relationship means that if the volume of fabrication have increased by one ton, the cost of domestic manufacture will increase by Rp 142,578.4. The coefficient for rebar is 42513.57 or has a positive relationship meaning that every an increase in the weight of rebar by one ton, it will cause an increase in logistics costs of domestic manufacturing costs by Rp 42,513.57. The coefficient for ready mix is 40660.03 or has a positive relationship meaning that every an increase of ready mix volume one ton, it will cause an increase in logistics costs of domestic manufacture of Rp 40,660.03. While the coefficient for bulk material is 227738.3 or has a positive relationship means that every an increase in the volume of bulk material capital goods by one ton, it will cause an increase in logistics costs for the domestic manufacture cost of Rp 227,738.3.

4.5.1   The Coefficient of Determination (R^2)

Based on the results of test data from this study, it was obtained coefficient of determination (R^2) that indicates the size or ability of the dependent variable can be explained or influenced by the independent variables. The higher the R^2 then indicates that the estimation is better, and vice versa if the smaller R^2 then the estimation is not quite convincing. Results of test based on Appendix 1 obtained the coefficient of determination adjusted R-squared (R^2) is 0.671209. This shows that the cost of domestic manufacturing as the dependent variable in this model can be explained by 67.1209% by the independent variables in the research model of fabrication, rebar, ready mix and bulk material while the remaining 32.8791% is influenced by variables outside the model.

4.5.2   F-Test (Simultaneous)

Proof of independent variables together have influenced to the dependent variable is done by using test F. Based on results of F-test as seen in Appendix 1 obtained value of $F_{arithmetic}$ amounted to 86.23025 with a significance level of 0.000000. The results of this test indicate that all independent variables together in this study, consecutively fabrication, rebar, ready mix and bulk material, have a significant effect to the domestic manufacture variable. Using other methods by comparing the F test results showed that $F_{count} > F_{table}$ is 86.23025 > 2.90 then H_0 is rejected or H_1 accepted, so it can be said that the variation model is be able to explain by the variations of the independent variables.

4.5.3   t-Test (Partial)

Based on data test results in Appendix 1 obtained result of partial regression analysis results in the independent variable on the dependent variable with a degree of confidence level $\alpha = 0.05$. The complete test results of the partial coefficient of the t-test can be seen in Table 5. Based on the table, it can be seen that the all independent variables have a partial effect on the domestic manufacture variables are fabrication, rebar, ready-mix, and bulk material. With this regards, the second hypothesis proposed in this study can be accepted, which is a hypothesis that stated that the fabrication, rebar, ready mix, and bulk material variables have a partial effect on the domestic manufacture variable.

Table 5.   Second Estimated t Test Results

Relationship between Variables			Prob	Information
Fabrication	→	domestic manufacture cost	0.0000	Significant
Rebar	→	domestic manufacture cost	0.0413	Significant
Ready mix	→	domestic manufacture cost	0.0000	Significant
Bulk material	→	domestic manufacture cost	0.0000	Significant

Source: processed with EViews 10.00

4.6.   *Identification of Estimated Results of Third Equation*

The identification the results of the regression estimation for the third equation is purposed to observe the effect the derived variable of foreign logistics costs (FLC) and domestic manufacture (DM) to the dependent variable domestic logistics costs (DLC). The results of regression for the third estimation of domestic logistics costs can be seen in Appendix 1. Based on the appendix, it can be explained that the foreign logistics costs variable has a positive effect coefficient which means that if the foreign logistics costs increases due to the rise of import of capital goods, it will increase the domestic logistics costs. The other independent variable, the variable of domestic manufacture also has a positive coefficient, which means that if the factor of domestic manufacturing increases because of the additional procurement of capital goods from within the country, it will increase the cost of domestic logistics costs.

Based on Appendix 1 can be seen that values regression coefficient of foreign logistics costs (FLC) is 6284.305 or has a positive correlation means that if the cost of foreign logistics cost (FLC) increases by one dollar the United States then the cost of domestic logistics costs (DLC) will be increased by Rp 6,284.31. The value of the regression coefficient for domestic manufacturing (DM) is 0.013841 or has a positive relationship meaning that every an increase in domestic manufacturing (DM) of one rupiah, it will cause an increase in domestic logistics costs (DLC) of Rp 0.013841. Based on Appendix 1 then the regression equation for the third estimations as follows:

$$DLC = 5.94 * 10^8 + 6284.305 * FLC + 0.013841 * DM$$

4.6.1   The Coefficient of Determination (R^2)

Based on result of the test for the third estimation, it can be obtained by the coefficient of determination (R^2) that indicates the size or ability of the variation of the dependent variable can be explained or explained by the independent variables. Based on Appendix 1 obtained outcome of test that the coefficient of determination adjusted R-squared (R^2) is 0.651626. This shows that the domestic logistics costs (DLC) as the dependent variable in the third estimation model in this study can be explained by 65.1626% by the independent variable in the model that is foreign logistic cost and domestic manufacturing while the remaining 34.8374% is influenced by other variables outside the model.

4.6.2   F-Test (Simultaneous)

Proof of independent variables altogether have impacted to the dependent variable is done by using test F. Criteria for significance can be based on the results of the F_{count} and coefficient probability F_{count} based on result of F test calculation as presented Appendix 1 obtained value of $F_{aritmethic}$ amounted to 157.1846 with a significance level of 000000. This shows that combining foreign logistics costs (FLC) and domestic manufacture (DM) variable have a significant effect to the domestic logistics costs (DLC). Using other methods by comparing the F test results showed that $F_{count} > F_{table}$ is 157.1846 > 3.47 then H_0 is rejected or H_1 accepted, so it can be said that the variation model of the dependent able to explain the variation of the independent models together.

4.6.3   t-Test (Partial)

Based on Appendix 1 have partial regression analysis results in the independent variable on the dependent variable with a degree of confidence level $α = 0.05$. The complete results of the partial test of the coefficient of the t-test

can be seen in Table 6 which can show an interpretation of the significance of the partial and found that foreign logistics costs are more significant than domestic manufacture.

Table 6.   Third Estimated t Test Results

Relationship between Variables			Prob	Information
Foreign logistic costs	→	domestic logistic cost	0.0000	Significant
Domestic manufacture cost	→	domestic logistic cost	0.8967	Not significant

Source: processed with EViews 10.00

Based on Table 6 it can be seen that not all variables are proposed in this study consisted of variables foreign logistics costs (FLC) and domestic manufacture (DM) partially have effected to the dependent variable domestic logistics costs (DLC). The results of the domestic manufacture (DM) regression test were 0.8967 which showed no significant effect to the domestic logistics costs (DLC). Based on the test results it can be concluded that the hypothesis of a third proposed in this study cannot be accepted or rejected which hypothesis alleging that the variable foreign logistics costs (FLC) and domestic manufacture (DM) are partially effecting to the variable domestic logistics costs (DLC).

4.7.   Identification of Estimated Results of the Fourth Regression Equation

Results of regression test of the fourth estimation is to determine and investigate the effect of variable domestic logistics costs (DLC) to the variable total investment (TI). Results of regression of the fourth estimation is presented in Appendix 1. Based on the appendix, it can be explained that the domestic logistics costs (DLC) variable has a significant positive effect coefficient to the total investment (IT).

Based on Appendix 1 it can be seen that the value of the domestic logistics costs (DLC) regression coefficient is 81.70923 or has a positive relationship meaning that if the domestic logistic cost factor (DLC) increases by one rupiah the total investment cost (IT) will increase by Rp 81.70923. Therefore regression of the fourth estimated research can be arranged as follows:

TI = 6.33 * 10^{10} + 81.70923 * DLC.

4.7.1   The Coefficient of Determination (R^2)

Results of test data from this study were obtained coefficient of determination (R^2) which shows the ability of independent variables able to explain more variation from change in the dependent variable. Based on the results of the regression test fourth estimation as presented in Appendix 1 obtained coefficient of determination adjusted R-squared (R^2) is 0.676480. The result indicates that the variable total investment (TI) as the dependent variable of the fourth estimation can be explained by 67.6480% by the independent variable in the model of research that domestic logistics costs (DLC) while the remaining 32.3520% influenced by other variables outside the model.

4.7.2   t-Test (Partial)

Based on the test results of data as presented in Appendix 1 obtained results of partial regression analysis on the independent variable on the dependent variable with a degree of confidence level α = 0.05. Learn from the test results obtained by the value of the coefficient of partial test as shown in Table 7.

Table 7.   Fourth Estimated t Test Results

Relationship between Variables			Prob	Information
Domestic logistic cost	→	total investment	0.0000	Significant

Source: processed with EViews 10.00

Based on Table 7 it can be seen that the independent variables affect significantly to the total investment variable partial so the hypothesis fourth proposed in this study accepted which hypothesis alleging that the variable domestic logistics costs (DLC) influence partial significant to the total variable investment (IT).

4.7.3 F-Test (Simultaneous)

Proving the effect of simultaneous independent variables domestic logistics costs (DLC) on the dependent variable total investment (TI) is done by using test F. Criteria for significance can be based on the results of the F_{count} and prob F_{count} based on results of the regression test fourth estimation as shown in Appendix 1 obtained value of $F_{aritmethic}$ amounted to 366.9242 with a significance level 0.000000. This shows that the domestic logistics costs (DLC) variable significantly influences the total investment (IT) variable. Using the methods of testing other by comparing the value of $F_{aritmethic}$ and prob $F_{aritmethic}$ shows that $F_{count} > F_{table}$ is 366.9242 > 4.30 then H_0 is rejected or H_1 accepted, so it can be said that the variation model of the dependent is able to explain the variations of the model independently.

5. Conclusion

Executing cement projects in Indonesia are still confusing and questioning ever been. Controlling budgets especially became puzzling and based on experienced was always traditionally exceeded that consequently prone to be targeted by auditor. The problems is the best model logistics costs were not discovered even at the preliminary level in Indonesia. Practitioners and or experts are only relying information and data from uncertain sources that explaining logistics costs in Indonesia at 27% GDP. The number that does not make sense comparing logistics costs in regions are about 7% to maximum of 12%.

Based on the need that logistics costs model is urgently demanding in Indonesia, through theoretical, literature, and empirical approach, the model is proposed and presented. Based on study, model logistics costs in Indonesia consists of foreign logistics costs, domestic manufacture, domestics logistics costs that build of total costs investment. To be concerning that variable foreign logistics costs found took bigger portion in Indonesia and must be prior becoming high attention to every investor who are willing to make investment in Indonesia.

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List of Appendixes

Appendix 1.
First estimation
Dependent Variable: FLC
Method: Panel Least Squares
Date: 04/19/19   Time: 20:11
Sample (adjusted): 2010Q4 2018Q4
Periods included: 36
Cross-sections included: 8
Total panel (balanced) observations: 288

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-48193.11	50296.09	-0.958188	0.3394
OIL(-2)	1114.324	548.6637	2.030977	0.0439
DEXCHANGE(-2)	-59.98031	17.62008	-3.404089	0.0008
DIST(-2)	-0.246449	0.714039	-0.345148	0.7304
SIZE(-2)	12.06561	3.532927	3.415189	0.0008
DINS(-2)	0.507226	0.370404	1.369384	0.1728
CUST(-2)	1.09E-05	7.29E-07	14.92872	0.0000

R-squared	0.735230	Mean dependent var		183370.5
Adjusted R-squared	0.725363	S.D. dependent var		125434.2
S.E. of regression	65734.83	Akaike info criterion		25.06542
Sum squared resid	6.96E+11	Schwarz criterion		25.19558
Log likelihood	-2098.495	Hannan-Quinn criter.		25.11825
F-statistic	74.51247	Durbin-Watson stat		2.061981
Prob(F-statistic)	0.000000			

Second estimation
Dependent Variable: DDM
Method: Panel Least Squares
Date: 04/13/19   Time: 23:14
Sample (adjusted): 2010Q4 2018Q4
Periods included: 36
Cross-sections included: 8
Total panel (balanced) observations: 288

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.74E+08	40753599	-4.259762	0.0000
FABR(-2)	142578.4	33104.23	4.306955	0.0000
REBR(-2)	42513.57	20669.41	2.056834	0.0413
DREADYMIX(-2)	40660.03	2431.197	16.72428	0.0000
DBULKM(-2)	227738.3	50198.38	4.536766	0.0000

R-squared	0.679084	Mean dependent var		-13174460
Adjusted R-squared	0.671209	S.D. dependent var		4.21E+08
S.E. of regression	2.42E+08	Akaike info criterion		41.47213
Sum squared resid	9.51E+18	Schwarz criterion		41.56510
Log likelihood	-3478.659	Hannan-Quinn criter.		41.50986
F-statistic	86.23025	Durbin-Watson stat		1.938147
Prob(F-statistic)	0.000000			

Third estimation

Dependent Variable: DLC
Method: Panel Least Squares
Date: 04/13/19   Time: 23:16
Sample (adjusted): 2010Q4 2018Q4
Periods included: 36
Cross-sections included: 8
Total panel (balanced) observations: 288

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.94E+08	79957957	7.433304	0.0000
FLC(-2)	6284.305	356.3266	17.63636	0.0000
DDM(-2)	0.013841	0.106494	0.129973	0.8967

R-squared	0.655798	Mean dependent var	1.75E+09
Adjusted R-squared	0.651626	S.D. dependent var	1.01E+09
S.E. of regression	5.96E+08	Akaike info criterion	43.26605
Sum squared resid	5.86E+19	Schwarz criterion	43.32183
Log likelihood	-3631.348	Hannan-Quinn criter.	43.28869
F-statistic	157.1846	Durbin-Watson stat	1.897979
Prob(F-statistic)	0.000000		

Fourth estimation

Dependent Variable: TI
Method: Panel Least Squares
Date: 04/13/19   Time: 23:18
Sample (adjusted): 2010Q3 2018Q4
Periods included: 36
Cross-sections included: 8
Total panel (balanced) observations: 288

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.33E+10	7.98E+09	7.927778	0.0000
DLC(-2)	81.70923	4.265628	19.15527	0.0000

R-squared	0.678328	Mean dependent var	1.91E+11
Adjusted R-squared	0.676480	S.D. dependent var	1.02E+11
S.E. of regression	5.82E+10	Akaike info criterion	52.42372
Sum squared resid	5.90E+23	Schwarz criterion	52.45974
Log likelihood	-4611.287	Hannan-Quinn criter.	52.43833
F-statistic	366.9242	Durbin-Watson stat	1.934602
Prob(F-statistic)	0.000000		

Impact of ERP System Usage on Supply Chain Integration: A Structural Equation Modeling, Jordanian Pharmaceutical Manufacturing Case study

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Abstract

This study aimed to investigate the impact of ERP System Usage on Supply Chain Integration at Jordanian Pharmaceutical Manufacturing firms. A random sample from employees working in the Jordanian Pharmaceutical Manufacturing firms (Human Resource Department, Financial Department, Production Department, Supply Chain Department as well as Operations & Quality Department) were chosen totaling (183) individuals. The study applied using SPSS and Amos to do the analysis. The study using a questionnaire to achieve the study objectives through Structural Equation Modeling (SEM). The study results revealed that the Customer Relationship Management System, Inventory Management System, Financial Management System, production and operation Management System has a significant positive effect on Integration with Supplier, Integration with Customer and internal processes integration. The study concluded that there exists a statistically significant relationship between ERP system on Integration with Supplier, Integration with Customer and internal processes integration at Jordanian Pharmaceutical Manufacturing firms. The study found out that there was huge contribution of the ERP system in supply chain integration at Jordanian Pharmaceutical Manufacturing firms.

Keywords: ERP System, Supply Chain Integration, Jordanian Pharmaceutical Manufacturing Firms and Structural Equation Modeling

1. Introduction

The world is facing constant changes of the requirements for the competitive environment, customer needs, the business challenges that have led to the invasion of digital technology, and finally the new innovations to the business environment across its various sectors, which contribute to improving its operations, achieving customer satisfaction and business objectives, and gaining a greater market share.

Accordingly, the pharmaceutical manufacturing organizations have been moving towards the adoption of enterprises' resources planning systems, which allow organizations to optimally exploit available resources to

allow for more efficiency and effectiveness in the implementation of business plans, reduce the response time due to the effective transfer of Information, and in turn, ease the decision making process in real-time through a set of integrated programs that contribute to the sharing of accurate information among all of business units. This is manifested through the improvement of communication and coordination between the internal processes and external partners such as: the relationships with suppliers, distributors, and customers through supply chain Integration, which supports coordination between supply chain members who manage inter and intra-organization activities starting from (receiving of customer order, provision of raw material, manufacturing, distribution, ending with delivery of the product to the end consumer) to achieve more efficiency in the flow of products, services, and information that provide customers with higher value at the right time, in the right place, suitable price, and high quality. On the other hand, the success of the supply chain integration reflects into the value added towards the customers, organizations' quality reputation, timely delivery, and ensuring the continuity and survival globally.

Tseng, et. al. (2011) stated that customer satisfaction is a primary cause that leads organizations to use information technology tools to access information and relationships with customers, in order to make the core processes of business more flexible and efficient. Moreover, Ince, et. al. (2013) believes that organizations need efficient and effective information systems like ERP system to obtain accurate data at the right time to compete at the global complex marketplace. Gollner, et. al. (2016) mentioned that organizations noticed that the competitiveness of business found into effective distribution of resources and improvement of business processes that are integrated and seek to accomplish the high quality of product, low cost, and delivery in the right time. Madanhire and Mbohwa (2016) explained that the use of ERP systems provides support for all of important activities such as (manufacturing and logistics, finance, sales, CRM, SCM, and HR) through the integration of data and shared knowledge among all business units. Furthermore, Ngai, et. al. (2011) said that supply chain integration is one of most important elements of SCI requirements to design a network in which the supply chain partners cooperate with internal business processes to reach to optimum practices. Ram, et. al. (2013) discussed that SCI seeks to linkage internal processes with external processes (outside partners) such as: suppliers and customers through the ERP system to achieve rapid responds to customers' needs. Marinagi, et. al. (2015) mentioned that supply chain management integration works on the controlling of information, materials, services and money to enhance the quality of business operations. Gollner, et. al. (2016) reported that ERP evaluation has to be considered through the stakeholders' involvement.

Therefore, this study aims to investigate the impact of ERP System Usage on Supply Chain Integration in Jordanian Pharmaceutical Manufacturing firms.

1.1. **Significant of the study**

There are a few researches addressed the ERP System Usage in the Arab countries in general. In addition, there are a few studies are talking about the impact of ERP System Usage in Jordanian pharmaceutical manufacturing firms, and supply chain integration. Therefore, this study will have a small contribution to building further studies of this topic that can be used in other industries. The existing study might be considered as one of the studies that combined both variables (ERP and SCI) together to examine its impact on business processes and relationships with abroad partners, and level of alignment with ERP system. As well as, may provide managers with recommendations in some of pharmaceutical manufacturing firms in regard to re-discuss using of ERP system as an information system to develop their business, retain its market share to achieve the competitive advantage.

Therefore, this study would discuss the extent of ERP System Usage at pharmaceutical manufacturing firms to look into its benefits that return on businesses. At the same time, what are they losing when they never apply these technologies to accomplish their business processes? Moreover, this study can be used to give a recent recommendation for decision makers and other managers about the importance of ERP and the effect of using the technology on business partnerships with suppliers, and customers to help in the right decisions in the real time; In general clarify the benefits of ERP System usage for all processes. Finally, provides a theoretical and academic framework about the impact of ERP System usage on Supply Chain Integration that could support researches about the benefits of ERP systems.

1.2. Objectives of the study

Investigate the impact of ERP System Usage (Human Recourse Management System, Customer Relationships Management System, Inventory Management System, Financial Management System, Production and Operations Management System) on Supply Chain Integration (Integration with Suppliers, Internal processes Integration, Integration with Customer) in Jordanian Pharmaceutical Manufacturing firms.

1.3. Research questions

Based on the research problem statement, its main question and the objectives to be achieved, the following research questionneedsd tbe answeredrs:

Does ERP system dimension affect Supply Chain Integration dimensions (Integration with Suppliers, Internal processes Integration, Integration with Customer) at Jordanian Pharmaceutical Manufacturing firms?

2. Literature Review

2.1. Enterprise Resources Planning (ERP) System

The term of Enterprise Resource Planning arose from the Material Requirements Planning and Industrial Computraization systems; it is introduced by Garnar firm for Research and Analysis (Jagoda and Samaranayake, 2017). According to Mabert, et al. (2013) ERP systems currently seek to cover all the basic functions of any service or production organization, since service organizations, nonprofits and governments are all now able to use the ERP systems.

Garg and Khurana (2017) there are many examples of units in the ERP systems that have an individual application: manufacturing, supply chain, finance, customer relationship management, warehouse management, and decision support system.

Njihia & Mwirigi (2014) determined that information systems literature refers to the beginnings of events of What to know about "information systems integration", which is the basis in the work of ERP software to the sixties and seventies and specifically by developing what is known as inventory tracking systems through Material Requirements Planning and MRP II (Manufacturing Resource Planning) systems have also contributed to laying the foundation stone for ERP (Enterprise Resource Planning) software development. Indeed, many IT systems researchers' consideration Enterprise Resource Planning systems as a functional extension othe f manufacturing resource planning system.

Ullah, et. al. (2017) viewed the ERP systems as being system enhancing core business functions that can be supported through a comprehensive information system, that provconsistentently information for each part of business, which including HR, finance, marketing and sales, customer service, and intra- and extra operations on time.

Ociepa (2017) mentioned that ERP system as system to manage of resource planning, business commitments, data flows. Finally, Syahid, et al., (2017) define ERP system as integrates data from each department under one centralized system contains a number of modules that designated based on department's needs.

The implementation of the ERP system requires prior systematic planning, especially with regard to the operations of the organization. Therefore, requires coordination with Individuals who specialize in these systems, in addition coordination between the various divisions and departments constituting the organization (Abugabah, et al., 2015).

The implementation of the ERP system requires a major change in work practices and relationships from individuals to the management of the organization, because the process of change requires qualified individuals who are able to train workers and qualify them to adapt to the use of the ERP system (Fadlalla and Amani, 2015).

Many researchers have addressed the requirements of implementing the ERP system or critical success factors (Ahmad and Cuenca, 2013).

Hsu, et al., (2015) identify these requirements as teamwork, support for senior management, change of operations, project management, and effective communications training.

Costa, et al., (2016) go further, where he emphasized on a set of requirements that are re-engineering administrative processes, change management, work teams, organizational culture, support for senior management, future vision, effective communication, project management, Software development, performance evaluation, organizational structure, end-user participation, knowledge management.

Whereas, Hasheela-Mufeti and Smolander (2017) categorizes these requirements with four factors: organizational, technological, strategic and tactical factors. In adition, Baker and Yousof study (2017) emphasized on senior management support, project management, user training, communications, seller support and business engineering re-engineering.

While Al-Hadi and Al-Shaibany (2017) mentioned that these requirements are represented in the efficiency of project implementation, the product itself, the seller's point of view, the organizational climate, and technical factors.

Finally, Kiran and Reddy (2019) stated that the requirements for implementing the ERP system in the organizations are in terms of consultants support, knowledge transfer, senior management support, user's support of the system, effective communications, and conflict resolution.

2.2. **Supply chain integration**

Supply chain integration consists of internal processes, partnerships with suppliers and end-consumers, that to ensure information flow and raw materials in the real time, with high quality and price (Poranki, et. al., 2015).

Supply chain integration is "an effective method that enhances the performance of an organization's suppliers and customers" (Flynn, et al., 2010).

Supply chain integration as "the degree to which a manufacturer collaborates with its supply chain partners and coordinately manages intra- and inter-organization processes" (Poranki, et. al., 2015).

Qi, et al., (2017) defined supply chain integration as "cooperation plans and activities between suppliers, manufacturers, warehouses distributors, and retailers that aim to develop products by transforming raw materials into finished goods for customers". While, the supply chain integration "intends to provide the products to the end consumer starting with purchasing materials ending with delivery to the end consumer" (Wheelen, et al., 2018).

According to Lii and Kuo (2016) the supply chain integration enables organization to design products faster, with higher qualities and lower costs. Annan, et al., (2016) demonstrated that the supply chain integration able organization to minimize the cost of serving and monitoring customers and suppliers.

In the current study, the researcher relied on Poranki, et. al., (2015); Mehralian, et. al., (2015); Tiwari, et. al., (2015); Huo, et. al., (2014); Xu, et. al., (2014) in determining the dimensions of measuring Supply Chain Integration.

3. RESEARCH MODEL AND HYPOTHESES

Our research model is shown in Fig. 1. The definitions of various constructs in the model. In this study, the authors construct the research model based on reviewing the selected literature on ERP System and Supply chain integration.
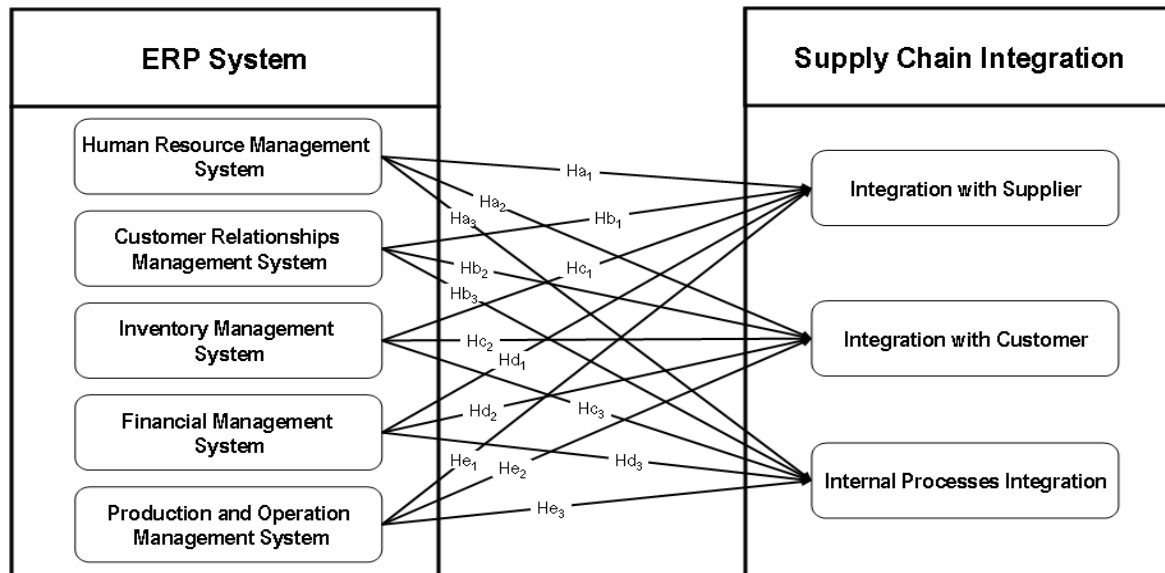
Fig. 1. Research model

Based on the above discussions, the researcher proposes the following hypothesis:

Ha1. The Human Resource Management System positively affects on Integration with Suppliers.
Ha2. The Human Resource Management System positively affects on Integration with Customer.
Ha3. The Human Resource Management System positively affects on internal processes integration.
Hb1. The Customer Relationship Management System positively affects on Integration with Supplier.
Hb2. The Customer Relationship Management System positively affects on Integration with Customer.
Hb3. The Customer Relationship Management System positively affects on internal processes integration.
Hc1. The inventory Management System positively affects on Integration with Supplier.
Hc2. The inventory Management System positively affects on Integration with Customer.
Hc3. The inventory Management System positively affects on internal processes integration.
Hd1. The Financial System positively affects on Integration with Suppliers.
Hd2. The Financial Management System positively affects on Integration with Customer.
Hd3. The Financial Management System positively affects on internal processes integration.
He1. The production and operation Management System positively affect on Integration with Supplier.
He2. The production and operation Management System positively affect on Integration with Customer.
He3. The production and operation Management System positively affect on internal processes integration.

4. Methodology

4.1. Study Population

The study population included all employees working in the Jordanian Pharmaceutical Manufacturing firms from three levels.

4.2. Study Sample

The sample size appropriate from study population were (183) employees working in the Jordanian Pharmaceutical Manufacturing firms (Human Resource Department, Financial Department, Production Department, Supply Chain Department as well as Operations & Quality Department) who were chosen in a randomly sampling method.

4.3. **Data collection and instrument**

The data was obtained through a survey. This consisted of the questions in the questionnaire that were sent the responded. Using scale of ERP system based on Gupta, et. al., (2018); Hasan, et. al., (2017); Poranki, et. al., (2015); Ram, et. al., (2014); Heizer; Render and Zubi (2013). As well as, to measure the supply chain integration the researcher adapted the Poranki, et. al., (2015); Mehralian, et. al., (2015); Tiwari, et. al., (2015); Huo, et. al., (2014); Xu, et. al., (2014) scale. A questionnaire was prepared to gain answers to specific questions. The items of questionnaire were mainly closed. Likert-type scale was used ranging from 1 = strongly disagree to 5-strongly agree.

5. DATA ANALYSIS

The study uses Statistical Package for social science (SPSS) to measuring reliability of the ERP system constructs and Supply chain Integration constructs. Structural Equation Modeling (SEM) in data analysis through using the Amos version 23 to test the study hypotheses was used.

5.1. **Measuring Reliability**

Reliability test was performed one more time to verify whether the ERP system and supply chain integration constructs are reliable. Reliability results as shown in table 1 clarify that all constructs were higher than the acceptable level stated by Hair. et al., (2010) stated.

TABLE 3. Reliability Analysis Results for Measurements items

Construct (or factor)	Cronbach's alpha	
	No of items	**Value**
HRMS	6	0.890
CRMS	6	0.889
IMS	6	0.903
FMS	6	0.895
POMS	6	0.916
ERP System	30	0.970
Integration with Supplier	8	0.922
Integration with Customer	8	0.925
internal processes integration	8	0.946
supply chain integration	24	0.963

5.2. **The hypotheses testing**

The examination the hypotheses using structural equation modeling through AMOS 23.0. However, the model provided a good fit indicators as: χ2/df = 1.418, with the goodness of fit index (GFI) and adjusted goodness of fit index (AGFI) was .0962 and 0.934, the normed fit index (NFI) was 0.973, the Tucker-Lewis coefficient (TLI) was 0.984, as well as, the comparative fit index (CFI) was 0.984 and the root mean square error of approximation (RMSEA) was 0.049, indicating a good fit between the theoretical model and the data. Table 4 presents each parameter's C.R., Estimate and S.E.

Hence, Customer Relationship Management System has a significant positively effect on Integration with Supplier, Integration with Customer and internal processes integration (*β* = 0.268; 0.324 and 0.182; *C.R* = 3.385; 3.755 and 2.473; P-*value* = 0.003; 0.000 and 0.014) or Hb1; Hb2 and Ha3 is supported).

Inventory Management System has a significant positively effect on Integration with Supplier, Integration with Customer and internal processes integration (*β* = 0.254; 0.221 and 0.213; *C.R* = 2.868; 2.451 and 2.271; P-*value* = 0.005; 0.015 and 0.024) or Hc1; Hc2 and Hc3 is supported).

Financial Management System has a significant positively effect on Integration with Supplier, Integration with Customer and internal processes integration (*β* = 0.250; 0.235 and 0.246; *C.R* = 2.255; 2.080 and 2.597; P-*value* = 0.025; 0.039 and 0.011) or Hd1; Hd2 and Hd3 is supported).

Finally, production and operation Management System has a significant positively effect on Integration with Supplier, Integration with Customer and internal processes integration (*β* = 0.354; 0.274 and 0.263; *C.R* = 3.736; 2.799 and 2.617; P-*value* = 0.000; 0.014 and 0.010) or He1; He2 and He3 is supported).

TABLE 4. HYPOTHESES TESTING RESULT

| Hypothesis | Regression Weights | | Estimate | SE | C.R. | P Value | Results |
	From	To					
Ha1	HRMS	Integration with Supplier	-0.041	0.069	-0.595	0.552	Rejected
Ha2	HRMS	Integration with Customer	0.055	0.071	0.772	0.441	Rejected
Ha3	HRMS	internal processes integration	0.080	0.084	0.944	0.346	Rejected
Hb1	CRMS	Integration with Supplier	0.268	0.079	3.385	0.003	Accepted
Hb2	CRMS	Integration with Customer	0.324	0.086	3.755	***	Accepted
Hb3	CRMS	internal processes integration	0.182	0.073	2.473	0.014	Accepted
Hc1	IMS	Integration with Supplier	0.254	0.088	2.868	0.005	Accepted
Hc2	IMS	Integration with Customer	0.221	0.090	2.451	0.015	Accepted
Hc3	IMS	internal processes integration	0.213	0.093	2.271	0.024	Accepted
Hd1	FMS	Integration with Supplier	0.250	0.110	2.255	0.025	Accepted

Hd2	FMS	Integration with Customer	0.235	0.112	2.080	0.039	Accepted
Hd3	FMS	internal processes integration	0.246	0.094	2.597	0.011	Accepted
He1	POMS	Integration with Supplier	0.354	0.094	3.736	***	Accepted
He2	POMS	Integration with Customer	0.274	0.097	2.799	0.014	Accepted
He3	POMS	internal processes integration	0.263	0.100	2.617	0.010	Accepted

6. DISCUSSION

From analysis, it was observed that the Customer Relationship Management System has a significant positive effect on Integration with Supplier, Integration with Customer and internal processes integration. This means that the increased one unit in Customer Relationship Management System can significantly increased the same degree in Integration with Supplier, Integration with Customer and internal processes integration. As well as, Inventory Management System has a significant positive effect on Integration with Supplier, Integration with Customer and internal processes integration. This means that the increased one unit in Inventory Management System can significantly increased the same degree in Integration with Supplier, Integration with Customer and internal processes integration.

Financial Management System has a significant positive effect on Integration with Supplier, Integration with Customer and internal processes integration. This means that the increased one unit in Financial Management System can significantly increase the same degree in Integration with Supplier, Integration with Customer and internal processes integration.

Production and operation Management System has a significant positive effect on Integration with Supplier, Integration with Customer and internal processes integration. This means that the increased one unit in production and operation Management System can significantly increase the same degree in Integration with Supplier, Integration with Customer and internal processes integration.

Human Resource Management System not positively affects on supply chain integration (Integration with Supplier, Integration with Customer and internal processes integration).

7. CONCLUSION

From the analysis, it can be concluded that there exists a statistically significant relationship between some of ERP system on Integration with Supplier, Integration with Customer and internal processes integration at Jordanian Pharmaceutical Manufacturing firms. The study found out that there was huge contribution of the ERP system in supply chain integration at Jordanian Pharmaceutical Manufacturing firms.

7.1. Limitation

The study was limited to the Jordanian Pharmaceutical Manufacturing firms. The study was also limited to Human Resource Department, Financial Department, Production Department, Supply Chain Department as well

as Operations & Quality Department in Jordanian Pharmaceutical Manufacturing firms and not the other firms in other sector.

7.2. **Further research**

The studies recommend the extension of this research to examining the effect of ERP system on creative performance.

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The Impact of Government Expenditure on Economic Growth in Afghanistan

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Abstract

This study evaluates the impact of expenditure compositions on economic growth in Afghanistan. The data was collected from the World Bank and Ministry of Finance using a period of 2004 to 2019. The gross domestic product was stated as dependent variable and public expenditure compositions were included as independent variables. The adjusted Keynesian function was applied to estimate the impact of government expenditure on economic growth. Unit root test, Johansen co-integration test and bound test were checked. All variables were stationary at level and first difference. Hence, Autoregressive Distribution Lag (ARDL) model was applied. Our findings expose that there is a long-run relationship between dependent and independent variables. Furthermore, the previews and current expenditures on education and infrastructure are positively correlated with economic growth in Afghanistan. But, security expenditure is negatively linked with growth rate. The adjusted R-squared revealed that 99% variation of dependent variable explained by independent variables. To increase the economic growth rate, the government should adopt precise and accurate control on its spending on defense, as to reduce corruption and mismanagement.

Keywords: Public Expenditure, Economic Growth, Keynesian Function, Afghanistan

Introduction

Since 1960, it has been crucial for the government to spend state expenditure into different sectors of the economy. As such, public expenditure denotes to the expenses incurred by the government for the provision and maintenance of distinct public goods and to accelerate economic growth rate (Muhammed & Asfaw, 2014). Economic growth defines as an increase in output of an economy's capacity to produce goods and services to promote the wellbeing of residents within a country (Adamu, Jibir, & Hajara, 2015). Several scholars examined the correlation between public expenditure and economic growth in different regions, but there is not a concrete result on which components of public expenditure has direct effect on economic growth (Muhammed & Asfaw, 2014).

Many scholars like Aschauer (1989) claims that increase in government expenditure on both social and physical capital speeds up economic growth. For instance, public expenditure in social service boosts the labor productivity and augments the growth of national output. At the same vein, government spending on infrastructure such as road, communication power and so on declines the cost of production, encourages private sector investment and promotes economic growth. Conversely, some academics like Babatunde (2007) argue that increasing government

expenditure reduces the economic growth. He believes that government may cover this enhancement through tax raise and/or borrowing. Higher tax rate discourages employees for longer working hours and/or searching new jobs, which declines income and aggregate demand.

Many scholars have explored the impact of government spending on economic growth rate. Landau (1985) studied the correlation between government expenditure and economic growth in the developed countries. He exposed that public consumption and investment expenditure declined economic growth rate. At the same vein, Grier and Tullock (1989) anlyzed impact of government consumption on economic growth over a period of 1951-80 in 113 countries. They found that economic growth is negatively associated with public expenditure in the OECD countries. A similar finding was confirmed by Dar and AmirKhalkhali (2002) and Fölster and Henrekson (1999). Conversely, Patricia and Izuchukwu (2013) analyzed the impact of education expenditure on economic growth in Nigeria using a period of 1977 to 2012. Their findings revealed a positive and significant long-term correlation between education expenditure and economic growth. Furthermore, Lahirushan & Gunasekara (2015) investigated the relationship between public expenditure and economic growth in asian countries using secondary data of 1970 to 2013. Their results showed a positive and significant association between targeted variables. Moreover, they confirmed a long-term relationship for government expenditure and gross domestic products in Asian countries. Kapunda & Topera (2013) studied the components of public expenditure and its effect on economic performance in Tanzania during the time of 1965 to 2010. They found a positive and significant effect of capital expenditure on economic performance. But expenditure on health, agriculture, infrastructure, defense and gerneral public services are reported insignificant.

Afghanistan has suffered decades of war and conflict, which damaged economic, social and political infrastructures. Since 2002, the new government allocates millions of dollars to rebuild the communities and to improve the welfare of households in the country. Government budget is classified into two main categories; operational and development. In 2004, domestic revenues financed only 50.6% of operational budget. The remained part of operational budget and total development budget are financed by international assistance (MoF, 2004). Majority of these funds provided by the international partners, so the money should be utilized wisely and devote on sectors with more productivity. Unfortunately, there is not any noticeable investigation to address the impact of expenditure components on economic growth in Afghanistan. This study analysis this correlation and provides information to policymakers on usage of limited financial resources. For meaningful results the following research question is posed:

1. What is the correlation between expenditure compositions and economic growth?

Data and Function Specification

This study relied on secondary data. The data obtained from the Afghanistan Ministry of Finance and the World Bank. It contained over the period of 2004 to 2019. This research applied the adjusted Keynesian function, which was adopted by Muhammed & Asfaw (2014) and Nurudeen and Abdullahi (2010) in the context of Ethiopian and Nigerian economic growth. The empirical function is posed as follows:

$$GDP = F(Educ, sec, Inf, \dots) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots. (1)$$

The above equation is converted into ln model and it formed as below:
$$lnGDP = \beta_0 + \beta_1 lnEduc + \beta_2 lninf + \beta_3 lnInf + \varepsilon \dots\dots\dots\dots. (2)$$

Where:
GDP   =   gross domestic product
Edu   =   expenditure on education
Sec   =   expenditure on security
Inf   =   expenditure on infrastructure
ε   =   error term
β   =   unknown parameters

Results

This study analyzed the impact of expenditure compositions on economic growth in Afghanistan. Gross domestic product is stated as dependent variable and education, infrastructure, and security expenditures are included as independent variables. In time series analysis, it is a precondition to check whether the variables are stationary or not. The Augmented Dickey Fuller (ADF) test is employed to check the order of integration for all variables. The unit root test results presented in Table 1. This exposes that all variables are stationary at level or first difference. Gross domestic product, education and security are stationary at their first difference. Only infrastructure is stationary at its level.

Table 1: Unit root test results

| Variables | Level | | First Difference | |
	ADF Test	P-value	ADF Test	P-value
Ln_gdp	-0.3088	0.9799	-3.5045	0.0947
Ln_edu	0.3998	0.9963	-4.2514	0.0291
Ln_inf	-4.2074	0.0258	-	-
Ln_sec	-1.0504	0.9008	-6.4407	0.0011

Source: EViews output

The Johansen co-integration test was employed to check the integration and co-movement between dependent variable and independent variables. This method considered both unrestricted Trace and Eigen value tests. The Johansen co-integration test outputs depicted in Table 2. The estimated findings confirm an integrated relationship between GDP and government spending. This result is in line with Gangal and Gupta (2013), Olabisi and Funlayo (2012), Muhammed and Asfaw (2014).

Table 2: Co-integration test results

Unrestricted co-integration rank test (Trace)				
Hypothesized No. of CE(s)	Engen value	Trace Statistics	0.05 Critical Value	Prob.**
None *	0.9928	110.04	47.8561	0.0000
At most 1 *	0.8643	40.854	29.7970	0.0018
At most 2	0.4746	12.881	15.4947	0.1192
At most 3 *	0.2414	3.8691	3.84146	0.0492
Unrestricted co-integration rank test (Maximum Eigen value)				
Hypothesized No. of CE(s)	Engen value	Max-Eigen Statistics	0.05 Critical Value	Prob.**
None *	0.9928	69.194	27.5843	0.0000
At most 1 *	0.8643	27.972	21.1316	0.0047
At most 2	0.4746	9.0123	14.2646	0.2851
At most 3 *	0.2414	3.8691	3.84146	0.0492

Source: EViews output

The unit root test revealed that all variable are stationary at their level and first difference. Hence, the Autoregressive Distribution Lag (ARDL) model was employed to estimate the impact of expenditure components on economic growth. Table 3 demonstrates details of ARDL test:

Table 3: ARDL model results

Variable	Coefficient	Std. Error	t-Statistics	Probability
C	-13.1739	3.4764	-3.7894	0.0631
ln_gdp (-1)	0.6245	0.1813	3.4430	0.0750
ln_gdp (-2)	0.9917	0.2160	4.5871	0.0444

ln_edu	0.7499	0.1335	5.6132	0.0303
ln_edu (-1)	0.6203	0.1808	3.4301	0.0755
ln_edu (-2)	0.9149	0.2069	4.4215	0.0475
ln_inf	0.3401	0.1067	3.1873	0.0859
ln_inf (-1)	0.5174	0.1306	3.9602	0.0582
ln_inf (-2)	0.0618	0.0891	0.6935	0.5597
ln_sec	-0.6010	0.1221	-4.9193	0.0389
ln_sec (-1)	-0.5549	0.1573	-3.5265	0.0718
ln_sec (-2)	-0.7385	0.1452	-5.0846	0.0366
Adjusted R^2		0.9913		

Source: EViews output

The predicted coefficients uncover that volume of GDP in the last two years also accelerates current growth rate in Afghanistan. Both coefficients are statistically significant. This finding is in line with Olabisi and Funlayo (2012). Furthermore, previews and current education expenditures are positively correlated with economic growth. Each percent increase in current education spending augments economic growth by less than one percent (0.75%). This means that education expenditure enhances human capital in Afghanistan and leads to boost economic development. This finding was supported by Singh and Weber (1997) in Swiss, Patricia and Izuchukwu (2013) in Nigeria and Mathui et al, (2013) in Kenya.

Similarly, infrasturture spending is also positively associated with economic development in Afghanistan. The estimated coneficients show that both previews year and current expenditures on infrastruture enhance economic growth. A 10% increase in infrastucture investment accelarates economic growth rate by 3.4%. This implies that spending to roads, telecomunication, electricity and other infrastructures declined production cost and encouraged private sector investments in Afghansitan. This result was found by Palei(2015).

Expenditure on security and defense is a major part of budget in Afghanistan. The coefficients reveal that past and present security expenditures are negatively linked with economic development in Afghanistan. For current spending, 1% increase in defense expenditure results to decline growth rate by 0.6%. This is in line with findings of Lim (1983) and Lebovic and Ishaq (1987).

Table 4: ARDL Bound test results

Test Statistic	Value	k
F-statistic	13.1706	3
Critical value bounds		
Significance	I0 Bound	I1 Bound
10%	2.37	3.2
5%	2.79	3.67
2.5%	3.15	4.08
1%	3.65	4.66

Source: EViews Output

Table 4 reports the results of bound test. This test checks long-run relationship between dependent variable and independent variables. The calculated F-statistic (13.1706) is higher than the upper bound critical value (4.66) at 1 percent level. Thus, the null hypothesis is rejected, meaning long-run relationship among variables.

Conclusion and policy recommendation

This study analyzed the impact of expenditure compositions on economic growth in Afghanistan using ARDL model. The unit root test and Johansen co-integration test were check. The results show that dependent and independent variables are stationary at their level and first difference. Furthermore, these variables are integrated. The estimated coefficients of education and infrastructure affect economic growth rate directly. However, expenditure on security is negatively linked with economic development.

Based on the above findings, this study proposes the following recommendations. First, the government should prioritize its expenditures. Second, to increase economic development the government should adopt precise and accurate control on its spending on defense to reduce fraud and mismanagement. Finally, the government should increase expenditure on education and infrastructure to accelerate economic growth.

Acknowledgement

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Focus, Asset Tangibility and Value Creation in M&A Transactions: Evidence from the Pharmaceutical Industry

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Abstract

Through mergers and acquisitions the pharmaceutical industry has changed in the last years like never before. The widespread paradigm that acquirers face negative returns at acquisition announcement, resulting in significant losses, no longer applies. Including the largest consolidation wave in 2013 to 2016, we find overarching highly positive returns for acquirers, targets and combined entities. With a differentiated analysis approach of categorizing events in specialization, diversification and R&D-driven acquisitions based on the acquirer and target's business model, we are able to assess intra-industry M&A success drivers holistically and from a completely new angle. Not only are we seeing specialization acquisitions from an acquirer perspective outperform the other two types by around 2%, but also targets in R&D-related acquisitions face an increase of roughly 50%, more than two times of the other groups' returns. Furthermore, the results highlight that acquirers earn the highest returns in asset deal transactions, while the sellers are worse off. Finally, we see the largest M&A wave in the industry ever since leads to positive and superior reactions of around 3%. In parallel, the tense market situation results in a paradigm shift not only for the affected M&A parties, but for the competitors as well. Where there was a parallel movement of the acquirers' and competitors' abnormal announcement returns in the early years of the millennium, there now is a shift in the opposite direction, meaning that good news for the acquirer now implies bad news for the competitor.

1. Introduction

The largest wave of mergers and acquisitions (M&A) within the pharmaceutical industry ever in the years 2013 to 2016 reached a total deal value of 832 billion USD. With a total M&A volume of approximately 2.7 trillion USD since 1985, roughly one third of the total transaction value has been realized only in those four years, putting the pharmaceutical industry among the most heavily consolidating sectors in the world. Drivers for the intense acquisition activity are some far-reaching challenges such as continuing patent expiries of global blockbuster drugs

(Sagonowsky 2017), a simultaneous slack in the industry wide R&D pipeline (DiMasi, Grabowski and Hansen 2016), increasing cost pressure due to government health reforms such as the growing importance of cost-effective substitute products (IMS 2015) or the emergence of innovative, though more complex biologics (Aitken and Kleinrock 2015; Aitken 2016). While these challenges are perceived rather homogeneously, the solution via M&A is discussed controversially.

Haucap, Rasch and Stiebale (2019) and Ornaghi (2009) analyze how M&A affects innovation of involved firms and report overall negative effects of mergers on innovation among pharmaceutical companies. However, while Ornaghi (2009) does not find a better merger performance along with higher levels of relatedness more recent studies come to an opposite insight with positive effects of relatedness on the success of mergers and alliances in the pharmaceutical industry (Distre and Rajagopalan 2012; Sears and Hoetker 2014). A similar shift can be observed in capital market valuation of acquisition activities. For a long time, it was largely undisputed that for a bidder an acquisition results in negative share price reactions, the target faces large positive stock returns while the reaction for the combined entity is neutral or slightly positive (e.g. Bruner 2002; Offenberg, Straska and Waller 2014; Xu 2017). But acquirer's returns in cross-industry M&A announcements significantly changed over the last years (Alexandridis, Antypas and Travlos 2017) and became on average significantly positive.

These findings give first motivation to reevaluate the success of M&A transactions in the pharmaceutical industry. Industry-specific empirical evidence so far offers mixed results (Ravenscraft and Long 2000; Higgins and Rodriguez 2006), and there is no comprehensive assessment how specialization and diversification activities differ in capital market perception. Furthermore, most studies only focus on acquisitions with public targets, leaving the impression that acquisitions generally follow the respective patterns. But only one third of all pharmaceutical transactions comply with this type of deal. The majority are acquisitions of private targets and asset deals.

We contribute to the literature technically as we extend the included transaction history of the pharmaceutical industry by the last M&A wave, covering the period from 2000-2016, and by three types of targets, namely listed firms, privately held companies and pure asset deals. This procedure results in a final sample of 886 transactions. From the research perspective, we offer new insight as we cluster acquisitions in the three groups of *Specialization*, *Diversification* and *R&D-Focus*. Therefore, acquirers and targets are assigned to one out of six categories, based on the individual business model the company primarily operates in. Given the combination of acquirer's and seller's category, we are able to assess transactions and the respective strategic focus thoroughly, allowing to derive deal type-specific success factors from a broad set of qualitative and quantitative variables. Finally, we provide a holistic evaluation for the whole pharmaceutical industry by analyzing the market reactions of competitors within the industry, too.

Our results highlight a set of novel key findings. First, we report significant positive stock returns at the announcement day for all affected parties. Second, we document clear differences between the various transaction types and respective M&A strategies. Besides the overall effect in terms of abnormal stock returns' height and direction, especially the relevant influencing factors of capital market reactions differ significantly. In a final step we are able to emphasize that market reaction paradigms fundamentally change over time and that this has not only consequences for the affected M&A parties, but also for the entire industry with its competitors as well.

The rest of the paper is organized as follows. Section 2 provides a short overview of the status quo of (pharmaceutical) M&A research. Section 3 describes the data collection process and research methodology. As the main part, section 4 lists all the empirical results covering various univariate, multivariate and propensity score matching analyses on multiple M&A dimensions from an acquirer, target, combined entity and competitor's perspective. Finally, Section 5 provides a summary and concludes the paper

2. Literature Review

Andrade and Stafford (2004) argue that acquisitions serve two primary roles, either as a chance for internal growth or capital increase, or in terms of market consolidation and the reduction of inefficiencies (Danzon, Epstein and Nicholson 2007). For the analysis of specialization or diversification as the superior strategy to long-term performance, it is rather undisputed consensus that a diversification on average destroys value. Although there are

positive effects such as risk mitigation, broader financing possibilities, tax advantages or reduced principal-agent problems, the negative effects such as increased coordination efforts, overinvestment and cross-subsidization of weak business units outweigh the benefits (e.g. Biggadike 1979; Lang and Stulz 1993; Berger and Ofek 1995; Scharfstein and Stein 2000). Similar to the general motives of M&A activities, the effort to further specialize or diversify is seen as a response to external industry specific shocks (Lamont and Polk 2002) while the dominant direction changes over time (e.g. Comment and Jarrell 1995).

The range of dedicated M&A studies within the pharmaceutical industry is rather limited and studies provide mixed results which partly deviate from the cross-industry average. Ravenscraft and Long (2000) analyze 65 US mergers from 1985 to 1996 after the *Hatch-Waxman Act in 1984* and report abnormal stock returns of 13.3% for target companies, -2.1% for acquirers and 0.6% for the combined entities. Higgins and Rodriguez (2006) investigate 160 acquisitions between 1994 and 2001 and find positive buyer returns of 3.9%. They also observe a much stronger positive impact if the buyer has previously collected detailed information about the target through alliances or cooperations. Danzon, Epstein and Nicholson (2007) analyze 383 transactions from 1988 to 2000 and look especially at differences and motives of small versus big pharmaceutical companies. Recent research with a focus on the pharmaceutical industry mainly concentrates on the detection of superior expansion strategies in terms of acquisitions versus alliances or in-licensing (e.g. Lungeanu, Stern and Zajac 2016). The main focus is on the pharmaceutical-specific R&D situation and the changing industry conditions of the recent years. Despite steadily rising R&D expenditures, companies are becoming less and less successful to reach market maturity of new and innovative drugs on their own, which is why many firms try to overcome this dilemma by focusing on one of the two expanding strategies to maintain their product pipeline (e.g. Banerjee and Siebert 2017-1 and 2017-2; Gou and Zhou 2016; Ornaghi 2009; Grabowski and Kyle 2008; Feyzrakhmanova und Gurdgiev 2015; Lakdawalla 2018; Garnier 2008; Barrow 2012). As a consequence, the strategies of big pharma are going to change in order to stay successful (Gleadle et al. 2014; Young 2014; Gautam und Xiaogang 2016). Phillips and Zhadnov (2013) show that the R&D intensity is directly linked with the M&A activity in the industry, as especially small companies invest more in times where a sale is easy. Furthermore, companies with a high R&D spent are lucrative targets (Lin and Wang 2016). However, these companies usually possess a strong bargaining position in acquisition negotiations resulting in high prices and respective premia (Upadhyay and Zeng 2017).

The transaction type where the acquirer only buys certain assets such as products, business units or market rights is quite common in the pharmaceutical industry. However, so far these specific asset deals are hardly included in empirical examinations, hence only evidence from cross-industry studies exists. From a buyer's perspective, asset deals offer the decisive advantage against complete takeovers that only dedicated areas will be acquired and have to be integrated into the existing company (Hanson and Song 2003 and 2006; Borisova, John and Salotti 2013; Clayton and Reisel 2013). Allegedly unimportant or inefficient areas as well as redundant administrative structures remain with the seller. The sale is most often triggered by the selling company, with the consequence that there is only one or just a few potential acquirers, decreasing the chance of an expensive competitive bidding (Sicherman and Pettway 1987; Sicherman and Pettway 1992). Finally, the seller remains as an independent company, which has, to some extent, further specialized as well. As a result, a seller's shareholder perspective is completely different compared to a complete acquisition. The wealth effects observed is empirical asset deal studies indicate that both the acquirer and the seller realize positive stock returns (Sicherman and Pettway 1987; Sicherman and Pettway 1992; Jory and Ngo 2015; Nguyen 2016).

To explain the competitors' share price reactions a broad set of models has been established, starting with the *Collusion Theory* in the early 1980s (Eckbo 1983 and 1985; Mitchell and Mulherin 1996), later followed by the *Acquisition Probability Hypothesis* (e.g. Song and Walking 2000), the *Productive Efficiency Hypothesis* (e.g. Fee and Thomas 2004; Shahrur 2005), *Buying Power and Purchasing Efficiencies/ Countervailing Power Hypothesis* (Fee and Thomas 2004) or the *Preemptive Merger Theory* (e.g. Fishman 1988; Fridolfsson and Stennek 2005; Molnár 2007). Unfortunately, none of these models can holistically explain an industry over longer time periods. Although there might be dominant patterns, it is likely that these patterns change over time if the overall market situation changes as well. Therefore, recent studies mainly focus on specific situations or areas (Dimopoulos and Sacchetto 2014; Uhlenbruck et. al. 2016; Filson, Olfati and Radoniqu 2015).

3. Data & Methodology

3.1. Sample Selection

This analysis differentiates between six groups, namely so-called *FIPCOs (Fully Integrated Pharmaceutical Companies), Biologics, Generics, Research and Development, MedTech* and *In Vitro / In Vivo Diagnostics*. A company is defined as a FIPCO if it is involved in various value adding activities from research to distribution of all kinds of different drugs, i.e. small molecules, biological substances or animal health and markets at least one authorized drug. As Biologics become more dominant in the human pharma sector (Aitken und Kleinrock 2016), there will be a separate group with companies which meet the same requirements as FIPCOs, but focus only on biological drugs. Although manufacturers of generic drugs are usually not involved in the area of drug research and development, they have a market share of more than 90%[1] for prescription medicines, frequently acquiring companies or dedicated portfolios, especially when they face the loss of patent protection. Companies in the area of research and development play an important role in drug discovery and are typically young and small firms, working on a handful of promising drug candidates. Especially for big organizations these companies play a key part in maintaining their drug development pipeline. The last two groups of *MedTech* and *Diagnostics* are not directly involved in the prescription medicine business, however their products are directly linked with the administration of those, hence they are regularly involved in M&A activities of big pharma companies. All other types of firms in the healthcare sector (e.g. healthcare provider, pharmacy chains or hospital provider) and pharmaceutical industry (e.g. pure OTC manufacturers, contract development and manufacturing organizations or chemical and API manufacturers) are out of scope. As companies regularly operate in more than one of the areas mentioned above, they are assigned to the group where they are doing most of their business. This type of company information was gathered via Thomson Reuters, Bloomberg and publicly available company profiles.

Given the wide range of different business models in the pharmaceutical industry, merely selecting the final sample only by the industry SIC code is too inaccurate. Therefore, as generally done by other studies as well (e.g. Guo and Zhou 2016; Banerjee and Siebert 2017-1), a stepwise filter approach was used in order to gather M&A announcement information on the types of companies described above. Transactions were taken from *Thomson Reuters*, where:

1) either the buyer or target has a *SIC Code* of 2833, 2834, 2835, 2836, 2899, 5122 or 0742[2]
2) the Thomson macro industry is *Healthcare* or *Materials* (excl. *Containers & Packaging*)
3) the transaction is completed and the deal value is at least 1 mil. USD
4) the share of the acquired company is above 50% after the transaction (If multiple acquisitions with the same target occur, only the first transaction with a share of more than 50% is considered.)
5) the acquisition was announced between 01.01.2000 and 31.12.2016.

This selection results in a baseline of 4,777 acquisitions with a cumulated deal value of 2.2 trillion USD. Next, all transactions were excluded where:

6) the deal purpose is clearly not pharma/ drug related (e.g. real estate, going private)
7) the deal value is below 50 mil USD
8) the company information is not available or the transaction cannot be unambiguously assigned to one ISIN (In this context, only those events were included, where the buyer comes from the EU, USA, Canada, Israel, Japan or Australia)

The final sample of 886 acquisitions with a cumulated deal value of 1.49 tril USD includes private target transactions (N = 320) and *Asset Deals* (N = 188), where the acquirer only buys dedicated business units, drugs, patents or brands of the selling company, which still exist after the transaction. Table 1 highlights the distribution

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[1] IMS Market Outlook 2015: The Role of Generic Medicines in Sustaining Healthcare Systems - http://www.apmgr.org/docs/IIHI_Generics_Healthcare_Brief.pdf
[2] 2833 – Medicinal Chemicals and Botanical Products; 2834 – Pharmaceutical Preparations; 2835 – In Vitro and In Vivo Diagnostic Substances; 2836 – Biological Products, Except Diagnostic Substances; 2899 – Chemicals and Chemical Preparations, Not Elsewhere Classified; 5122 – Drugs, Drug Proprietaries, and Druggists' Sundries; 0742 – Veterinary Services for Animal Specialties

of the transactions for each year. The continuous increase in terms of number and size of M&A transactions becomes obvious.

Table 1: Overview of number and value of pharma M&A events for each year from 2000 to 2016. Deal values in mil USD.

Year	Events	Buyers	Deal Value	Min	Max	Median	Average
2000	39	34	102,194.2	51.5	75,960.9	212.5	2,620.4
2001	34	30	48,663.6	65.0	16,900.0	272.5	1,431.3
2002	27	23	65,468.0	50.0	59,515.0	190.0	2,424.7
2003	36	26	17,618.4	54.2	3,400.9	217.5	489.4
2004	38	34	83,470.9	50.0	60,243.4	186.5	2,196.6
2005	51	35	38,608.7	50.0	7,366.9	273.0	757.0
2006	64	52	69,388.0	50.0	16,600.0	230.0	1,084.2
2007	52	47	68,724.5	56.0	14,554.6	268.6	1,321.6
2008	57	40	82,103.2	50.2	27,733.6	234.3	1,440.4
2009	58	44	150,655.2	54.5	67,285.7	401.3	2,597.5
2010	56	39	68,702.0	55.4	23,898.9	316.5	1,226.8
2011	62	48	73,018.2	56.0	20,097.8	305.0	1,177.7
2012	59	42	45,057.6	54.1	7,183.4	285.0	763.7
2013	51	41	73,544.8	78.0	15,501.4	402.6	1,442.1
2014	75	57	212,452.0	50.4	68,445.4	379.2	2,832.7
2015	71	54	170,217.3	50.0	38,750.5	445.0	2,397.4
2016	56	45	118,736.4	50.1	29,540.0	378.2	2,120.3
Total	**886**	**301**	**1,488,623.0**	**50.0**	**75,960.9**	**300.0**	**1,680.2**

Given the range of different business models within the pharmaceutical industry, a definition of a deal as a specialization in case of identical SIC codes of acquirer and target (e.g. Berger and Ofek 1995; Lamont and Polk 2002) would result in a classification where that nearly all transactions in the sample were specialization deals. Other studies especially with the focus on pharmaceuticals define similarity as the overlap of commonly cited patents (Schildt and Laamanen 2006), a diversification if non-prescription medicines are acquired or as the number of therapeutic areas a company is operating in (Banerjee and Siebert 2017-2).

As an acquisition can be a specialization in one dimension, while it is a clear diversification in another area, all of the clustering approaches mentioned above are either too broad or too narrow, which might yield in misleading results. To overcome this classification problem, all transactions will be clustered in three categories based on the above mentioned groups of different business models (*FIPCOs, Biologics, Generics, etc.*):

1) *Specialization:* In general, two kinds of transactions will be handled as specialization deals. First, all events where the acquirer and the target come from the same business model category, e.g. both are mainly engaged in the Generics business. Although it might be the case, that to some extent acquisitions mean a diversification (e.g. new region, new therapeutic area), an identical business model results in similar management capabilities, market expertise, understanding of competition and regulatory frameworks, resulting in a stronger focus of the existing setup. Second, all[3] asset deals will be handled as a specialization as well. The reason is that typically an asset deal represents a specialization for both, the acquirer and the seller, further focusing on their specific business models, even though they might be in a different business model category (e.g. in 2014, Mylan (Generics) bought the majority of Abbotts (FIPCO) generics business).

2) *Diversification:* Consequently, all transactions, where the acquirer and the target come from different business model categories, are considered as diversification deals.

3) *R&D Focus:* As an exception of diversification deals, transactions where the target is a R&D company are categorized separately. Firstly, the risk and return profile of these targets is quite different to established

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[3] Except for eight asset deals with a clear focus on R&D, hence they are considered in the third group.

companies, as there is a high chance, that the drug candidates will not reach market approval. Secondly, the research areas are usually to some extent similar to the ones of the acquirer, hence they would be somewhere in between a pure specialization and some kind of diversification.

3.2. Research Methodology

To measure the short-term capital markets evaluation to M&A announcements an event study approach is used to determine the cumulated average abnormal returns (CAR) of the acquirers' stocks around the event day. Following Campbell, Lo und MacKinlay (1997), a period of 252 trading days prior to the event window is fixed, and the event window covers 21 days with 10 days prior and subsequent to the announcement day. Stock returns are calculated by the market model approach with the industry specific *MSCI ACWI Pharmaceuticals & Biotechnology Index (Thomson Ticker: M2AFPB $)* as benchmark index. Robustness checks have been conducted with the Capital Asset Pricing Model, Scholes and Williams Model and the Fama and French 3-Factor Model as well as the MSCI World as a different benchmark, all leading to similar results.

In order to identify the main success drivers, a broad set of control variables is used to perform multiple univariate and multivariate regression analyses on the CAR. For each event, 26 variables are gathered which are either deal, acquirer or target-specific, focusing not only on quantitative accounting measures, but also on drug portfolio characteristics. As the sample not only includes exchange listed target companies most of the company specific financial data are not available for private companies and subsidiaries and most of the parameters focus on the transaction or the acquirer. Where possible, dummy variables are used to account for the fact whether the information for a target is available. Unless otherwise stated, the information is taken from *Thomson Reuters*. In case accounting information is not available for a specific period, the last available information is used. The following list provides an overview of the variables as well as descriptive statistics.

Variable	Description	Mean / Median N = 886	
Deal-specific variables:			
D-DV	*Deal Value* – Value of the transaction in USD. For handling reasons, the logarithm is used (e.g. Moeller, Schlingemann and Stulz 2005; Danzon, Epstein and Nicholson 2007).	2.57	2.48
D-2013+	*M&A Wave* – Dummy variable that has the value 1, if the transaction was during the last M&A wave in 2013 to 2016, 0 otherwise (e.g. Jensen 1993; Andrade and Stafford 2004).	0.29	/
D-MoPCO	*Method of Payment (Cash only)* – Dummy variable that has the value 1, if the transaction was purely cash financed, 0 otherwise (e.g. Myers and Majluf 1984; Eckbo, Giammarino and Heinkel 1990; Fuller, Netter and Stegemoller 2002).	0.58	/
D-NAT	*Cross Border* – Dummy variable that has the value 1, if the acquirer and target come from different countries, 0 otherwise (e.g Rossi and Volpin 2004; Erel, Liao and Weisbach 2012; Xie, Reddy and Liang 2017).	0.47	/
D-USA	*Acquirer from the US* – Dummy variable that has the value 1, if the acquirer comes from the US, 0 otherwise (e.g. Rossi and Volpin 2004; Moeller and Schlingemann 2005; Mateev and Andonov 2017).	0.62	/
D-SPEC	*Specialization* – Dummy variable that has the value 1, if the acquisition is clustered into group one, 0 otherwise (e.g. Berger and Ofek 1995).	0.41	/
D-DIV	*Diversification* – Dummy variable that has the value 1, if the acquisition is clustered into group two, 0 otherwise.	0.33	/

Acquirer-specific variables:

A-DV/MC	*Deal Value to Market Cap* – Ratio of the transaction value to the market cap of the acquirer one day prior to the announcement (e.g. Danzon, Epstein and Nicholson 2007; Alexandridis, Antypas and Travlos 2017).	23.7%	5.6%
A-EBITDA	*EBITDA Margin* – Ratio of EBITDA of the acquirer in USD to the sales of the acquirer in USD.	-20.0%	23.8%
A-R&D	*R&D Ratio* – Ratio of the acquirer's total R&D spend in USD to the sales in USD in the year prior to the announcement.	51.9%	13.0%
A-SALES	*Sales Development* – Sales growth rate from the year prior to the announcement to the year of the announcement (e.g. Higgins and Rodriguez 2006; Danzon, Epstein and Nicholson 2007).	26.7%	10.5%
A-RoE	*Return on Equity* – The return on equity ratio of the acquirer in the year prior to the announcement.	6.0%	13.1%
A-Tq	*Tobin's Q* – Ratio of the acquirer's market value in USD to the book value in USD (incl. liabilities) one month prior to the announcement (e.g. Higgins and Rodriguez 2006; Fischer 2017). Values are capped at +15 (see Danzon, Epstein and Nicholson 2007).	2.31	1.91
A-PtBR	*Price-to-Book Ratio* – Ratio of the acquirer's market value in USD to the book value in USD (excl. liabilities) one month prior to the announcement. Values are capped at +15.	3.72	2.88
A-PA	*Drug Portfolio Age* – Average age of the drug portfolio (active incredient) since market authorization via FDA and EMA (e.g. Danzon, Epstein and Nicholson 2007). Information taken from federal databases (FDA – Orange and Green Book[4]; EMA - centralized authorization procedure[5]). Maximum values are capped at 15. For companies without information, the value is 15 as well. Final age calculate via *MAX(age FDA, age EMA)*.	11.46	12.32
A-NM	*New Medicines* – Absolute number of newly authorized drugs (innovative as well as generic formulations) in the period of one year prior to the announcement (e.g. Guo and Zhou 2016; Banerjee and Siebert 2017-1). Again, data is collected via federal databases and calculated via *MAX(number FDA, number EMA)*.	3.48	1.00
A-CT$_P$	*Phase of Clinical Trials* – The average phase of the clinical trials in the period of one year prior to the announcement. Each phase has a score (see Guo and Zhou 2016) ranging from 0 to 7 (pre-clinical studies = 0; Phase I = 2; Phase II = 3; Phase III = 5 and Phase IV = 7). Again, data is collected from federal FDA[6] and EMA[7] databases. Final value is calculated via *MAX(phase FDA, phase EMA)*.	2.57	3.33
A-CT$_N$	*Number of Clinical Trials* – Absolute number of clinical trials in Phase I-IV in the period of one year prior to the event. Again, data is collected from the federal databases and the final value is calculated via *MAX(CT FDA, CT EMA)*.	34.10	2.00
A-M&A	*M&A Experience* – Dummy variable that has the value 1, if the acquirer has done more than 5 similar acquisitions since 1990, 0 otherwise (e.g. Fuller, Netter and Stegemoller 2002; Golubov, Yawson and Zhang 2015).	0.59	/
A-FIPCO	*Acquirer is FIPCO* – Dummy variable that has the value 1, if the acquirer is categorized as a FIPCO, 0 otherwise.	0.55	/

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[4] https://www.fda.gov/Drugs/InformationOnDrugs/ucm129662.htm
[5] https://mri.cts-mrp.eu/Human/Product/AdvancedSearch
[6] https://clinicaltrials.gov/
[7] https://www.clinicaltrialsregister.eu/ctr-search/search

A-GEN	*Acquirer is Generics* – Dummy variable that has the value 1, if the acquirer is categorized as a generics manufacturer, 0 otherwise.	0.19	/
Target-specific variables:			
T-NM	*New Medicines* – Same as *A-NM* only for the target company. For asset deals the respective information was customized.	0.29	0,00
T-CT$_P$	*Phase of Clinical Trials* – Same as *A-CT$_P$* only for the target company. For asset deals the respective information was customized.	1.11	0,00
T-CT$_N$	*Number of Clinical Trials* – Same as *A-CT$_N$* only for the target company. For asset deals the respective information was customized.	2.16	0,00
T-PRV	*Target is Private* – Dummy variable that has the value 1, if the target is a private company, 0 otherwise (e.g. Chang 1998; Fuller, Netter and Stegemoller 2002; Bargeron et al. 2008).	0.36	/
T-MV	*Market Value* – Dummy variable that has the value 1, if the (fair) value of the target is known, especially with regard to private companies and subsidiaries, 0 otherwise.	0.53	/

4. Results

4.1. Univariate Analyses

As a first step, we will focus on the overall results of the event study regarding the short-term reactions to a M&A announcement in the pharmaceutical industry, followed by a set of selected univariate analyses on some of the control variables mentioned earlier. The general discussion of the results will follow a two stage process. First, the results for the entire sample are presented, afterwards the three subsamples in terms of specialization, diversification and R&D-focus will be elaborated. Given the history of acquirer reactions to M&A announcements, irrespective of whether these studies are across industries (e.g. Kothari and Warner 2007) or pharma specific suggest that the overall returns are negative. On the other hand, significant differences in the outcome between the subgroups (e.g. Berger and Ofek 1995; Higgins and Rodriguez 2006) and in times of consolidation waves in the last couple of years (e.g. Alexandridis, Antypas and Travlos 2017) are likely.

Window	CAAR	P-Val	Neg.	Delta	P-Val
1) Specialization (N = 366)				*1) – 2)*	
[-5;5]	1.8%	*** | ***	43%	1.7%	** |
[0;1]	1.8%	*** | ***	39%	1.3%	** | *
[0;2]	2.3%	*** | ***	39%	1.7%	*** | **
2) Diversification (N = 293)				*2) – 3)*	
[-5;5]	0.1%		50%	0.1%	
[0;1]	0.6%	** | ***	42%	-0.2%	
[0;2]	0.6%	** | **	42%	0.3%	| *
3) R&D-Focus (N = 227)				*3) – 1)*	
[-5;5]	0.0%		48%	-1.7%	** | ***
[0;1]	0.7%	* |	42%	-1.1%	* | ***
[0;2]	0.3%		43%	-2.0%	*** | ***
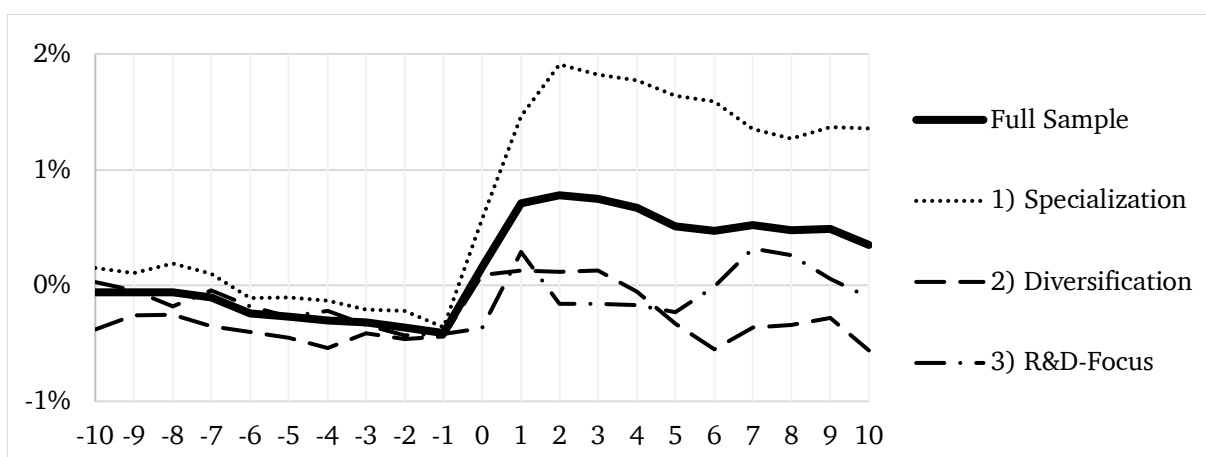
Window	CAAR	P-Val	Neg.
Full Sample (N = 886)			
[-10;10]	0.3%	** |	51%
[-5;5]	0.7%	*** | *	48%
[-1;1]	1.1%	*** | ***	43%
[0]	0.6%	*** | ***	47%
[0;1]	1.1%	*** | ***	42%
[0;2]	1.2%	*** | ***	44%
[0;5]	0.9%	*** | ***	47%
[0;10]	0.7%	*** |	48%

Figure 1: Cumulated abnormal returns of the acquirer for the full sample as well as the different subgroups. The first P-Value represents the parametric tests, the second the non-parametric tests. Significance levels are 10% (*), 5% (**) und 1% (***).

Figure 1 illustrates the results of the overall event study analysis for the full sample over the full event period as well as the three sub-groups for three selected event windows. Looking at the full sample, there is a highly significant abnormal return of a maximum and of 1.2%*** in the short period [0;2] after the acquisition announcement. At the same time, the share of negative announcement returns is at minimum around 42%, indicating that the majority of pharma M&A announcements imply a value increase for the acquirer. Taking a closer look at the differences of the three M&A strategies, the superiority of specialization transactions becomes obvious. With abnormal returns of 2.3%*** and a negative share of 39%, this type of transaction is the explicit driver of the overall positive M&A announcement returns. Both other groups, the diversification as well as the R&D-focus still have smaller, but partly insignificant returns of maximum 0.6%*** and 0.7%*. Consequently, the comparison of the sub-samples document significant higher returns of up to 2% of specialization deals compared to the other groups.

These initial results already highlight a clear discrepancy to the majority of past M&A research results, not only across industries, but particularly within pharma. First, the acquirer is not facing per se negative returns, second, there are important difference between transactions within an industry in terms of the M&A strategy. Although the well-known paradigm that from an investor perspective a specialization is advantageous over a diversifications holds true, R&D-driven acquisitions represent an exception to that habit. Even if they might be a specialization with regard to the future drug portfolio, investors are uncertain how to assess these deals, as there is a risk of not realizing potential sales or synergies.

The next section focuses on a set univariate analyses of some of the variables mentioned earlier. As these are regularly part of dedicated M&A research, the goal is to analyze if there is a significant influence within pharma as a whole, but in particular between the three different groups. Table 2 highlights the results of the univariate analyses for ten control variables for the event window [0;2]. Overall, most of the deal specific variables have a significant influence on the overall abnormal returns.

Within pharma, the last couple of years were marked by a set of patent expiries of large blockbuster drugs, while the development of new drugs became more expensive and, at the same time, less successful (DiMasi, Grabowski and Hansen 2016). Additionally, cost pressure due to governmental cost-cutting programs within the health sector as well as growing importance of innovative drugs like Biologics have put some of the big industry players under pressure. M&A waves are considered as an industry wide response to such external shocks (Jensen 1993; Andrade

and Stafford 2004), hence responses often differ within time and especially within the occurrence of a M&A wave (Cai, Song and Walking 2011; Fich, Nguyen and Officer 2018).

Table 2: Univariate analyses for ten of the 26 control variables for the event window [0;2]. Abnormal returns are given for the full sample (FS) as well as each of the three sub-groups 1) Specialization, 2) Diversification and 3) R&D-Focus. The first P-Value represents the parametric tests, the second the non-parametric tests. Significance levels are 10% (*), 5% (**) und 1% (***).

Variable	Condition	Group	A) Condition is True N	CAAR	P-Val		Neg.	B) Condition is False N	CAAR	P-Val		Neg.	A) – B) Delta	P-Val	
D-2013+	Year of the Transaction is 2013 or later.	FS	253	2.9%	***	***	38%	633	0.5%	***	***	46%	2.4%	***	***
		1)	97	4.0%	***	***	33%	269	1.7%	***	***	41%	2.3%	**	**
		2)	79	2.5%	**	***	37%	214	-0.2%			44%	2.7%	***	*
		3)	77	1.8%	**		47%	150	-0.6%			55%	2.4%	**	**
D-MoP$_{CO}$	The acquisition is purely cash-financed.	FS	513	1.6%	***	***	40%	373	0.7%	**	*	49%	0.9%	*	***
		1)	209	2.9%	***	***	35%	157	1.5%	***	***	45%	1.4%		**
		2)	166	1.0%	***	***	37%	127	0.0%			50%	1.0%		*
		3)	138	0.3%			50%	89	0.2%			55%	0.2%		
D-NAT	Acquirer and target are not from the same country.	FS	412	1.4%	***	***	41%	474	1.0%	***	**	46%	0.4%		
		1)	196	2.5%	***	***	35%	170	2.0%	***	***	44%	0.5%		
		2)	140	0.4%		**	44%	153	0.7%	*		41%	-0.3%		
		3)	76	0.2%			49%	151	0.3%			54%	-0.1%		
D-USA	Acquirer is from the USA.	FS	548	0.8%	***	**	47%	338	1.8%	***	***	39%	-1.0%	*	**
		1)	195	1.6%	***	***	45%	171	3.1%	***	***	32%	-1.5%	*	**
		2)	190	0.7%	**	**	42%	103	0.4%			44%	0.3%		
		3)	163	0.1%			54%	64	0.7%			47%	-0.6%		
A-DV/MC	Acquirer's ratio of deal value to market cap is greater than 20%.	FS	233	2.7%	***	*	43%	653	0.7%	***	***	44%	2.0%	***	**
		1)	120	4.8%	***	***	37%	246	1.1%	***	***	40%	3.7%	***	**
		2)	71	0.8%			48%	222	0.5%	**	***	41%	0.4%		
		3)	42	-0.1%			50%	185	0.3%			52%	-0.4%		
A-R&D	Acquirer's ratio of R&D spending to sales is less than 10%.	FS	372	2.1%	***	***	34%	514	0.5%	**		51%	1.6%	***	***
		1)	185	3.3%	***	***	30%	181	1.2%	**	*	48%	2.1%	**	***
		2)	151	0.9%	**	***	36%	142	0.2%			49%	0.7%		***
		3)	36	1.2%			42%	191	0.1%			54%	1.1%		*
A-SALES	Acquirer's sales growth rate is less than 7.5%.	FS	362	1.2%	***	***	46%	524	1.2%	***	***	42%	0.0%		
		1)	143	2.2%	***	***	46%	223	2.4%	***	***	35%	-0.2%		
		2)	114	0.7%			42%	179	0.4%	*	*	43%	0.3%		
		3)	105	0.4%			52%	122	0.1%			53%	0.3%		
A-Tq	Acquirer's Tobin's Q is less than 2.	FS	472	1.5%	***	***	42%	414	0.8%	***	***	45%	0.7%		
		1)	210	2.2%	***	***	42%	156	2.4%	***	***	35%	-0.2%		
		2)	160	1.1%	*	**	40%	133	-0.1%	*		45%	1.2%		
		3)	102	0.9%			45%	125	-0.2%			58%	1.1%		
A-NM	Acquirer launched new drugs in the year prior to the announcement.	FS	470	0.8%	***	***	45%	416	1.6%	***	***	42%	-0.8%		
		1)	189	1.7%	***	***	41%	177	2.9%	***	***	37%	-1.2%		*
		2)	157	0.7%	***	***	40%	136	0.4%			46%	0.3%		
		3)	124	-0.4%			57%	103	1.1%			47%	-1.5%		
T-PRV	Target is a private company.	FS	320	0.9%	**	**	44%	566	1.3%	***	***	43%	-0.4%		
		1)	64	2.4%	***	***	34%	302	2.3%	***	***	40%	0.1%		
		2)	136	0.7%			44%	157	0.4%	*	*	41%	0.3%		
		3)	120	0.4%			50%	107	0.1%			54%	0.3%		

During the last M&A wave in the years 2013 and thereafter we can see significantly higher abnormal returns compared to the years before. The difference are around 2.5%***, irrespective of looking at the full sample or individual groups. Regarding the question, whether an acquisition is purely cash-financed (Myers and Majluf 1984; Eckbo, Giammarino and Heinkel 1990), significant differences become obvious. While it is a clear advantage with 1.4%** and 1.0%* within group 1) and 2), R&D-related transactions are rather unaffected. However, this is mostly in line with Fuller, Netter and Stegemoller (2002), who show that returns are higher, if the acquisition of small and private firms are financed either with stock-only or with a mix of stock and cash. As companies within group 3) are mainly small, innovative firms, this rule seems to hold true for pharma companies as well. Another often analyzed characteristic relates to the question, whether an acquisition takes place within the same country of the acquirer (e.g. Rossi and Volpin 2004; Moeller and Schlingemann 2005; Bassen, Schiereck and Wübben 2010; Mateev and Andonov 2017; Xu 2017). Within pharma, this is rather irrelevant, as none of the

results differ significantly across the groups. Clearly, the pharma industry especially within the countries of the final sample is so much standardized and regulated via the FDA and EMA that local factors do not seem to play a significant role. On the other hand, the question if the acquirer is a US company has a major influence (Martynova and Renneboog 2006; Mateev and Andonov 2017), at least for the specialization group. With -1.5%**, US acquirers face significantly less abnormal returns than acquirers from other countries. Frequently, higher corporate governance standards and investor protection in the USA are considered as the main driver.

Looking at the acquirer-specific characteristics stated above, only a couple of variables seem to have relevant influence on the short-term stock reactions. In the past, high volume acquisitions were always accompanied by significant losses for the acquirer (e.g. Moeller, Schlingemann and Stulz 2005; Gorton, Kahl and Rosen 2009; Alexandridis et al. 2013). The reasons normally being that these "megamergers" were either too expensive or resulted in complex and costly transformations, slowing down business development, finally leading to large and rather slow acting corporates. In the last couple of years, however, large scale acquisitions resulted in large positive abnormal return for the acquirer (Alexandridis, Antypas and Travlos 2017), which also applies to the pharma industry, at least for the specialization transactions. With a difference on 3.7%***, megamergers outperform "normal" acquisitions by far. Of high importance is the fact, that this is only true for specialization deals, as diversification and R&D-transactions face only minor or even negative reactions around the announcement day, however both are not statistically significant. As the centerpiece of the pharmaceutical industry, R&D has always been one of the most popular fields of research around the success of pharma companies (e.g. DiMasi, Grabowski and Hansen 2016; Guo and Zhou 2016; Banerjee and Siebert 2017-1). No matter if you look at the full sample or the specific groups, the smaller the current R&D spent is, the better the market assess the an growth strategy. However, again the difference is the highest for the specialization group with 2.1%***, compared to 0.7%*** and 1.1%*** for the diversification and R&D group. Although, to some extent, the sales development is related to R&D expenditure, in general there is no significant influence on the abnormal returns (Higgins and Rodriguez 2006; Danzon, Epstein and Nicholson 2007), which is also true for the given sample. Like with sales development, Tobin's Q does not seem to have a significant influence either, albeit the overall importance of this ratio is undisputed within M&A research (e.g. Lang, Stulz and Walking 1989; Lang and Stulz 1994; Andrade und Stafford 2004; Danzon, Epstein and Nicholson 2007; Fischer 2017). Although there are quite large differences in some of the groups' abnormal returns, none of the results depicts statistically significant results. The last acquirer-specific variable accounts for the drug portfolio and innovation capabilities. The overall figures show, that the market rates an acquisition higher, if the acquirer has not launched at least one new drug in the year prior to the announcement. However, only within the specialization group the difference of -1.2%* is slightly significant, despite the fact that the reaction of -1.5% within the R&D-Focus group is even higher.

The last analyzed univariate regression variable tests, whether the ownership structure of the target has an effect. Recent studies show that the involvement of private companies, either as acquirers or targets, can have a significant influence on the M&A reactions (e.g. Chang 1998; Fuller, Netter and Stegemoller 2002; Bargeron et al. 2008). Nevertheless, the results indicate that ownership has no influence within the pharma industry. Given the intense regulation and extensively available market intelligence on market authorizations and drug sales, the overall market situation with all its players seems already quite transparent.

4.2. Multivariate Analyses

The following section will have a closer look at the multivariate regression analyses of the 26 control variables mentioned earlier. Table 3 highlights the results of the multivariate analyses for a selection of event windows for the full sample as well as the distinction between the three sub-groups. In addition, another set of calculations provides information on how the model varies in case of focusing on the three major acquirer groups (FIPCOs, Generics and Biologics). Looking at the overall model for the full sample in dependence of the event window, in total 19 out of the 26 variable show significant values, seven of which are relevant, irrespective which window is used. For the deal-specific variables the results are in line with the ones of the univariate analyses. Again, *D-2013+, D-MoPCO* and *D-USA* are highly significant with up to 2.66%***, 1.86%*** and -1.33%**. Apart from that, only the two variables *D-NAT* and *D-SPEC* with -1.01%* and 1.64%** are slightly significant for one window each. The latter one again underlines how crucial it is to acquire a similar business model.

For the acquirer-specific variables only four out of the 14 coefficients have significant values across all event windows. With up to 2.58%*** for *A-DV/MC*, transformations generally outperform smaller transactions within the pharmaceutical industry. The return on equity is negative and highly significant for all three timeframes. Values of a minimum of -2.29%*** imply that investors do not like expensive acquisitions, if the financial situation is already rather positive. Although the distinction if a company launched new drugs in the year prior to the announcement was mostly insignificant in the univariate analyses, there is an important negative influence up to -0.13%** per new drug launched. The last overarching significant variable is the distinction of generic drug manufacturers. On average, their acquisitions achieve a maximum of 4.14%*** higher returns in the days around the announcement day than the rest of other business models, however even FIPCOs seem to be good acquirers as well, as they achieve at least for the longer period a superior return of 1.49%* (*A-FIPCO*). Of the remaining acquirer-specific variables, another seven disclose significant values depending on the event window. Both *A-EBITDA* and *A-R&D* are highly significant for the longer timeframes and with 0.68%*** and 0.76%*** positive and similar to some degree. However, these two ratios are normally negatively correlated, meaning that for a concrete acquisition, both effects partly cancel each other out. Similar circumstances hold true for Tobin's Q (*A-Tq*) and the Price-to-Book ratio (*A-PtBR*). Usually these two ratios are positively correlated, meaning that for values of -0.51%** and 0.26%* the combined effect is rather attenuated. Furthermore, this fact also explains why the sign of both variables change between event windows. Although there were no significant differences for the sales development in the univariate analyses, there is a negative impact of -1.03%** for the longer time frame, showing that an acquisition is assed more pessimistic, if the outlook for a company is already promising without the acquisition. Finally the two research and drug portfolio-related factors portfolio age (*A-PA*) and the average clinical trial phase (*A-CTP*) have significant and positive values of 0.15%** and 0.29%** per full year of the average portfolio age and the average phase value of the clinical trial portfolio, meaning the more "outdated" the acquirer's drug portfolio is, the more the market values new revenue potential via external growth.

Table 2: Multivariate analyses for the 26 control variables. Results are given for the windows [-5;5], [0;1] and [0;2] for the full sample (FS), for the window [0;2] for each of the three sub-groups 1) Specialization, 2) Diversification and 3) R&D-Focus as well as for the three biggest acquirer groups A) FIPCOs, B) Generics and C) Biologics. Significance levels are 10% (*), 5% (**) und 1% (***). Variance Inflation Factors were all below 3.0, hence not separately stated. DW-Test = Durbin Watson-Test.

	Full Sample			(1)	(2)	(3)	(A)	(B)	(C)
Variable	**[-5;5]**	**[0;1]**	**[0;2]**	**[0;2]**	**[0;2]**	**[0;2]**	**[0;2]**	**[0;2]**	**[0;2]**
D-DV	-0.24%	-0.45%	-0.47%	0.27%	-1.60% *	-0.81%	-0.33%	1.23%	1.34%
D-2013+	2.05% ***	2.58% ***	2.66% ***	2.75% ***	2.41% **	3.43% ***	1.34% **	3.18% *	5.76% **
D-MoP$_{CO}$	1.66% **	1.81% ***	1.86% ***	2.48% ***	1.56% *	1.51%	1.39% **	2.19%	4.98% **
D-NAT	-0.48%	-1.01% *	-0,70%	-0.39%	-0.25%	-2.58% *	-0.46%	0.61%	-4.08% *
D-USA	-1.57% *	-1.33% **	-1.33% **	-2.14% **	0.18%	-3.42% **	-0.69%	-2.06%	-2.61%
D-SPEC	1.34%	0.84%	1.64% **	/	/	/	0.68%	4.14%	3.27%
D-DIV	0.06%	-0.32%	0.07%	/	/	/	-0.76%	1.07%	3.50%
A-DV/MC	1.37% **	1.80% ***	2.58% ***	5.83% ***	1.23% *	0.93%	2.11% ***	0.91%	2.07%
A-EBITDA	0.68% ***	0.14%	0.59% ***	0.72% ***	-0.30%	1.12% ***	0.44%	-6.41%	1.10%
A-R&D	0.76% ***	-0.15%	0.40% **	0.69% **	-0.61% *	1.21% ***	-0.13%	-9.60%	1.12% **
A-SALES	-1.03% **	-0.10%	-0.41%	-0.52%	-1.39% *	0.21%	0.94% **	3.41%	-1.59% **
A-RoE	-2.29% ***	-1.55% ***	-1.60% ***	-0.61%	-3.06% **	-2.69% ***	-1.01%	8.61%	-3.20% *
A-Tq	-0.51% **	0.47% ***	0.26%	0.73% *	0.21%	0.08%	0.16%	-0.57%	0.83% ***
A-PtBR	0.26% *	-0.16%	-0.06%	-0.03%	-0.27%	0.08%	-0.08%	-0.65%	0.02%
A-PA	0.09%	0.15% **	0.12% *	0.15%	0.12%	0.06%	0.22% **	0.07%	0.04%
A-NM	-0.13% **	-0.10% **	-0.11% **	-0.15% **	0.01%	-0.12%	-0.14% **	-0.16% *	-0.40%
A-CT$_P$	0.19%	0.25% *	0.29% **	0.65% **	0.11%	0.22%	0.13%	0.69% *	0.13%
A-CT$_N$	0.00%	0.00%	0.00%	-0.01%	0.01%	-0.01%	0.00%	0.00%	0.05%
A-M&A	-0.25%	-0.29%	-0.04%	-0.70%	-0.38%	0.74%	-0.36%	-2.11%	-2.07%
A-FIPCO	1.49% *	0.62%	0.56%	-0.10%	0.47%	1.19%	/	/	/
A-GEN	4.14% ***	2.88% ***	2.57% ***	2.65% *	2.34%	-0.01%	/	/	/
T-NM	0.28% **	0.13%	0.20% **	0.01%	0.88%	0.44% *	0.02%	-0.05%	0.63%
T-CT$_P$	-0.17%	0.04%	-0.04%	0.23%	-0.26%	0.01%	-0.01%	0.53%	-0.28%
T-CT$_N$	0.00%	-0.01%	-0.02%	-0.07%	0.00%	-0.10%	-0.01%	-0.04%	-0.16%
T-PRV	-0.12%	-0.05%	-0.32%	-0.31%	-0.87%	-0.65%	1.01%	-2.80%	1.22%
T-MV	-1.09%	-1.17% **	-1.21% **	-3.45% ***	-0.09%	-2.19% *	-0.57%	-2.56%	-6.44% ***
Intercept	-1.12%	-1.02%	-1.35%	-2.96%	2.32%	2-32%	-1.47%	0.09%	-4.73%
N	886	886	886	366	293	227	490	128	124
F-Statistic	3.50***	4.51***	4.85***	3.61***	1.78**	2.30***	2.19***	1.33	2.42***
R²	9.6%	12.0%	12.8%	20.3%	13.8%	21.5%	10.2%	23.6%	37.0%
Adjusted R²	6.8%	9.4%	10.2%	14.7%	6.1%	12.1%	5.5%	5.9%	21.8%
DW-Test	1.75	1.96	1.95	2.08	2.17	2.02	2.20	2.14	2.13

For the few target-specific variables, only *T-NM* and *T-MV* have a significant influence. This means, that for each newly launched drug of the target company, the abnormal returns at the announcement date are on average 0.28%** higher, highlighting the positive sales outlook. Additionally, if the market value of the target is transparent, the average abnormal returns fall by around -1.21%**, suggesting that if the market is aware of the fair value, deal prices and the respective premiums are considered as too high. All other variables do not seem to have a significant influence on the short-term abnormal returns of the acquiring firm.

Taking a closer look at the three M&A strategies 1) to 3), huge differences in the relevance of specific variables become obvious. Thus, depending on the group, not only the sign and value of individual variables are significant drivers, but also different variables in the each group are relevant. In total, only two out of all 24 variables have a significant influence for all three types of transactions. Again, across all groups, acquisitions in the last couple of years clearly outperformed earlier transactions with up to 3.43%***, however differences between diversification and R&D deals can be up to 1%. Secondly, the R&D expenditures have a major influence across the groups, although the way they are relevant is completely different. While a spending is highly positive for R&D-related acquisitions (1.21%***), the reaction is rather moderate for specialization deals (0.69%**), while it is negative in case of a diversification (-0.61%*).

For the rest of relevant variables, the importance differs significantly from group to group. For example, the absolute deal value has an influence of -1.60%*, but only if the acquisition is a diversification. On the other side, while acquirers from the US face high negative abnormal returns of -2.14%** and -3.42%** for specialization and R&D deals, a diversification is rather unaffected. Another example is the large difference between transactions which tend to be transformations. While the influence is 5.83%*** for specializations, R&D deals are again barely influenced by this circumstance. Comparable statements can be made for the majority of remaining significant variables (*D-MoP$_{CO}$, D-NAT, A-EBITDA, A-SALES, A-RoE, A-NM, A-CT$_P$, T-NM* and *T-MV*).

This pattern holds true when distinguishing between the different acquirer's business models as displayed in A) to C). Although due to the smaller sample sizes the overall explanatory power of the model increases to some extent, the number of relevant variables and respective significance levels decreases. Like before, the dummy variable which differentiates deals of the last M&A wave is the only significant factor across the three largest acquirer groups, however the spread further increases from 1.34%** for FIPCOs to 5.76%** for Biologics manufacturers. Although insignificant for Generics manufacturer deals, a similar difference between group A) and C) is valid for the method of payment with 1.39%** and 4.98%**. Apart from that, within in the deal-specific variables there is only one more minor significance for a negative impact of cross-border acquisitions within group C) of -4.08%*. For the acquirer and target-related variables this scattering of significance levels and magnitudes further intensifies. If a coefficient is significant at all, this is usually only the case for one of the three groups (i.e. *A-DV/MC, A-R&D, A-RoE, A-Tq, A-PA, A-CT$_P$* and *T-MV*). The exception to these are the sales development (*A-SALES*) and the acquirer's launch of new drugs in the year prior to the announcement (*A-NM*). However, the former factor already changes the sign between both groups. Taking the results of group A) to C) together, again we can see a clear necessity to have to differentiated view what type of company is doing what and that one pharmaceutical company cannot always be compared with another pharmaceutical company.

Taking together all the results of the univariate and multivariate analyses, a couple of key findings should be highlighted. Firstly, the fact that acquirers face negative abnormal returns during M&A announcements is not valid anymore, at least for the pharmaceutical industry. Taking into account the transactions of the largest industry consolidation wave ever, the investor reaction has significantly changed. Secondly, a clear differentiation of market participants, their respective business models and implicit capabilities is crucial to truly assess whether intra-industry transactions imply a stronger focus on a firm's existing business strategy or if they aim for adjacent or new markets via diversification, which need to go beyond standard industry classifications. Thirdly, not all deal, acquirer and target-related characteristics have the same influence for all types of transactions and business models. When assessing short-term abnormal returns to M&A announcements within the pharmaceutical industry, it is crucial to assess if the deal is either a specialization, diversification or research-driven.

4.3. Transaction Deep Dive – Asset Deals

The following sections will cover a set of deep dives on specific transactions types covering subgroups of the full sample mentioned earlier. As a first step, the focus will be on asset deals, as the implications for the acquirer and the selling company are quite different compared to "complete" acquisitions. The selling company continues to exist after the transaction, hence the consequences for the shareholders are by far not that severe. In parallel, the acquirer only buys certain assets, meaning that other potentially inefficient or redundant overhead functions remain with the seller. As a consequence, for both parties, this type of transaction is a kind of increased specialization, as the acquirers strengthen their business in the respective area and the seller in parallel releases previously bound capital and management resources. Consequently, not only the reaction of the acquirer is of high importance, but also the abnormal returns of the selling company are of a special interest. Out of the 886 transactions of the initial sample, 188 events represent an asset deal, where the acquirer only buys individual divisions, market authorizations or brands. Out of these 188 asset deals, 148 had a publicly listed selling company. Following the results of recent studies (Rosenfeld 1984; Sicherman and Pettway 1987 and 1992; Jory and Ngo 2015), in general slightly positive abnormal returns both for the acquirer and the seller are likely, however differences might occur, e.g. due to the performance prior to the transaction (Nguyen 2016).

Table 3: Comparison of cumulated abnormal returns for asset deals. Results for I) the acquirer (N = 188), II) the acquirer for all remaining "complete" acquisitions (N = 698), III) the acquirer for all complete specialization acquisitions (N = 186) and IV) the selling company in asset deal transactions (N = 144). Significance levels are 10% (*), 5% (**) und 1% (***).

Window	(I) CAAR	(I) P-Val	(I) Neg.	(II) CAAR	(II) P-Val	(II) Neg.	(III) CAAR	(III) P-Val	(III) Neg.	(IV) CAAR	(IV) P-Val	(IV) Neg.	(I)–(II) Delta	(I)–(II) P-Val	(I)–(III) Delta	(I)–(III) P-Val	(I)–(IV) Delta	(I)–(IV) P-Val
[-10;10]	2.0%	*** **	43%	-0.1%		52%	0.7%	*	48%	1.3%		46%	2.1%	* **	1.3%	*	0.7%	
[-5;5]	2.2%	*** ***	39%	0.3%	*	51%	1.4%	**	47%	1.5%		48%	1.9%	** ***	0.7%		0.7%	
[0]	1.0%	*** ***	43%	0.5%	*** ***	49%	0.8%	** *	48%	1.9%	*	47%	0.5%		0.2%		-0.9%	
[0;1]	2.0%	*** ***	34%	0.9%	*** ***	44%	1.7%	*** ***	43%	2.1%	* *	43%	1.1%	* ***	0.3%		-0.1%	**
[0;2]	2.5%	*** ***	37%	0.8%	*** ***	45%	2.0%	*** ***	41%	1.8%		45%	1.7%	*** ***	0.5%		0.7%	***
[0;5]	2.3%	*** ***	38%	0.5%	**	49%	1.7%	*** *	43%	1.4%		49%	1.8%	** ***	0.6%		0.9%	**
[0;10]	2.4%	*** ***	38%	0.3%	*	51%	1.1%	**	50%	1.3%		53%	2.1%	** ***	1.3%	**	1.1%	**

Table 4: Multivariate analyses for I) acquirers (N = 188) and IV) sellers (N = 144) in asset deal transactions. Significance levels are 10% (*), 5% (**) und 1% (***). Values displayed for the acquirer (A) and seller (S) perspective, i.e. for the regression on group I), the financial and portfolio information was taken for the acquirer, for the regression on group IV), the information was taken for the seller. Variables without any relevant information for asset deals (e.g. specialization deals or total number of clinical trials) were not considered.

Variable	(I) Acquirer in asset deals [-5;5]	(I) Acquirer [0;1]	(I) Acquirer [0;2]	Variable	(IV) Seller in asset deals [-5;5]	(IV) Seller [0;1]	(IV) Seller [0;2]
D-DV	-1.09%	0.32%	-0.30%	D-DV	-1.18%	0.57%	0.54%
D-2013$^+$	2.21%	0.84%	1.14%	D-2013$^+$	1.24%	0.48%	0.29%
D-MoP$_{CO}$	0.96%	2.10% ***	1.39%	D-MoP$_{CO}$	0.08%	0.67%	1.04%
D-NAT	-2.07%	-1.33%	-1.26%	D-NAT	-0.41%	-0.75%	-0.57%
A-USA	-4.24% ***	-2.68% ***	-3.27% ***	S-USA	-0.24%	-0.19%	-0.24%
A-DV/MC	7.80% ***	6.38% ***	9.23% ***	S-DV/MC	5.45% ***	2.60% *	2.50% *
A-EBITDA	1.67% ***	-0.16%	0.76% **	S-EBITDA	2.89% ***	0.75%	0.79%
A-R&D	1.93% ***	0.07%	1.04% ***	S-R&D	6.65% **	-0.25%	0.70%
A-SALES	-2.30% ***	0.76%	-0.07%	S-SALES	-0.35%	1.63%	1.37%
A-RoE	0.20%	3.21% **	2.63% *	S-RoE	-4.06% **	-6.02% ***	-5.27% ***
A-Tq	0.56%	0.18%	0.42%	S-Tq	2.75% ***	4.07% ***	4.12% ***
A-PtBR	0.12%	-0.05%	-0.09%	S-PtBR	-0.89% **	-1.14% ***	-1.25% ***
A-PA	0.42% *	0.16%	0.17%	S-PA	-0.03%	-0.38%	-0.36%
A-NM	-0.10%	-0.07%	-0.04%	/	/	/	/
A-M&A	-1.24%	-0.63%	-0.34%	/	/	/	/
A-FIPCO	1.31%	-1.05%	-1.25%	S-FIPCO	-3.43%	0.41%	0.85%
A-GEN	5.12% **	1.72%	0.50%	S-GEN	-0.12%	2.47%	2.58%
/	/	/	/	S-CAR$_{T-1}$	-0.65%	-0.82%	-0.52%
Intercept	-1.37%	-0.98%	0.58%	Intercept	0.42%	-1.67%	-2.55%
F-Statistic	3.88***	3.35***	3.98***	F-Statistic	6.81***	7.97***	7.57***
R²	27.9%	25.1%	28.5%	R²	45.4%	49.3%	48.0%
Adjusted R²	20.7%	17.6%	21.3%	Adjusted R²	38.8%	43.1%	41.7%
DW-Test	1.92	2.25	2.18	DW-Test	1.91	1.74	1.79

Table 4 shows the abnormal returns not only for the acquirer and the seller in asset deals, but also the results of all the remaining complete acquisitions as well as all the remaining specialization deals are illustrated. Looking at the acquirer side (I), there are highly significant abnormal returns of up to 2.5%***, while the share of negative transactions reduces to a minimum of 34%. This already indicated that investors generally appreciate the acquisition of dedicated assets and that they favor these types of transactions over complete acquisitions as illustrated earlier (figure 1 depicts that the average abnormal return for the full sample was around 1.2%***). This behavior also supported when looking at the reactions of the complete acquisitions II) and III) and the respective comparisons with group I). Although in complete acquisitions the acquirers still face significantly positive returns of maximum 0.9%*** for the full sample of complete transactions and 2.0%*** for complete specialization deals only, they are both significantly lower compared to asset deals. Especially in the longer periods following an announcement, for the window [0;10] the differences between group I) and II) as well as I) and III) are 2.1%*** and 1.3%**.

When taking a look on the sellers' side, their market reactions are quite positive for all event windows as well. The abnormal returns range from 1.3% in the longer periods up to 2.1%* in the days around the asset deal announcement. However, although the reactions are quite high, the decisive difference with the group of acquirers (I) is that returns are no longer significant. Only at the announcement day itself as well as during the window including the day after low significance levels are shown. In parallel, the share of negative events rises to 53% in the days following the announcement, although the returns are still 1.3%. These results imply that, compared to the acquirer, the sellers in asset deals face abnormal returns which are much more scattered, meaning that for some events the results are quite positive, while for others they are obviously negative. Again, this is additionally supported taking into account the return comparison results of I) and IV). First, only the event windows in the days after the announcement show significant levels. Second, only the non-parametric tests certify the relevant differences, again implying a greater scattering of results. Again, these results are quite a novelty, at least for the pharmaceutical industry. Not only enjoy the acquirers, on average, the highest positive returns but, at the same time, the sellers of these transactions are, in general, worse off.

The second step of the asset deal analyses takes a closer look on the coefficients influencing the abnormal returns for acquirers and sellers and addresses the question, whether these differ for both groups. Table 5 summarizes the results of the multivariate analyses for the acquirer (I) and the seller (IV) in asset deals for three event windows. The variable values are collected from the perspective of the acquirer for group (I) und from the seller for group (IV). As Nguyen (2016) points out the seller's abnormal returns decisively depend on the returns in the year prior to the announcement, another variable ($S\text{-}CAR_{T\text{-}1}$) will be included in the regression. For the acquirers, only two variables have a significant influence across all three windows, while seven others have an important influence only with respect to specific event periods. In accordance with the full sample, US acquirers face significantly negative returns compared to their international counterparts, where the reactions are much higher with up to -4.24%***. A similar pattern applies for the relative transaction volume. With 9.23%***, again the results are much higher compared to the full sample from table 3, highlighting that acquisitions are more positive, the higher the relative asset value is. Given the remaining deal-specific variables, only the payment method has an influence of around 2.10%*** for the short period around the announcement day. For the company-specific coefficients, mainly the information regarding the financial situation (*A-EBITDA, A-R&D, A-SALES* and *A-RoE*) is of importance, however with mixed results. Apart from that, only the two variables regarding portfolio age and whether a company is a Generics manufacturer are marginally significant for the longer event period, highlighting that an older drug portfolio and the focus on Generics result in better results.

Looking at the sellers in asset deals the results are quite different compared with those for the acquirers. None of the deal-specific variables have a relevant influence on the abnormal returns. Furthermore, in total four company-specific variables have a significant influence across all windows, two more coefficients become important for the longer event window. Like the acquirer the selling company enjoys a significantly higher return of up to 5.45%***, the higher the relative selling price of the assets is. Secondly, based on the return on equity, the better the financial situation is the worse the market reacts around the announcement. Unlike the acquirers, the valuation ratios Tobin's Q and the price-to-book ratio with a maximum of 4.12%*** and -1.25%*** now play a crucial role for the

abnormal returns around the announcement day. Although in reality they are positively correlated, the overall influence is quite intense, keeping in mind that these ratios are in absolute values. Apart from this, only the two coefficients *S-EBITDA* and *S-R&D* are significant in the longer event window. However, as normally these two values are negatively correlated, in reality the overall effect will be rather small. In summary, the results show that asset deals are a completely different type of transaction compared to complete acquisitions. Not only do acquirer face significantly higher returns compared to "normal" acquisitions, but the sellers, on average, are worse off. Furthermore, multivariate regression highlights that again, the set of relevant coefficients for both sides differs fundamentally.

To further increase the robustness of these results, the asset deal acquirers will be matched with comparable events from the set of complete acquisitions using a *Propensity Score Method (PSM)*, in order to make sure, that the significantly better returns of asset deals do not only occur because of severe differences in the values of the events' control variables. Using the method of Rosenbaum and Rubin (1983) and (1984) two matching algorithms (direct two neighbors and maximum distance of 0.05%) will be used to reduce the bias of each control variable (Caliendo und Kopeinig 2008; Stuart 2010).

Table 5: Propensity Score Matching for asset deal transactions. Comparison with complete acquisitions. First N-value represents the number of asset deals, the second one the number of complete acquisitions. ΔM as the difference in sample means. Values highlighted where the bias is below the critical 5% value. The first P-Value represents the parametric tests, the second the non-parametric tests. Significance levels are 10% (*), 5% (**) und 1% (***). Bias as the difference in sample means divided by the average standard deviation.

Variable	Full Sample N = 188/692			Direct two Neighbors N = 188/270			Max. Distance: 0.05% N = 149/275		
	ΔM	Bias	P-Val	ΔM	Bias	P-Val	ΔM	Bias	P-Val
D-DV	-0.22	35.9%	*** ***	-0.05	9.3%		-0.08	15.2%	**
D-2013⁺	-0.05	10.1%		-0.01	2.1%		-0.02	4.2%	
D-MoPco	-0.03	5.3%		-0.04	8.4%		-0.06	13.0%	
D-NAT	0.12	23.9%	*** **	0.01	2.8%		0.04	7.3%	
A-USA	-0.16	33.5%	*** ***	-0.04	8.0%		0.07	13.8%	
A-DV/MC	-8.1%	17.1%	* *	0.7%	2.2%		2.7%	8.2%	
A-EBITDA	16.9%	7.6%		7.5%	3.9%		-1.5%	0.7%	
A-R&D	-11.4%	5.2%	***	-10.3%	4.8%	**	0.5%	0.2%	**
A-SALES	5.6%	7.1%		4.0%	5.2%		3.1%	4.2%	
A-RoE	0.7%	1.1%		3.8%	7.7%		-1.1%	2.1%	
A-Tq	-0.33	22.5%	**	-0.05	4.0%		-0.07	5.0%	
A-PtBR	-0.49	17.4%	** *	-0.09	3.5%		-0.07	2.7%	
A-PA	0.38	10.7%		0.17	4.9%		0.33	9.1%	
A-NM	0.08	1.1%		-0.69	9.1%		-0.51	6.6%	
A-M&A	0.05	10.2%		0.00	0.7%		0.01	3.0%	
A-FIPCO	-0.09	17.6%	** *	-0.05	9.1%		-0.04	8.9%	
A-GEN	0.06	16.2%	**	0.00	0.3%		0.02	5.6%	
CAAR [0;2]	1.65%	21.9%	*** **	1.50%	21.2%	** ***	1.92%	25.4%	*** ***

Table 6 shows the results of the propensity score matching for asset deals. The first set shows the initial situation of the full sample, where clear differences in the means of the control variables for both groups become obvious. Only one variable has an initial bias of less than 5%. When matching the asset deals with the direct two neighbors of complete acquisitions, the size of the control group reduces to 270 complete acquisitions. As a result, the comparison of variable means highlights only one coefficient with minor significant differences (*A-R&D*). However, at the same time we are able to reduce the bias for ten of the 17 variables below the 5% threshold, while the remaining factors have a bias of less than 10%. Nonetheless, the difference in abnormal returns remains highly significant at 1.5%***, underlining the superiority of asset deals from an acquirer's perspective. The second matching procedure generally supports these results, however the outcome is slightly worse, not only due to the higher bias values and significance levels, but due to the fact that roughly 20% of asset deal events need to be excluded due to missing matching partners.

4.4. Target's Reaction to M&A Announcements

The following section is a deep dive into the market reactions of the acquired companies. Since asset deals were already discussed, they are excluded from further analysis. From the initial sample 279 transactions had publicly traded companies as takeover targets. In accordance to the results of past cross-industry and pharma-specific studies, significantly positive returns are likely (e.g. Bruner 2002; Ravenscraft and Long 2000), while again significant differences between the focus groups are likely, especially when focusing on R&D-driven acquisitions (e.g. Phillips and Zhadnov 2013; Upadhyay and Zeng 2017).
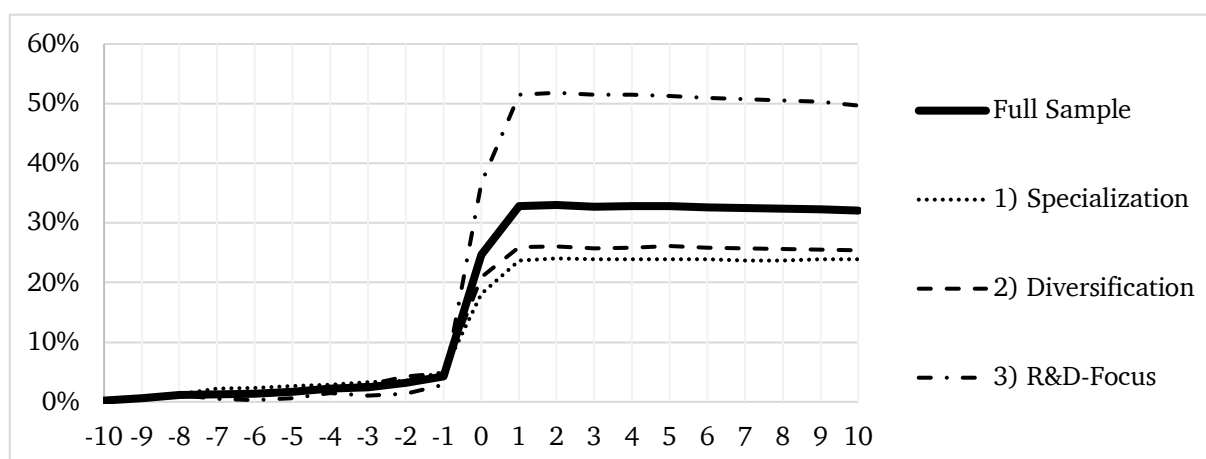
Window	CAAR	P-Val	Neg.
Full Sample (N = 279)			
[-10;10]	32.1%	*** ; ***	14%
[-5;5]	31.4%	*** ; ***	14%
[-1;1]	29.6%	*** ; ***	14%
[0]	20.4%	*** ; ***	21%
[0;1]	28.5%	*** ; ***	16%
[0;2]	28.7%	*** ; ***	14%
[0;5]	28.5%	*** ; ***	15%
[0;10]	27.8%	*** ; ***	17%

Window	CAAR	P-Val	Neg.	Delta	P-Val
1) Specialization (N = 88)				*1) – 2)*	
[-5;5]	21.5%	*** ; ***	15%	-3.1%	
[0;1]	18.7%	*** ; ***	21%	-2.4%	
[0;2]	19.0%	*** ; ***	17%	-2.2%	
2) Diversification (N = 109)				*2) – 3)*	
[-5;5]	24.6%	*** ; ***	18%	-26.4%	*** ; ***
[0;1]	21.1%	*** ; ***	17%	-27.6%	*** ; ***
[0;2]	21.2%	*** ; ***	16%	-27.8%	*** ; ***
3) R&D-Focus (N = 82)				*3) – 1)*	
[-5;5]	51.0%	*** ; ***	6%	29.5%	*** ; ***
[0;1]	48.7%	*** ; ***	10%	30.0%	*** ; ***
[0;2]	49.0%	*** ; ***	7%	30.0%	*** ; ***

Figure 2: Cumulated abnormal returns of the target for the full sample as well as the different subgroups. The first P-Value represents the parametric tests, the second the non-parametric tests. Significance levels are 10% (*), 5% (**) und 1% (***).

Figure 2 shows the abnormal returns of the M&A targets within the days around the announcement day. As expected the overall results are highly significant with on average positive reactions up to 32.1%*** for the full sample. Additionally the share of negative reactions drops to a minimum of 14%. The most striking result can be derived from comparing the different focus groups: Acquisitions which are R&D-driven result in abnormal target returns which are more than twice as high in comparison to the other two groups. With up to 51.0%*** and a share of negative reaction of a minimum of 6%, R&D-related deals clearly outperform specialization and diversifications deals which, on average, result in similar reactions of roughly around 20%***. Not only that these results certify some of the highest reactions in the pharmaceutical M&A research ever since, they also underline once more the fundamental importance of R&D in the context of takeovers, especially in industries where innovation is at the core of business activity.
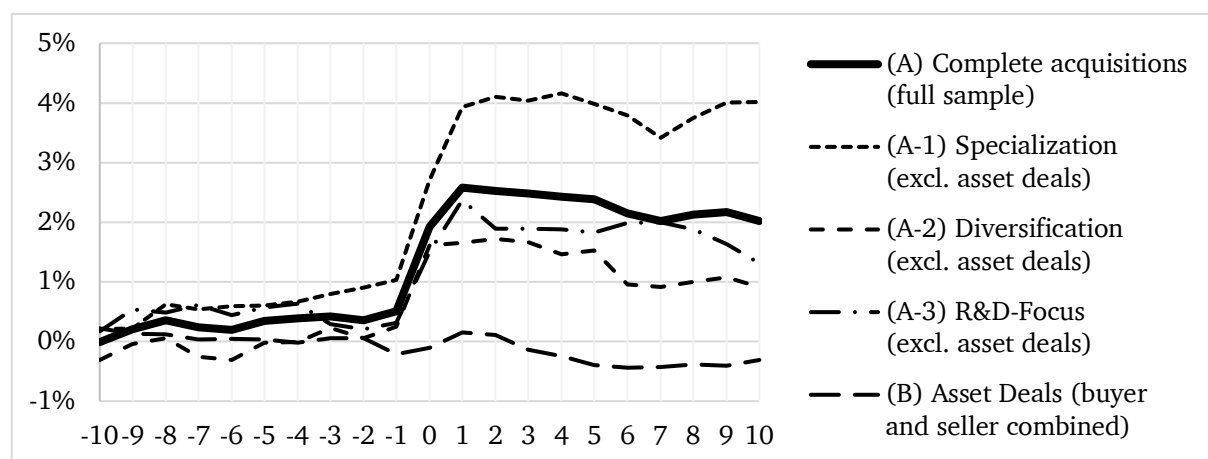
Although the overall market reactions are quite clear, relevant coefficients with an overarching significance are not available. Furthermore, for targets of transactions with a focus on diversification not one single variable is significant at all, resulting in an overall poor explanatory power. Consequently, as table 7 illustrates none of the control variables is relevant irrespective of the focus group. Additionally, the differences in direction in height between the groups are more drastic, compared to earlier acquirer-focused analyses. Transactions conducted in the years 2013 to 2015, for example, again led to much higher returns than those announced earlier, but only for the specialization deals. Diversification-driven acquisition on the other hand are rather unaffected. Similar results are valid for the acquirer and target-specific variables, i.e. the relative transaction volume is much more relevant for R&D-targets than for the other groups. Conversely, the same applies to for *T-SALES, T-CT$_P$* or *A-NM*. Finally, for the target of R&D-driven acquisitions it is particularly advantageous if the acquirer comes from the USA. With 35.8%* this variable has the strongest relevance of all. Furthermore potential R&D synergies are likely, as the total amount of clinical trials has a highly significant influence with 0.33%*** per clinical trial, again keeping in mind that the variable is based on absolute values. In summary we can see, that on one hand the returns for targets within the pharmaceutical industry are in general remarkably high, on the other hand the prediction power of the models is rather limited.

Table 6: Multivariate analysis for the target of complete acquisitions. Results for the window [0;2] for the full sample (FS) and for sub-groups 1) Specialization, 2) Diversification and 3) R&D-Focus. Significance levels are 10% (*), 5% (**) und 1% (***).

Variable	FS	(1)	(2)	(3)
D-DV	-4.54%	3.32%	0.20%	-8.52%
D-2013$^+$	9.19% *	10.90% *	0.74%	6.20%
D-MoP$_{CO}$	3.86%	-2.26%	4.73%	-3.21%
D-NAT	2.97%	3.64%	3.61%	23.20%
T-USA	0.38%	-2.27%	12.70%	-1.10%
T-DV/MC	6.64% *	6.29%	7.77%	22.50% **
T-EBITDA	-1.03%	-6.57% **	0.44%	-2.21%
T-R&D	1.80%	-2.93%	2.76%	0.49%
T-SALES	1.39%	12.90% ***	-2.25%	-0.71%
T-RoE	-4.07% *	1.20%	-8.15%	0.46%
T-Tq	0.92%	1.92%	1.48%	0.24%
T-PtBR	-0.67%	-0.84%	-1.82%	-0.44%
T-PA	1.06% *	-1.35%	-3.08%	-1.50%
T-NM	-0.20%	0.44%	0.52%	0.48%
T-CT$_P$	1.56%	2.48% **	-1.00%	-0.60%
T-CT$_N$	-0.23%	-0.25%	0.40%	0.70%
A-USA	10.90% **	14.10% **	-1.77%	35.80% *
A-DV/MC	-6.59%	-7.40%	-11.80%	-40.60%
A-EBITDA	1.54%	3.97%	2.18%	-6.34%
A-R&D	-2.14%	-0.45%	-1.36%	-20.50%
A-SALES	5.08%	5.14%	4.68%	5.50%
A-RoE	-0.99%	-1.56%	-11.10%	-7.72%
A-Tq	-0.63%	0.79%	-0.13%	3.97%
A-PtBR	-0.46%	-0.35%	-0.28%	-3.00%
A-PA	0.42%	0.52%	-0.47%	-0.21%
A-NM	-0.30%	1.18% *	0.50%	0.81%
A-CT$_P$	0.52%	-1.06%	2.02%	3.26%
A-CT$_N$	0.14% ***	0.04%	0.03%	0.33% ***
Intercept	-6.53%	-31.80% *	-8.36%	-22.70%
N	279	88	109	82
F-Statistic	4.33***	3.44***	1.33	1.51*
R²	32.7%	62.0%	31.8%	44.4%
Adjusted R²	25.1%	43.9%	8.0%	15.0%
DW-Test	1.83	2.06	1.27	1.52

4.5. Combined Industry Returns

One of the last open topics of the analysis of short-term announcement effects is the question what the reaction of the combined entity is. Normally the acquirer is multiple times bigger than the target, with the consequence that, e.g. even with the highly positive returns of the target company, the overall wealth effect can be negative due to worse reactions on the acquirer's side. However, recent studies outline that the combined effect is normally positive on average (Bruner 2002; Offenberg, Straska and Waller 2014; Xu 2017).

Window	CAAR	P-Val	Neg.	Delta	P-Val
(A-1) Specialization (N = 88)				(A-1) – (A-2)	
[-5;5]	3.4%	*** ***	32%	1.5%	
[0;1]	2.9%	*** ***	31%	1.5%	
[0;2]	3.1%	*** ***	28%	1.6%	*
(A-2) Diversification (N = 109)				(A-2) – (A-3)	
[-5;5]	1.9%	*** ***	37%	0.5%	
[0;1]	1.4%	*** ***	28%	-0.7%	
[0;2]	1.5%	*** ***	28%	-0.1%	
(A-3) R&D-Focus (N = 82)				(A-3) – (A-1)	
[-5;5]	1.4%	*	48%	-2.0%	* **
[0;1]	2.1%	*** ***	39%	-0.8%	
[0;2]	1.6%	*** *	44%	-1.5%	*

Window	CAAR	P-Val	Neg.	Delta	P-Val
(A) Complete acquisitions (N = 279)				(A) – (B)	
[-5;5]	2.2%	*** ***	38%	2.6%	*** ***
[0]	1.4%	*** ***	36%	1.3%	*** **
[0;1]	2.1%	*** ***	32%	1.7%	*** ***
[0;2]	2.0%	*** ***	33%	1.7%	*** ***
[0;10]	1.5%	*** ***	43%	1.6%	*** ***
(B) Asset deals (N = 148)					
[-5;5]	-0.4%		45%		
[0]	0.1%		49%		
[0;1]	0.4%	** **	45%		
[0;2]	0.3%	*	44%		
[0;10]	-0.1%		51%		

Figure 3: Cumulated abnormal returns of the combined entity for the full sample as well as the different subgroups of complete acquisitions. Combined returns based on the sum of the market cap weighted abnormal returns. For asset deal transactions buyer and seller returns are combined, however both companies of course stay separate firms after the transactions. The first P-Value represents the parametric tests, the second the non-parametric tests. Significance levels are 10% (*), 5% (**) und 1% (***).

Figure 3 illustrates the abnormal returns for the combined returns for the acquisitions with publicly listed targets. When looking at the full sample, in line with recent studies the returns are positive and highly significant with up to 2.2%***. However, keeping in mind that the targets reactions were between 20% and 50%, the combined returns are rather small. With a negative share of a minimum of 32%, two out of three acquisitions are value enhancing from an industry perspective, only one out of three is value decreasing. Taking a look at the three subgroups the combined returns are positive and highly significant for all three types of transactions. Although the R&D targets had by far the highest returns, still the relative size is not big enough to outperform the other two groups. With up

to 2.1%*** they are on a similar level as the diversification deals with 1.9%***. As before, in the "acquirers only" case, specialization acquisitions are once more the group with the highest returns of 3.4%***. Another important finding is that asset deals, in contrast to complete acquisitions, do not create value from a macroeconomic perspective, at least on average. Although both, the acquirer and seller generally face positive returns as seen before, potential gains of one side regularly balance out the losses on the side of the counterpart.

As a consequence this implies that from a holistic perspective within complete acquisitions, normally the target company is the winning part which is responsible for the increase of the capital stock. For asset deals however it is the other way around, meaning that the acquirer is the alleged beneficiary. Table 8 supports this as it shows the average and median of the weighted return shares of the above listed groups. Irrespective of the transaction types, within the group of complete acquisitions the target bears the major stake of the positive returns. Most interestingly, the average and median of specialization target's share is the highest with 2.8% and 1.6% of all groups, even though returns for these returns were the lowest of all target companies. At the same time, the acquirers in R&D-driven transactions have an average and median return which is with -0.7% and -0.6% clearly negative. In contrast, the situation for asset deals is the opposite. While the median for the acquiring and selling company is with 0.3% and 0.1% nearly the same, the difference of the average is 2.3% in favor of the acquirer, meaning that at least for some buyers the market highly welcomes the asset swap.

Table 7:   Average and median of weighted return shares for complete acquisitions and asset deals.

CAARs [0;2]	Acquirer	Target
(A) Complete acquisitions (N = 279)		
Average	0.2%	2.2%
Median	0.0%	1.0%
(A-1) Specialization (N = 88)		
Average	0.3%	2.8%
Median	0.2%	1.6%
(A-2) Diversification (N = 109)		
Average	-0.2%	1.7%
Median	0.4%	0.5%
(A-3) R&D-Focus (N = 82)		
Average	-0.7%	2.3%
Median	-0.6%	1.2%
(B) Asset deals (N = 148)		
Average	2.3%	0.0%
Median	0.3%	0.1%

4.6. The Influence of Merger Waves and Competitor's Reaction

One of the most interesting findings of the analyses carried out so far is the fact that acquisitions in the last couple of years significantly outperform the deals in the early years of this century. Contrary to previous studies (Alexandridis, Antypas and Travlos 2017; Li and Tong 2018) this anomaly is not only limited to public deals, but retains valid for all types of transactions, for both, acquirers and targets. Consequently an industry wide phenomena has to be the relevant driver as given by the biggest M&A wave ever since as the answer to an industry-wide tense market situation. In case that there is a paradigm shift of investor reactions to M&A announcements during tense consolidation waves (e.g. Cai, Song and Walking 2011; Fich, Nguyen and Officer 2018), this would directly imply a changed reaction of market competitors as well.

Table 8: Propensity Score Matching for transactions of the last M&A wave in the years 2013-2016 excluding asset deals. First N-value represents the number of "on-wave" deals, the second one the transactions in the years 2000-2012. ΔM as the difference in sample means. Values highlighted where the bias is below 5%. The first P-Value

represents the parametric tests, the second the non-parametric tests. Significance levels are 10% (*), 5% (**) und 1% (***).

Acquirer's CAARs	Full Sample N = 206/492			Direct Neighbor N = 206/206			Max. Distance: 0.125% N = 142/290		
Variable	ΔM	Bias	P-Val	ΔM	Bias	P-Val	ΔM	Bias	P-Val
D-DV	0.16	24.2%	*** ***	-0.03	4.8%		0.03	5.1%	**
D-MoP$_{CO}$	-0.04	8.9%		-0.04	7.8%		-0.03	5.2%	
D-NAT	0.06	12.9%		-0.01	2.9%		0.00	0.5%	
D-USA	0.03	6.5%		0.02	5.2%		0.03	5.7%	
D-SPEC	-0.03	7.8%		0.00	1.1%		0.01	1.2%	
D-DIV	-0.05	10.6%		-0.04	8.0%		-0.02	4.3%	
A-DV/MC	8.8%	11.6%	**	-1.5%	1.9%		3.8%	5.2%	
A-EBITDA	-47.9%	16.2%	***	-42.0%	14.1%	**	-0.7%	0.4%	
A-R&D	19.7%	7.7%		21.0%	8.1%		-3.7%	2.1%	
A-SALES	1.0%	1.2%	*	1.7%	2.1%		-3.8%	5.8%	*
A-RoE	-10.3%	16.7%	* ***	-2.3%	3.7%	***	-14.0%	23.7%	*** ***
A-Tq	-0.37	20.9%	*** ***	-0.17	9.7%		-0.17	9.4%	
A-PtBR	0.24	7.5%		0.17	5.3%		-0.20	8.1%	
A-PA	0.73	22.4%	**	0.25	7.8%		0.48	14.9%	
A-NM	0.98	10.9%	*	0.20	2.2%		0.36	4.2%	
A-M&A	-0.05	9.8%		-0.05	9.7%		-0.04	8.1%	
A-CT$_P$	0.42	21.6%	** *	-0.06	3.2%		0.45	22.7%	**
A-CT$_N$	-8.20	13.8%		-0.43	0.7%		-0.89	1.4%	*
A-FIPCO	-0.01	1.0%		0.00	0.0%		-0.02	3.9%	
A-GEN	0.03	7.4%		0.00	1.4%		0.02	4.7%	
T-NM	-0.27	30.7%		0.01	1.1%		0.07	6.7%	
T-CT$_P$	0.17	7.7%		-0.10	4.5%		-0.03	1.6%	
T-CT$_N$	1.17	9.5%		0.42	3.4%		0.87	7.0%	
T-PRV	0.06	12.2%		0.01	1.9%		0.03	6.2%	
T-MV	-0.05	10.4%		-0.01	0.3%		-0.02	4.5%	
CAAR [0;2]	2.8%	30.1%	*** ***	2.6%	28.3%	** ***	3.8%	39.9%	*** ***

To answer this the first step is to validate that recent acquisitions really outperform earlier ones. By applying the PSM method, table 9 underlines the superiority of deals in the years 2013 to 2016 compared to those of the years 2000 to 2012. Although it is not possible to completely prevent an increased bias for all 25 coefficients, the direct neighbor method manages to reduce the bias of 15 variables below 5% and for only one factor (*A-EBITDA*) above 10%. Like before, using a maximum distance results in the exclusion of a high number of events. Nevertheless, abnormal returns of the acquirers significantly differ with up to 2.6%*** and 3.8%***.

The next step is to define who are the direct competitors of a company. Using the company profile methodology (FIPCOs, Biologics, Generics, etc.), we define the competitors' reaction as the sum of market value weighted abnormal returns of all companies of the same class at the announcement day. Finally we can use these competitor returns to assess if market reactions have changed in time. As the main questions is how the competition reacts to generally positive and negative events, the focus will be on both, the top and flop 50 acquirer returns in each period. Table 10 summarizes the competitor returns for the events with the highest and lowest acquirer abnormal returns in the two periods 2000 to 2012 and 2013 to 2016.

Although significance levels are rather weak, a clear pattern together with a paradigm shift over time becomes obvious. In the early years of this century, there was a clear parallel movement of the competitors with the acquirer. For positive acquirer returns, competitors faced as well an increase of on average up to 1.66%** in the days around the announcement with a share of negative returns of a minimum of 36%. At the same time, for negative acquirer returns the competition lost around -1.51%* as well with a negative share of 60%. Since 2013 the reaction patterns changed, meaning that positive acquirer returns result in less positive returns of the competitors, illustrating that in times of a tense market situation, good news for one company worsens the situations of the others. Again, the same applies to negative acquirer returns, as the competitor returns are less negative in the last couple of years. The comparison of the means over time also highlights the significant changes in the reactions. Taken everything together it becomes obvious that, like Wann and Lamb (2016) said, good news in bad times are worth more than

good news in good times and that this also directly influences other market participants and result in an industry-wide shift of announcement reaction paradigms.

Table 9: Weighted abnormal competitor returns for the top and flop 50 acquirer reactions in the two periods 2000-2012 and 2013-2016. The first P-Value represents the parametric tests, the second the non-parametric tests. Significance levels are 10% (*), 5% (**) und 1% (***).

Window	CAAR	P-Val	Neg.	CAAR	P-Val	Neg.	Delta	P-Val
	(A-I) Top 50 deals since 2013			(A-II) Top 50 deals before 2013			(A-I) – (A-II)	
[-5;5]	0.06%		44%	1.66%	** *	40%	-1.60%	*
[0;2]	0.41%	*	36%	0.33%		36%	0.08%	
[0;5]	0.17%		42%	0.40%		46%	-0.23%	
	(B-I) Flop 50 deals since 2013			(B-II) Flop 50 deals before 2013			(B-I) – (B-II)	
[-5;5]	-0.11%		44%	-1.45%		48%	1.34%	
[0;2]	0.03%		42%	-0.67%	*	56%	0.70%	
[0;5]	-0.12%		54%	-1.51%	*	60%	1.39%	*

5. Conclusion

Through mergers and acquisitions in the last couple of years, the pharmaceutical industry has changed like never before. In order to keep pace with the dynamically changing industry due to continuing patent expiries of global blockbuster drugs, a slack in the industrywide R&D pipeline or an increasing cost pressure due to government health reforms such as the growing importance of cost-effective substitute products, the largest M&A wave ever since took place in the years 2013 to 2016. With our differentiated analysis approach of categorizing the events based on the acquirer's and target's business model in specialization, diversification and R&D-driven acquisitions, we were able to put the intra-industry M&A success factors in a new light.

The results of past M&A studies showed that acquirers faced negative returns at the acquisition announcement, resulting in significant losses. This rule no longer applies. As the first pharma-specific M&A study involving events in 2013 to 2016, it becomes obvious that the shareholder's reaction has changed. Taking together 886 acquisitions of the years 2000 to 2016 we find overarching acquirer returns of 1.2%, while there is clear outperformance of specialization deals with 2.3% in contrast to a diversification and R&D-driven acquisitions with 0.6% and 0.7%. The set of 26 deal, acquirer and target-specific qualitative and quantitative variables which were used for univariate and multivariate analyses highlighted that 19 had an overarching significant influence on the acquirer returns. The differentiated analyses outlined that, although the overall tendency for each variable is rather similar across the subgroups, significant differences between business models and M&A strategies exist, e.g. the relative transaction volume (*A-DV/MC*) for specialization deals is 5.8% vs. 0.9% for R&D acquisitions.

As a second step we showed that specific transaction types have a major impact on who is gaining abnormal return at all and to what extent. Supported by additional propensity score matching tests to increase the respective robustness, asset deal transactions with returns up to 2.5% clearly outperform complete acquisitions, not only for the full sample, but even compared to other specialization deals from an acquirer perspective. In parallel, the assessment of the selling company's coefficients revealed that there are clear differences with regards to the relevant value drivers. While the financial ratios are crucial for the acquirer (*A-DV/MC, A-EBITDA, A-R&D* and *A-SALES)*, the seller's reaction is clearly driven by the company valuation ratios like *Tobin's Q, Price-to-Book Ratio* or the *Return on Equity* (*S-Tq, S-PtBR, S-RoE*).

The separate analysis of pure public acquisitions documented some of the highest target's returns given the past M&A literature. Although the overall abnormal return was on average roughly 30%, again there are major differences between the three subgroups. With roughly 50%, targets in R&D-related acquisitions gain more than twice as much of the relative value compared to the specialization and diversification targets with roughly 20%. Despite the clear results for the short-term market reaction, the multivariate models emphasized that none of the variables had a significant influence across the groups. However, again we see major differences in terms of

direction and magnitude for individual coefficients, e.g. if the acquiring company comes from the USA, the target's reaction is on average 35.8% higher for R&D targets than for diversification targets with -1.8%. The subsequent analysis auf the combined returns for both complete acquisitions as well as asset deals revealed that, although asset deals imply on overage the highest abnormal acquirer returns, the overall macroeconomic effect from buyer and seller combined equals each other out, meaning these deals appear value-neutral. In contrast, the complete acquisitions with up to 2.2% are in total value-enhancing, irrespective of the subgroup. However, again we see significant differences between the three acquisitions strategies. Although R&D targets had the highest returns, the combined effect of specialization transaction is by far the greatest compared to the other two types (3.4% vs. 1.9% and 2.1%).

Finally, we documented a clear paradigm shift of changed market reactions over time. Looking at the last M&A wave in the years from 2013 to 2016, we see a clear increase in abnormal returns of up to 2.4% compared to the years 2000 to 2012, further supported by additional Propensity Score Matching analyses. Due to the fact that this phenomena exists irrespectively of the transaction type, subgroup of company perspective, the overall industry situation seems to be responsible, which then has a direct influence not only to the affected M&A parties but as well to the competitors and the entire market. The final comparison of the market value-weighted competitor returns highlighted that besides the acquirer and the target company, the competitors face changed reactions too. Where there was a parallel movement of the acquirers' and competitors' abnormal announcement returns in the early years of the millennium, there is a shift towards the opposite direction, meaning that good news for the acquirer, now rather implies bad news for the competitors.

In summary, the study provides a new view at the M&A landscape in the pharmaceutical industry, while the differentiated transaction type approach can be easily extended to other industries as well. On one hand, the holistic view on the entire M&A landscape refutes the wide-spread paradigm of per se negative acquirer's reactions. Furthermore, the differentiated clustering in terms of business models and specialization strategies allows to highlight which takeover stra-tegies and influencing factors generally lead to superior short-term results amongst each other, finally emphasizing the criticality of a differentiated assessment of intra-industry takeovers.

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The Effect of Communication on Careers in Mediating by Leader Member Exchange with Political Skills as a Moderating Variable

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Abstract

This study analyzed the effect of communication on a career mediated by the leader member exchange with Political Skill as a moderating variable. The sampling method used in this study is a saturated sample that was distributed to all employees and lecturers at one of the University in Jakarta, with a population of 149 people. By distributing questionnaires to as many as the population within 2 weeks and the questionnaires that were successfully answered were 97 questionnaires via google form. Data analysis method in this study uses Partial Least Square with the help of Smart PLS software. The results of this study indicate: H1 Communication on career with a significant level of 0.002, H2 The quality of leader member exchange (LMX) affects career by 0,000, while H3 Communication has no effect on careers mediated by the quality of leader member exchange by 0.582, H4 The quality of leader member exchange has no effect on careers by 0.730 and H5 Quality superior-subordinate relations do not affect the career moderated by political expertise by 0.396.

Keywords: Career, Communication, Leader Member Exchange, Political Skill

1. Introduction

Human resources are the company's most important assets because of their role as subjects of implementing policies and operational activities of the company. Today, the latest developments see employees not as mere resources, but rather in the form of capital or assets for institutions or organizations. Therefore, the resources owned by the company such as capital, methods and machinery cannot provide optimum results if it is not supported by human resources that have optimum performance. For this reason, employee capabilities must be empowered through training, education and development. Human resource management can be interpreted as the utilization of human resources in the organization, which is carried out through the functions of human resource planning, recruitment and selection, human resource development, career planning and development, compensation and welfare, work safety and health, and industrial relations (Marwansyah, 2012).

Career in an organization is very important. Every employee who works in an organization would want an increase in his career. Developing careers are often associated with the future of employees, although they do not guarantee success. Basically every employee working in an organization or company carries different values and motivations. As for one of the motivations that shape their desires and ambitions to achieve success at work is a career. As (Mangkunegara, 2013) stated, a career is someone who wants to work in the organization where he works for a long time until retirement age. Likewise, (Mathis and Jackson, 2006) also stated that a career is a series of positions related to work that a person occupies throughout his life.

While career development according to (Flippo, 2010) can be interpreted as a series of work activities that are fragmented but still constitute or have a mutually complementary, sustainable relationship and give meaning to one's life. Career development is an employee activity that helps employees plan their future careers in the company so that the company and the employees concerned can develop themselves to the fullest. The aim of all career development programs is to match employee needs and goals with career opportunities available at the company now and in the future (Dubrin, 2005). The establishment of a well-designed career development system will help employees determine their own career needs and match employee needs with company goals (Rivai, 2004). Career development tools include skills, education and experience and behavior modification and improvement techniques, which provide added value so that one can work better. With career development, it is expected that every company leader can provide opportunities for employees in developing careers. Of course this career development needs the support of various factors (Marwansyah, 2012).

The power of effective communication is indeed extraordinary. Every company definitely needs effective communication so that all employees can work together towards the same goal. Apart from that effective communication is very closely related to career development. Sometimes not everyone can communicate effectively so that it has adverse effects, especially when it can dramatically affect a career. Communication is defined as the process of transferring information, ideas, understanding from one person to another in the hope that the other person can interpret according to the intended purpose (Mangkunegara, 2013). Likewise, (Ivancevich *et al*., 2007) describes communication as the transmission of communication and understanding through the use of shared symbols from one person or group to another.

International surveys prove that the first rank for success in career and business is Communication and Public Speaking. This is related to the ability to convey ideas and influence others both personally and in masses. The Employment Research Institute in 2005 revealed that hard skills only contribute to a person's success in life by only 18%, while 82% is contributed by abilities called soft skills. The more skilled a person speaks, the more the quality of his intelligence and intellect will show. In reality the higher the position of a person, the more they will be required to speak in public. So that communication can indirectly describe the quality of its human resources. Within an organization of course also have the same view of quality human resources. The role of a leader in the organization is needed in the application of human resource quality development because an effective leader can revive the organization which is expected to provide instructions, advice and encouragement to employees. Bosses in the company have roles such as motivating, inspiring and stimulating employee development (Turek and Turek, 2013). In some leadership theories that have been put forward by experts where each leader must treat his employees properly and fairly without any difference. But in reality, sometimes the leader will build relationships with employees based on the quality of interaction as in the Leader Member Exchange theory. Leader member exchange is an improvement in the quality of the relationship between supervision and employees will be able to improve the work of both (Morrow *et al*., 2005). As a result of time pressure, the leader establishes that there is a special relationship with a group of followers. This group is divided into two, first called in groups, which consist of people who are trusted and get an imbalance in this case the attention of a leader and tend to get special rights including career (Robbins and Judge, 2008). Those followers who have a certain mastery orientation develop this relationship that is more stable because such employees always turn to their superiors to find valuable information and experience that can provide prospects for developing skills that can benefit the company. This expertise can be in the form of Political Skill(Robbins and Judge, 2008).

Political Skillis a relatively new construction that utilizes an individual's ability to influence a situation (Ferris *et al*., 2005). In general, political skills are the ability to effectively understand others at work, and use that knowledge

to influence others to act in ways that enhance personal or organizational goals. Political skills are the potential of individuals who have good interpersonal use of positions and networks. High individual political skills can affect others effectively. This shows that individuals who have high political skills can consciously manage their own behavior to effectively influence their relationship partners. On the other hand, individuals with low political skills have a lack of understanding and consequently are unable to consciously manage their behavior in the workplace and effectively influence others less.

Specifically someone who has political skills will easily cover the negative side, is able to manage the dynamics of relationships and is often involved in impression management. When someone meets other people, there are usually many reasons for him to show an impression to others. Because in general, a person wants himself to be accepted by the public as intelligent, friendly, and morally good. So this can make it easier for employees to take advantage of the situation in developing a career.

Prior study by (Jacob w. Breland *et al*., 2007) examining the relationship between leader member exchange and objective measures of career success, it is likely that the quality of the direct leader-subordinate relationship is also an important predictor of subjective career success. In addition, due to the political nature of one's career development, it has been suggested that one's personal style and the impression it creates are positively related to subjective career success.

The study was motivated by several reasons including ineffective communication between superiors and subordinates directly within the University. In addition, the quality of the leader-subordinate relationship is directly chosen as a variable because it wants to prove whether there are differences in attitudes between superiors and subordinates that affect career. This study is interesting to learn, because this study uses the variable political exclusion where many people think something that smells of politics is negative, even though it can be positive. The selection of research objects is also based on the case that there are still many of the number of employees who have worked more than 10 years not showing career advancement. Career development is not only for structural positions but also for functional lecturers. As can be seen in the following diagram.
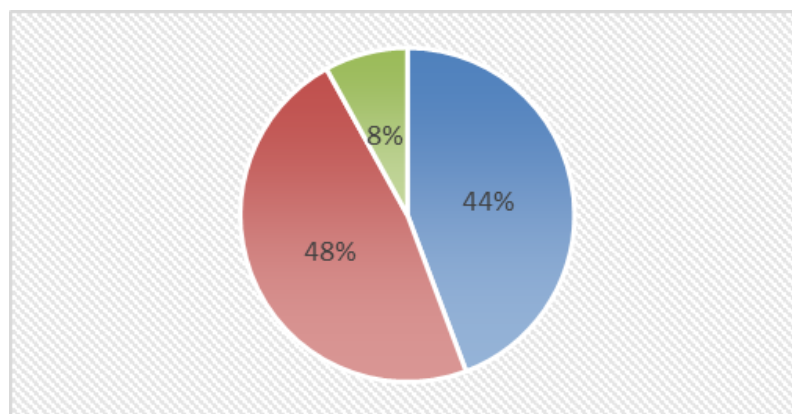

Figure 1. Percentage of Number of Employees for the Period of 1988-2019

It can be seen in the diagram above that there are 48% of employees who have never experienced career advancement from 1998-2019, and there are 44% who have served or experienced career advancement with more than 2 years of work experience while it is only 8% of employees who got less than 2 years of work experience. This proves that the career growth of lecturers and staff has slowed so that post study is necessary to examine the factors causing career development at the University.

2. Literature Review

2.1. Prior Study and Hypothesis Development

2.1.1. Communication and Career Development

Communication is generally an exchange of information carried out by two or more people with a specific purpose and objective. Communication is the sending and receiving of information, news, or messages made by two or more people so that the intent or message can be understood. Communication suggests that a thought, a thought, a meaning or a message are held in common. Communication envelops everything we do. Communication is a tool used by humans to carry out social interactions, both individually with individuals, individuals with groups or groups with groups (Mulyana, 2005). Communication skills can increase interpersonal benefits, which is a special skill, not only for self and family development, but also for career advancement.

Hypothesis 1. The higher the communication skill, will increase the probability of career development.

2.1.2. Communication and Leader Member Exchange

Communication is the most important skill in our lives. We spend most of the time we are aware and wake up to communicate. As with breathing, we think of communication as an automatic thing that just happens, so we don't have the awareness to do it effectively. If the organization is considered as a structure, then communication is a real substance that flows up, down, and sideways in an organization. Someone must have broad insight, honest, responsible, brave in making decisions, and also have good communication skills. Good communication between employees is easy for them as they are to collaborate with others even capable communication to improve the quality of relations between superiors and subordinates.

Hypothesis 2. Higher communication skill will increase Leader Member Exchange

2.1.3. Leader Member Exchange mediate Communication and Career Development

Leader member exchange is an improvement in the quality of the relationship between supervision and employees will be able to improve the work of both. Leadership studies are mostly done because leadership studies are important in organizations because they have a certain impact on the progress of the organization and others. That is because leadership is related to organizational performance (Morrow *et al*., 2005). Leader member exchange theory explains the process of making roles between leaders and subordinates and the exchange relationships that develop over time (Yukl, 2015). Communication skill will increase the process of leader member exchange, therefore will also increase chance of career development.

Hypothesis 3. Higher communication skill will increase career development that mediates by Leader member exchange.

2.1.4. Leader Member Exchange and Career Development

Leader exchange members focus on a two-way relationship between leaders and employees, with the aim of maximizing company performance with building positive interactions between leaders and employees. Leader member exchange describe the process of making a role between a leader and each of subordinates and is an exchange relationship that will continue to develop. In addition, the impact of leader member exchange can increase career development (Truckcnbrodt, 2000).

Hypothesis 4. The more effective leader member exchange, the higher the opportunity for career development.

2.1.5. Leader Member Exchange and Career Development moderates by Political Skill

Political Skill is the ability to obtain the power needed to achieve goals. Individuals who have socially intelligent political abilities, have accurate perceptions about their own and other people's behavior and social interaction in general, which allows them to be influential (Ferris *et al*., 2005; Robbins and Judge, 2008). Political Skillis the potential of individuals who have good interpersonal use of positions and networks. Employees must help other employees demonstrate, transmit, and impress themselves in the organization. Even seen having a high level of confidence. people who have political ability tend to have balanced self-confidence, so it's not arrogance. The most essential aspect of Political Skill is authenticity or sincerity. Real Political Skill is a positive force, and is essential for the success of work and careers in today's organizations.

Hypothesis 5. The more effective leader member exchange, the higher the opportunity for career development moderates by political skill.
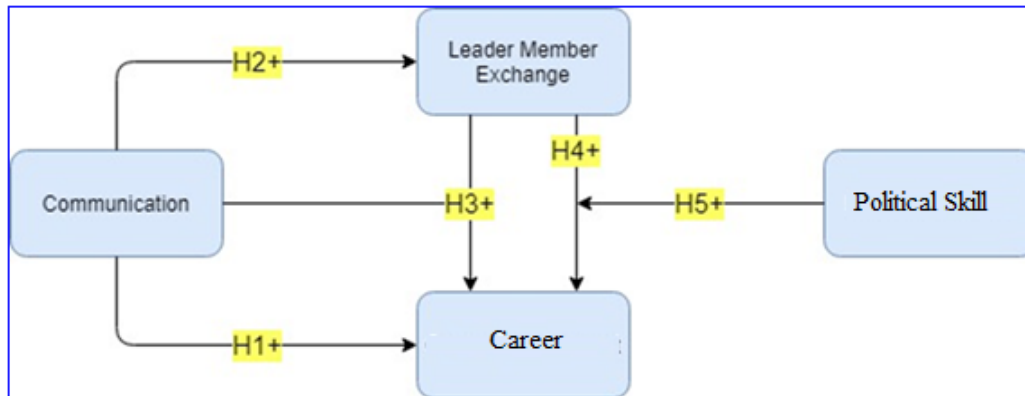
2.2. Conceptual Model

Figure 2. Conceptual Model

Source: Adapted from Truckenbrodt: 2000, and Morrow *et al*: 2005

3. Methodology

3.1. Data Source

This study is using primary data, data collected by researchers directly from the main source, collecting this data requires time in the form of a questionnaire to be given to lecturers and employees in one of the University in Jakarta. While secondary data can be obtained from the results of other people's research made for different purposes but can be utilized. Data and information collection is carried out through surveys by distributing questionnaires that are distributed directly by the researchers themselves to lectures and employees who are directly involved in either structural or functional position. The questionnaire provided contained a number of requests for filling out the questionnaire to the respondents accompanied by a list of questions or structured statements submitted to the respondent for response according to the conditions experienced by the respondent concerned. In this questionnaire the closed question model is used. The closed form is a question that has been accompanied by alternative answers before, so that respondents can choose one of the alternative answers. Answer choices ranged for each questionnaires on a scale 1 to 5.

3.2. Sample Selection

The population is the whole subject of study. If someone wants to examine all elements in the research area, then the research is a population study or census study. The population and sample in this study is Lecturers and Employees in one of the University in Jakarta area with a total of 149 person. Sampling techniques are basically grouped into two, Probability Sampling and Nonprobability Sampling. In this study the authors used the Nonprobability Sampling method, while the sampling method used was saturated sampling.

3.3. Variable Measurements

Researchers take measurements of existing variables using research instruments. The research instrument is a measuring instrument developed with reference to the characteristics of the research variables that are set to be studied. Variables in this research are Communication, Leader Member Exchange, Career Development, and Political Skill. Furthermore, indicators are determined to be measured through a number of statement items in the research instrument. Communication is based on respondent's degree of access to information, media quality, and information load. Leader member exchange is based on respondent's degree of how well leaders and subordinates level of respect, trust, and obligation. Career development is based on how well respondent's think of organization

policy, performance, educational background, and trainings. While Political Skillis a self assessment variabel based on social astuteness, interpersonal, networking abilities, and sincerety.

3.3. Models and Analysis

This study uses Structural Equation Model (SEM) analysis to test the hypotheses. While Partial Least Square (PLS) is one of the SEM model that based on variance. SEM based Covariance generally tests causality or theory while PLS is more predictive in nature. PLS is a powerful analysis method (Ghozali, 2011), because it is not based on many assumptions.

4. Results And Findings

Table 1 depicts the estimates of the hypothesis tested. Hypothesis 1 and 2 put Communication as independent variable, while Career and Leader Member Exchange act as dependent variables, repectively. Hypothesis 3 put Leader Member Exchange role in mediating Communication and Career. Hypothesis 4 test the direct relationship of Leader Member Exchange and Career development. While hypothesis 5 will test Political Skill in moderating the relationship of Leader Member Exchange and Career.

Table 1: Estimates of Hypothesis Testing

Hypothesis Testing	Estimates	Mean	S.D.	T-Stat.	P-values
Communication --> Career (H1)	0,382	0,403	0,126	3,042	0,002
Communication --> LMEx (H2)	0,749	0,757	0,048	15,750	0,000
Communication - LMEx - Career (H3)	-0,047	-0,028	0,085	0,551	0,582
Leader Member Exchange --> Career (H4)	-0,050	-0,092	0,145	0,346	0,730
Political Skill--> LMEx - Career (H5)	0,091	0,078	0,107	0,850	0,396

Hypothesis 1 examines the effect of Communication on Career development, based on the significant and positive result (p = 0,002; β = 0,382), hypothesis 1 is supported. Hypothesis 2 examines the effect of Communication on Leader Member Exchange, and based on the significant and positive result (p = 0,000; β = 0,749), hypothesis 2 is also supported. Hypothesis 3 examines the role of Leader Member Exchange in mediating Communication and Career with unsignificant and negative result (p = 0,582; β = -0,047), therefore hypothesis 3 is not supported. Hypothesis 4 examines the direct effect of Leader Member Exchange on Career development, and based on the unsignificant and negative result (p = 0,730; β = -0,050) therefore hypothesis 4 is also not supported. Hypothesis 5 put Political Skill in moderating the relationship of Leader Member Exchange and Career development, and based on the unsignificant and positive result (p = 0,396; β = 0,091), hypothesis 5 is also not supported. Below figure is the complete relationship between variables.
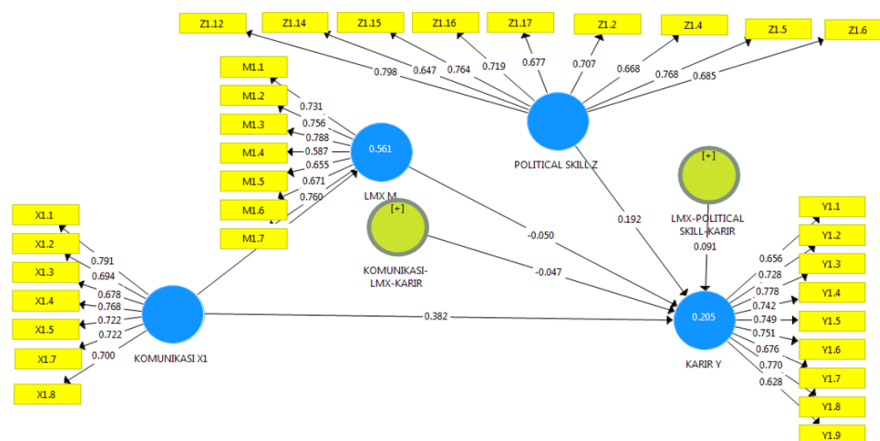

Figure 3. Relationship of Each Variables

5. Conclusions and Recomendations

This study has empirically findings about the effect of Communication on Careers mediate by the quality of Leader Member Exchange with Political Skill as moderating variable. This study use 97 respondents that consist of Lectures and Employees at one of the University in Jakarta. This study has shown that H1 and H2 is supported by the result, while H3, H4, and H5 is not supported by the results.

- H1 Communication influences career because lecturers and staff have effective communication skills. Because if someone has weak communication skills or a lack of communication with people around him, it will be increasingly difficult to get the desired career achievement. This is in line with research conducted by Margaret Hilton Bahniuk (a), Susan E. Kogler Hill (b) & Holly J. Darus (c) (1996) with the title The Relationship of Power-Gaining Communication strategies to career success, the results of his research stated These communication variables are supported.
- H2 Communication affects leader member exchange because communication in an organization has a very important role, especially between leaders and subordinate employees. As has been done by the employees and lecturers in this research, they build leader member exchange relationships because of the frequent intensity of communication that exists between the two. Truckenbrodt (2000: 234) states that in an organization seen from the relationships and interactions between superiors and subordinates, can be grouped into two groups, namely in groups and out groups. Employees who have a high relationship and interaction between leaders and subordinate employees are included in the group and outside the group in the group is out group.
- H3 communication has no effect on careers mediated by leader member exchanges. This is because most of them do not make a close relationship as a means of mediation for communication and career. meaning that communication will continue to influence career without being mediated by a leader member exchange.
- H4 Leader member exchange has no effect on career. survey results show that leader member exchanges built by employees and lecturers at the University cannot influence careers because they prioritize the quality of each individual not because of the closeness of leader member exchange.
- H5 Leader member exchange has no effect on careers that are moderated by political skills. Although this hypothesis has no effect, it turns out that the results of political skill data processing are able to strengthen the relationship between leader member exchange and career.

Based on the results of the research that has been done, there are some suggestions that can be considered for further research, namely:
- Researchers hope this research can be useful for research then by expanding other variables.
- For future studies are expected to be used as reference material for other company research
- For future studies are expected to conduct research related to careers in a company or industry that has broad career paths.

Acknowledgments

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ICT Diffusion and Economic Growth: A Comparative Study Across Economies

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Abstract
The development in information and communication technology (ICT) has opened up many endless opportunities, enabling broad communication and easy access to knowledge and information. This paper aims to offer a discussion regarding the economic impact of ICT on 89 countries divided into 7 low-, 20 lower middle-, 19 upper middle- and 43 high income economies. Accordingly, it studies the impact of investment growth in ICT and non ICT assets on economic growth for a period 1990 to 2018, thereafter, it examines the economic impact of using three ICT infrastructure indicators in order to tests the effective usage of ICT investment in those economies for the period 2000 to 2018. The methodology of this research follows a deductive approach and uses a panel data estimation. The results show that ICT capital still plays a major role in the richest countries in the world, while there is no significant impact of ICT in the Upper middle and low income economies and weak significant in lower middle income economies. Regarding the impact of using ICT, the results for four income groups, indicate that the level of the ICT infrastructure effect varies according to the indicator studied and middle income economies are gaining more from the use of ICT infrastructure than high income economies with a positive and strong effect on economic growth.

Keywords: ICT Capital, Non ICT Capital, ICT Infrastructure, Panel Data, Economic Growth

Introduction

Information and Communication Technology (ICT) is defined as an expansion of Information Technologies (IT). However, UNESCO (2002) presented a definition of ICT, stating that ICT is a mix of IT and related technologies, particularly communications. The World Bank (2014) reported that ICT includes networks, software, hardware, and media for gathering, storing, processing, transmitting, presenting information and associated services. Moreover, Pradhan et al. (2018) refers to the mobile telephone, digital phone network, servers and capabilities of the Internet and fixed broadband as ICT infrastructure.

Most economists argued that ICT gradually redefined and transformed economic landscapes from 1971 onwards after the technological (informational) revolution emerged (Dosi, 1982; Perez, 2009). This transformation leads to widespread acknowledge of the importance of information and communication technology for economic development. Dutta (2001) and Czernich et al. (2011) stated that Adopting ICT allows timely and easy access to information, which in turn enables the removal of an essential barrier to the effective functioning of the market: information asymmetries. Meijers (2014) explained that ICT enables widespread communication between companies so that reducing the cost of production and increasing productivity. Furthermore, ICT enables access to new markets, adopt e-business and e-commerce that reduce transaction costs and improve its efficiency and speed. Ding and Hynes (2006) claimed that the telecommunications sector works as a source of employment and revenue. It also has a role in encouraging domestic and foreign investment, which affect positively on economic growth.

Undeniably, ICT provide boundless opportunities on economic, institutional and social grounds. Nevertheless, the essential prerequisites to benefit from it are ICT infrastructure and access to it since technological advances will produce gains only when societies accept and adapt it. Dimelis and Papaioannou (2009) stated that technological advances are no more the same for all economies around the world. Each economy maintains different policies, conditions, and prerequisites to promote the implementation of new technology. Avgerou (2003) debates that ICT investment is successful only in those economies which have fundamentals for assets' efficient implementation and use. Therefore, developed countries have to possess better technologies according to their historical experience and existing infrastructure that is suitable for effective use.

Investments in ICT generally include: computers and their facilities, software as well as devices of telecommunications. Given the importance of ICT and the significant decline in the cost of computers and their other parts, and in the cost of communications networks and equipment over the last decades (Jorgenson, 2001), ICT become a dynamic area for investment and different economies have encouraged to get the benefit from the low cost of ICT infrastructure to do more investment in ICT in order to enhance their output and gain additional advantages from ICT. This raises many questions: How does investment in ICT assets, in comparison with investment in non-ICT assets affect economic growth? Which type of ICT infrastructure has the greatest impact on economic growth? Can ICT be a growth generator for the middle and low income economies?

In this regard, the aim of this paper is to explore the impact of the growth of ICT investment and non ICT investment on economic growth among different economies groups (high-, upper middle-, lower middle- and low-income economies). Furthermore, the paper examines the effective usage of ICT investment of those economies by studying the economic impact of using three ICT infrastructure indicators.

The rest of the paper is structured in the following manner. Section 2 discusses the main economic growth theories and explains the necessary factors for growth. Section 3 provides an overview of previous studies that empirically examine the economic importance of ICT. Section 4 discusses and analyzes the impact of ICT and non ICT investment growth on economic growth among different economies groups for a period 1990 to 2018. Section 5 examines the economic impact of using three ICT infrastructure indicators between the economies groups for a period 2000 to 2018. Last Section summarizes the study.

2. Technologies and Economic Growth: Theoretical Review

Theories of economic growth develop over time to explain differences in growth and to examine economic growth factors. The neoclassical theory of growth and endogenous theory of growth are the two dominant growth models. Robert Solow as the best known contributor to the neoclassical theory of growth used a neo-classical standard production function in his economic growth study, which showed that output (Y) depends on labor (N), capital (K) and the level of technology or productivity (A) which was assumed to be exogenous (Solow, 1956).

$$Y = AF(K, N) \qquad (1)$$

Solow argued that the capital has diminishing returns that is as capital increases output increases, but output increases less at high levels of capital than at low levels so that economy will reach to a steady-state and only technological change which has been assumed to be exogenous could achieve a permanent output growth rate.

Although Solow related the technological change to economic growth and believed that technological progress would be the determine of the long-term growth, neoclassical traditional growth theory had nothing to speak about the source of technological change and considered that knowledge itself as a residual that remained once the contribution of capital and labor was taken into account.

Therefore, Romer (1986) developed an endogenous growth theory that addresses problems with neoclassical theory. The theory incorporates the knowledge and technical progress into the production function as an endogenous input.

$$Y = F(A, K, N) \qquad (2)$$

This model addresses the importance of technological change and concludes that technical change is largely caused by intentional actions by people responding to incentives of the market (Romer, 1990). He claims that Investments not only produces new machines but also a new way of doing things. In this scenario, when a company raises its capital, the output of the business will increase, but also other companies will increase their productivity. That is why the endogenous growth model does not yield diminishing returns, contrary to the Solow growth model. In a later time Castellacci (2011) argued that technology and innovation will raise low-income countries' catch-up processes primarily through enabling improvement in education, knowledge dissemination, and labor productivity shifts. In this context, Technological progress plays an important role in economic development.

3. Previous Studies

In the last decades, several researchers who have used different timespans, data sources and various methodologies on one country or panel of countries level, have studied the effect of ICT. Some studies investigated the impact on the economic growth of ICT and conclude that ICT sector contributes significantly to the growth of economies. Another group of studies measured the ICT's impact by controlling other growth determinants and show that the ICT sector is one of the major drivers of economic growth. Additional studies designed for analyzing the causality between economic growth and ICT. Regarding the latter, some researchers found ICT causes economic growth, others showed that causality goes instead from economic growth to ICT, while most argued that ICT is both a cause and a result of economic development and few posited that there is no statistically significant causal or even negative effects between economic growth and ICT. However, with reference to the researches' target state, the research on ICT could be classified into three groups: The impact of ICT on global economies, on the developed economies, and on the developing economies.

Among the first group, where economists examine the ICT impact on global economies, Shiu and Lam (2008) used a sample of 105 countries, divided into different regions then into different income levels groups from 1980 to 2006. They found that the relationship between GDP and telecoms development is bidirectional in European countries and high income group, while a uni-directional relation existed from telecoms development to GDP in the Asia and Oceania countries, and from GDP to telecoms development in other income groups and other regions countries. Chakraborty and Nandi (2011) assessed the relationship between investment in telecom infrastructure and GDP in a panel sample of 93 countries classified to: developed, emerging and less developed countries over the period 1985 to 2007. They concluded that the relation between mainline teledensity and GDP is a bidirectional causal relationship for developing countries whereas for the more developed country the results showed weak evidence of the bidirectional relation. Yousefi (2011) examined the effect on the economic growth of ICT investment among four income groups for a sample of 62 countries from 2000 to 2006. The finding indicated that investment in ICT positively affect economic growth in high and upper middle income groups however in lower middle income and low income groups the effect was insignificant. Pradhan et al. (2013) studied 43 OECD countries from 1961 to 2011 to explore the relationship between the growth of economies and telecoms infrastructure. The results displayed a uni-directed causality running from GDP to telecoms infrastructure suggesting that the telecoms infrastructure in those OECD countries is not so helpful to improve economic growth. Niebel (2014) used a sample consist of 59 countries classified to developing, emerging and developed groups over the period 1995 to 2010 to study the economic impact of ICT investment. He revealed that the differences among the subgroups are small, also, ICT capital and GDP growth have a positive relationship. Pradhan et al. (2014) studied the G-20 countries by dividing it into developing, developed and total groups during 1991 and 2012. The

results showed bi-direction causality between economic growth and telecoms infrastructure index in the three groups. Liljevern and Karlsson (2017) argued the effects of investments growth in ICT on economic growth across 101 countries classified in four income groups for the period 2000 to 2017. They concluded that non-ICT capital are still much more important than ICT capital. Furthermore, in the high income group, a significant contribution of ICT on output existed, while no contribution existed in low and middle income group. Majeed and Ayub (2018) used various indicators of ICT in order to analyze their effects on GDP in 149 countries divided into regional and global levels between 1980 and 2015. The results presented that all ICT indicators have a positive and significant impact on GDP in both global and regional levels, however, the benefit from ICT is more in emerging and developing countries than developed countries. Pradhan et al. (2018) focused on G-20 countries over the period 2001 to 2012 to study the nature and direction of the relation between GDP and ICT infrastructure represented by two indicators internet and broadband users. The results indicated a long-run equilibrium relationship and short-run causality from ICT infrastructure to GDP.

Economists among the second group explore ICT impact in developed economies and several have shown that ICT has a significant contribution to developed economies' economic growth. O'Mahony and Vecchi (2005) found that ICT investment in the UK industry has a negative economic growth impact while in the US industry it has a positive effect on growth over the period 1976 to 2000. However, Beil et al. (2005) studied the causality between the US's GDP and telecom investments for the period 1947 to 2011. The findings identified a uni-directional causality that telecoms investment is caused by economic growth. Ramlan and Ahmed (2009) examined the relation between investment in the telecoms and Malaysia's economic growth between 1965 and 2005. The results proved that in short-run, there is no causality between ICT and GDP, while in long-run, ICT has the same pattern as GDP which shows it to be a growth factor in economic development. Ishida (2014) investigated the ICT impact on japan economic growth and energy consumption from 1980 to 2010. He found that ICT has moderately caused lower energy use, but it has not contributed to Japan's economic growth since the result shows that it is insignificant in growth model, while it is negative and significant in energy demand function. Khalili et al. (2014) argued the long term and short term causal analysis between ICT and GDP across six EU top ranked ICT countries for a period 1990 to 2011. They did not find any causality between ICT and economic growth in the short term, while in the long term, they found a unidirectional causality from ICT to economic growth. On the other hand, Toader et al. (2018) examined four indicators of ICT to evaluate how ICT affects GDP for the period 2000 to 2017 in European Union countries. The findings showed a positive and important effect of the ICT and the highest impact on GDP was recorded for mobile subscriptions.

The last group focuses on economic growth and ICT in developing countries. Sassi and Goaied (2013) used 17 MENA countries to study the economic growth impact of financial development and ICT during 1960 – 2009. The findings showed that ICT has appositive effect while financial development has a negative effect on the growth of economies, furthermore, the interaction between them is significantly positive indicating that the economies of MENA regions can profit from financial development once ICT thresholds are reached. Mehmood and Siddiqui (2013) evaluated the relationship between GDP and investment in telecoms in a group of 23 Asian countries from 1990 to 2010. They found causality runs from telecommunications investments to GDP. Hodrab et al. (2016) used a sample of 18 Arab countries in order to study the effect of ICT on the growth of economies during 1995 – 2013. They measured the infodensity index as an indicator of ICT and found a positive influence of ICT on the selected Arab countries' economic growth. Pradhan et al. (2016) assessed relationships between development of telecom infrastructure, financial development and economic growth in 21 countries of Asia divided into sub regions over the period 1991 to 2012. The results showed that the development of financial sector and telecoms infrastructure has a significant impact on economy output and there is causality between the variables in short and long run. Bahrini and Qaffas (2018) used a panel of 45 countries: 14 in MENA and 31 in SSA over 2007- 2016. The results derived from the GMM model indicated that mobile adoption, internet, and broadband adoption are the key drivers of economic growth. In addition, the results confirmed that in the fields of internet use and broadband adoption MENA countries are superior to the SSA countries. Haftu (2018) investigated the economic impact of telecom infrastructure with a particular emphasis on internet and mobile penetration in a group of 40 countries in sub-Saharan Africa from 2006 to 2015. He concluded that the mobile phone penetration impacted the region's GDP with a 10% rise in it contributes to a 1.2% GDP per capita change, while Internet users did not contribute to GDP during the period of the study. Adeleye and Eboagu (2019) studied 54 African countries from 2005 to 2015 and

applied different panel estimation to evaluate the ICT contribution to economic growth. The results demonstrated that the three ICT indicators have a positive significant economic impact, where the mobile subscriptions have the greatest elasticity across every specification and have the greatest potential for Africa to bypass conventional stages of development.

This study offers a global research image using a wide range of countries to examine the economic effect of ICT investment growth and to investigate the economic impact of using three ICT infrastructure indicators.

4. Impact of ICT Investment Growth on Economic Growth

In order to explore the impact of the growth of ICT investment and non ICT investment on economic growth among different economies groups. A sample of 89 countries is used for this aim and divided into four categories, which are classified as high-, upper middle-, lower middle- and low income economies by following the World Economic Situation and Prospects' country classification table, WESP (UN 2019), that depends on the per capita gross national income (GNI) of each country. Countries with GNI per capita below $1,025 are classified as low income economies, countries ranging from $1,026 to $4,035 are considered as lower middle income economies, on the other hand, from $4,036 to $12,475 are considered as upper middle income economies and high income economies for those with more than $12,475. Accordingly, the empirical part in this section is based on a panel dataset for 89 countries divided to 7 low income economies, 20 lower middle income economies, 19 upper middle income economies and 43 high income economies over 29 years from 1990 till 2018. Table A1 (Appendix A) presents the countries of this study.

4.1 Model Building of ICT Investments effects

Based on the existing theories which argued that labor, capital, and technological innovation are the essential drivers of sustainable growth economies, growth rate of GDP per capita is used as the dependent variable and the key explanatory variables represented by ICT capital services growth rates, non ICT capital services growth rates, employment growth rate and export growth rate are used as independent variables.

Table 1: Variables Descriptive and Data Sources of ICT Investments effects Model

Variables	Definitions	Measurement	Sources/Period 1990 - 2018
gGDPPC	Real GDP per capita growth rate expressed in 2016 PPP $.	Percentage	Conference Board Total Economy Database (TED)
gICT	ICT capital services growth rate, where ICT capital services are provided by assets as telecoms material, computer software and hardware	Percentage	Conference Board Total Economy Database (TED)
gNICT	Non-ICT capital services growth rate, where Non-ICT capital services provided by machinery, construction, transports, buildings, and other types of non-ICT assets	Percentage	Conference Board Total Economy Database (TED)
gEMPLOY	Employment growth rate that covers all people engaged in productive activity within the boundary of production of national accounting system (self-employed, employees, worker of unpaid family and military).	Percentage	Conference Board Total Economy Database (TED)
gEXPORT	Exports of services and goods growth rate. Exports of services and goods represent the value of every market service and good provided to the rest of the world.	Percentage	World Bank, World Development Indicators (WDI)

Source: authors' preparation based on empirical studies.

The following general model of linear regression is considered:

$$gGDPPC_{it} = \beta_0 + \beta_1\, gICT_{it} + \beta_2\, gNICT_{it} + \beta_3\, gEMPLOY_{it} + \beta_4\, gExport_{it} + \mu_{it} \quad (3)$$

Where, μ_{it} is the error term, t shows time effects and i shows individual effects. This model will apply to the four income groups of economies in order to compare ICT capital contribution to economic growth for each group.
Both types of capital services are expected to be a contributor to the growth of GDP as theory suggested. However, due to diminishing returns law on investments (Solow, 1956), ICT services should have relatively more marginal effects in lower income groups. Furthermore, since better prerequisites are supposed in developed countries, they will usually also be perceived as more effective users and active in investing in new technology. Therefore, ICT may also have a significant impact on output in high income economies. In addition, employment levels are essential to the increase in output, and thus, in most income economies, a positive effect on GDP is anticipated (Solow, 1956; Romer, 1990). For the export and trade levels, a positive effect on GDP is also expected since they are considered as vital factors for the growth of GDP, as Awokuse (2008) says that export growth stimulates economic growth, by expanding the market size, leading to large economies of scale, growing capital formation rates and technical changes.

4.2 Methodology of Testing the Impact of ICT Investment Growth on Economic Growth

Panel data is used to analyze the relationship between investment in ICT and economic growth since it eliminates heteroscedasticity problems from potential differences across countries (Greene, 2003).

Summary Diagram: Panel Method Followed in the paper
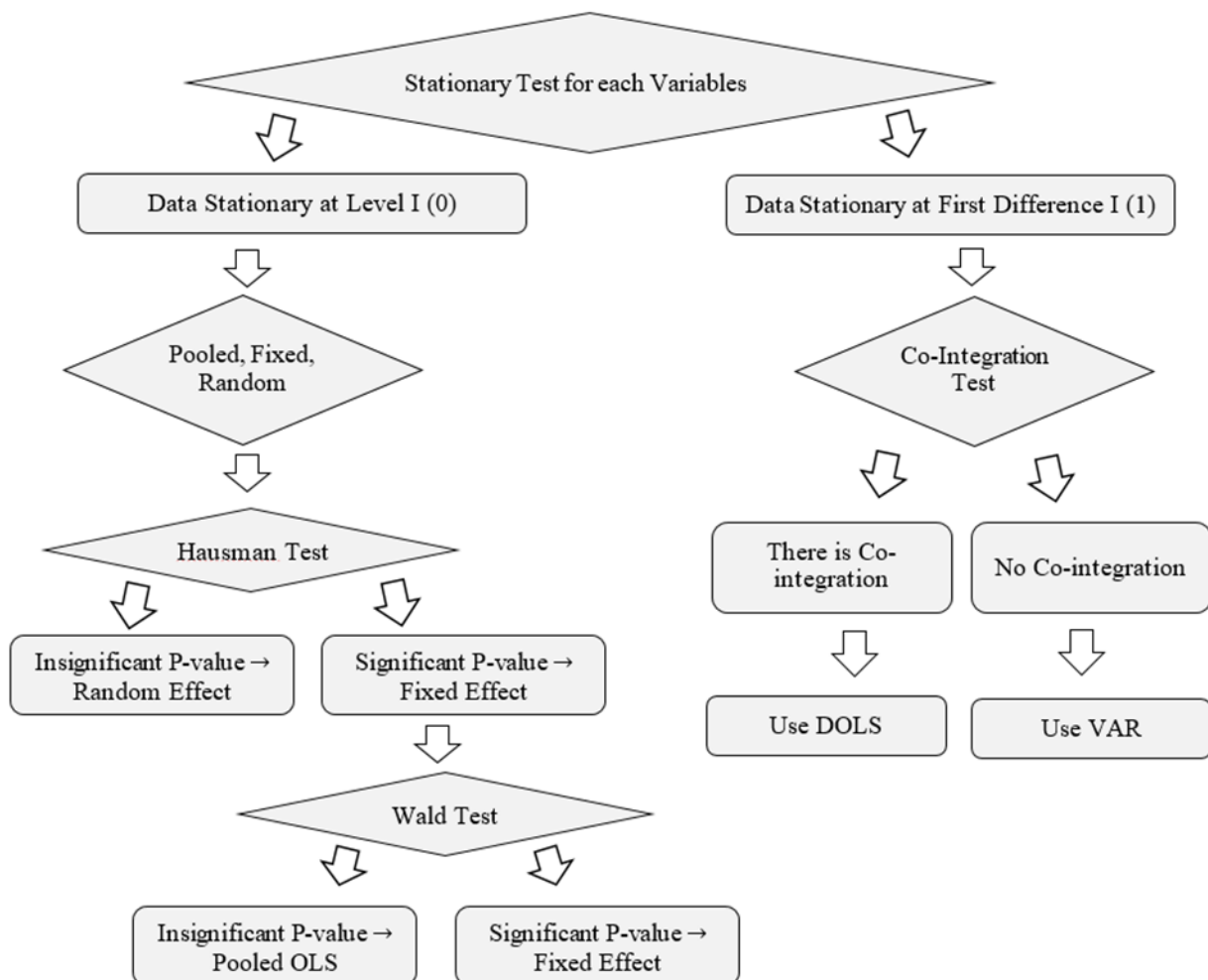
Source: authors' preparation

4.2.1 Stationarity Tests

The data shall be stationary prior to modeling and analysis, in that case, a stationary test is the essential prerequisite test in many techniques. Fisher ADF, Fisher PP (1932), and Levin, Lin, Chu (LLC) (2002) tests are the basic tests for panel unit root. Under the null hypothesis a unit root is existed, while under the alternative hypothesis no unit root existed. Studying the AR (1) for panel data, analytically:

$$y_{it} = \rho_i y_{it-1} + X_{it}\delta_i + \epsilon_{it} \qquad (4)$$

Where $I = 1, 2… N$ is cross section series or units, observed over periods t = 1, 2… T. The exogenous variables represented by X_{it} in the model, ρ_i are the coefficients of the autoregressive coefficients, and ϵ_{it} is the errors and assumed to be independent. If $|\rho_i| < 1$ then it is said that y_{it} is stationary, while if $|\rho_i| = 1$ then y_{it} is not stationary.

4.2.2 Panel Models

Pooled OLS, Random Effect (REM), and Fixed Effect (FEM) are three panel data models that examine group effects, country specific effects or both. Pooled OLS Estimator ignores the panel structure of the data assuming that all individuals have homogenous effects:

$$Y_{it} = \alpha + \beta X_{it} + \varepsilon_{it} \quad (U_i = 0) \qquad (5)$$

Where Y is dependent variable, X is independent variable, α is intercept, β is slope coefficient, U_i is the individual effect, ε_{it} are error terms, t shows time effects and i shows individual effects.

Fixed and random effects models examine the effects of individuals or time to check the heterogeneity (individuality) of every individual (country). Dummy variables consider a key role in the difference between the both. In fixed effect models, a dummy variable parameter is in the part of intercept while in the random effect model a dummy variable parameter is in the part of an error component.

Random effect model: $Y_{it} = \alpha + \beta X_{it} + (\varepsilon_{it} + U_i)$ (6)

Fixed effect model: $Y_{it} = (\alpha + U_i) + \beta X_{it} + \varepsilon_{it}$ (7)

For the fixed effect model, the effect of individual is assumed to be correlated with the regressors while the effect of individual in the random effect model is assumed to be uncorrelated with the regressors.

4.2.3 Model Selection

In order to estimate the best-fitted model between Pooled OLS, REM, and FEM, Hausman test (1978) answers for best model by comparing the random effect and fixed effect model. The null and alternative hypotheses that:

H_0: U_i uncorrelated with other regressors (REM is the preferred)

H_1: U_i correlated with other regressors (FEM is the preferred)

After Hausman test, if the fixed effect model is the appropriate model then a further test - Wald test - has to be checked to determine the right model between the pooled OLS and fixed effect. The null and alternative hypotheses are:

H_0: all dummy parameters are zero (Pooled OLS model is the preferred)

H_1: at least one dummy parameter is not zero (FEM is the preferred)

4.3 Tests Results of ICT Investments effects Model

The results of econometric methods for the panel data employed are presented in this section.

4.3.1 Stationary Tests Results for the Variables of ICT Investments Effects Model

With respect to the group income economies, the results of Fisher ADF, PP and LLC tests presented in Appendix B, tables B1–B4. They prove that gGDPPC, gICT, gNICT, gEMPLOY, and gExports are stationary at level in the four groups since at least two tests out of three tests adopted show that p-value is less than 5 %.

4.3.2 Panel Data Regression

Tables C1–C4 (Appendix C) present the pooled, random effect and fixed effect models results of the four income groups of economies. However, the best fitted model is fixed effects model in all groups since the results of Hausamn and Wald tests show p-value < 0.05 (null hypothesis rejected) (See Appendix D, Tables D1–D2). Accordingly, the regression for each income group is estimated by using fixed effect specification with cross-section weights Panel Corrected Standard Errors (PCSE) as a coefficient covariance method, that the PCSE estimator generates accurate standard error estimates.

Table 2: Fixed Effect Models Estimation Results – for All Income Groups

Economies Groups	High Income		Upper Middle Income		Lower Middle Income		Low Income	
Variables	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	-1.0235	(0.0000)	-0.4627	(0.1650)	-0.091325	(0.7717)	-0.911854	(0.3524)
gICT	0.0530	(0.0000)	0.0192	(0.2268)	0.024382	(0.0498)	-0.030234	(0.1675)
gNICT	0.0806	(0.1781)	0.4452	(0.0000)	0.336007	(0.0000)	0.358686	(0.0001)
gEMPLOY	0.2429	(0.0001)	0.3078	(0.0000)	0.318194	(0.0000)	0.492159	(0.0694)
gEXPORT	0.2476	(0.0000)	0.1338	(0.0000)	0.075469	(0.0000)	0.047096	(0.0058)

Source: authors' calculation using Eviews

4.4 Analysis and Discussions of ICT Investments effects Model

Interesting results are achieved from the empirical part that are different according to income level of economies. In the high income economies, the significance level of ICT capital services is in line with growth theories and Niebel (2014) and Yousefi (2011); high income economies should have an enormous stock of ICT capital as well as historic experience with how these assets can be used efficiently. Moreover, these economies are expected to develop suitable infrastructure to support such assets. The insignificance level of Non ICT capital services, consistent with Solow model that the capital has diminishing returns that is as capital increases, output increases, but output increases less at high levels of capital than at low levels. Employment growth has a significant impact on GDP growth, consistent with Glaeser et. al (2004). The results show that 1% increase in the employment growth rate will increase the growth of GDP per capita by 0.24%. For the export growth rate, the results also show a bigger coefficients which indicating a stronger relationship between export growth rate and GDP.

The findings of the fixed-effect model in the upper middle income economies show that ICT capital services no longer contribute to economic growth. According to Waverman et al. (2005) who argue the reason why ICT capital services exhibit insignificant contributions in less developed countries, which could have been a result of the telecom income trap. This means that ICT costs are higher than productivity gains. Consistent with the neoclassical model the value non-ICT capital services demonstrate increasing importance in explaining economic growth in comparison with the economies of high income. The results also show that growth in employment and exports in this group have an extremely important impact on economic growth.

In lower middle income economies, the result of ICT capital services contribution does not resemble those of the upper middle income economies, it shows that ICT capital services has significant impact on economic growth but with lower contribution, in line with the Niebel (2014) if the lower middle income economies considered to be an emerging economy. The findings for non-ICT capital services indicate substantially less important in explaining GDP growth in comparison with the upper middle income economies, which is not compatible with the idea of capital diminishing return mentioned in the neoclassic model that states that higher elasticity is required in economies that have fewer capital stocks, but in comparison with the high-income group, the contribution to this group appears to be higher. The growth rate of employment and exports also has a significant effect on per capita GDP growth. A 1% rise in the employment growth levels, leads to a 0.32% rise in the GDP per capita growth.

In low income economies, ICT capital services have made no significant contribution to GDP growth with a negative sign and Non-ICT capital services tend to have increased importance on economic growth. This is in line with Liljevern and Karlsson (2017), who stressed that lower income levels might also influence the promotion of efficient telecommunications infrastructure. Furthermore, Wavermann et al. (2005) have pointed out that economies with low-income tend to be less likely to invest in new technologies infrastructure. The explanation is that these types of investments are not encouraged by country-specific characteristics and infrastructure. This might imply that countries with lower incomes generally have lower ICT contributions in respect of other forms of capital that meet more primary requirements. Relative to the other income group, employment growth in low income economies tends to be much greater importance. This can be explained in part by the lower stocks of capital making employment in production more essential. Moreover, export growth also impacts economic growth significantly.

Overall, the results show that ICT capital still plays a major role in the richest countries in the world, while there is no significant impact of ICT in the Upper middle and low income economies and weak significant in lower middle income economies.

5. Impact of Using ICT on Economic Growth

To evaluate the using of ICT capital and its effects on growth of economies this section takes the usage of three ICT infrastructure indicators as a proxy, trying to assess which one has the greatest impact on economic growth and how their effect level differs between the groups of economies. Therefore, the empirical part in this section is established on the same panel dataset of 89 countries but over the time span 2000-2018 that is because, the availability of ICT infrastructure data for some years and some variables was limited, so we ended up with a period 2000 to 2018.

5.1 Model Building of ICT Usage effects

A set of variables regarding the use and access to ICT are chosen to achieve the aim of this section. Accordingly, per capita GDP is used as the dependent variable, three different measures of ICT infrastructure are used as the main explanatory variables (fixed broadband subscriptions, % of persons using the Internet, and mobile-cellular subscriptions) and three macro-economic control variables are used as the second explanatory variables (participation rate of Labor force, Gross Fixed Capital Formation as % of GDP, and Trade Openness).

Table 3: Variables Descriptive and Data Sources of ICT Usage effects Models

Variables		Definition	Measurement	Sources/Period 2000 - 2018
GDPPC		GDP per Capita, which is real gross domestic product divided by the total population	in US dollars using 2016 PPP USD	Conference Board Total Economy Database (TED)
ICT Indicators	**FBS**	Fixed Internet broadband subscriptions per hundred inhabitants, refers to the number of fixed broadband Internet subscriptions in a country for every 100 people	Percentage	ITU
	IU	Internet users, refers to the proportion of individuals who have used Internet from anywhere in the past three months	Percentage	ITU
	MCS	Mobile cellular telephone subscriptions per hundred inhabitants, refers to the number of mobile cellular subscriptions in a country for every 100 people	Percentage	ITU
TO		Trade Openness, which is the summation of imports and exports of services and goods as percentage of GDP	Percentage	World Bank, World Development Indicators (WDI)

GFCF	Gross Domestic Fixed Capital Formation as percentage of GDP, which includes equipment purchases, plant, land improvements, machinery, railways, the construction of roads, and industrial buildings.	Percentage	World Bank, World Development Indicators (WDI)
LABOR	Labor force participation rate, which is the proportion of the economically active population aged 15 and older, it includes employed people, unemployed people seeking employment and first time jo bseekers.	Percentage	World Bank, World Development Indicators (WDI)

Source: authors' preparation based on empirical studies.

The following general model of linear regression is considered:
$$\text{GDPPC}_{it} = \beta_0 + \beta_1 \text{ICTIndicator}_{it} + \beta_2 \text{LABOR}_{it} + \beta_3 \text{GFCF}_{it} + \beta_4 \text{TO}_{it} + \mu_{it} \qquad (8)$$

Based on the above model, three models are built, one for each ICT indicator. However, for the purpose of unity and linearity, variables are taken with log. Therefore, for the panel data models, the estimated three equations are:
Model I:
$$\text{logGDPPC}_{it} = \beta_0 + \beta_1 \text{logFBS}_{it} + \beta_2 \text{logLABOR}_{it} + \beta_3 \text{logGFCF}_{it} + \beta_4 \text{logTO}_{it} + \mu_{it} \quad (9)$$
Model II:
$$\text{logGDPPC}_{it} = \beta_0 + \beta_1 \text{logIU}_{it} + \beta_2 \text{logLABOR}_{it} + \beta_3 \text{logGFCF}_{it} + \beta_4 \text{logTO}_{it} + \mu_{it} \quad (10)$$
Model III:
$$\text{logGDPPC}_{it} = \beta_0 + \beta_1 \text{logMCS}_{it} + \beta_2 \text{logLABOR}_{it} + \beta_3 \text{logGFCF}_{it} + \beta_4 \text{logTO}_{it} + \mu_{it} \quad (11)$$

Each model will apply on the four income group of economies in order to compare the contribution of each ICT infrastructure usage to economic growth for each group.

Since many economists have stated that ICT infrastructure, directly and indirectly, impacts economic growth a strong and positive effect of ICT infrastructure on economic growth is expected in the four income groups of economies, but the impact will be varied according to the type of technology studied. Furthermore, in line with Mankiw et al. (1992) who state that a rise in the labor force will boost economic growth, a positive and significant coefficient of the labor force is predicted in the four income groups. In addition, gross fixed capital formation is considered a key factor for higher output (Haftu, 2018), thus a positive impact on GDP in most income groups is predicted. With regard to the degree of trade openness, it is predicted that this factor will impact positively and significantly on GDP per capita.

5.2 Methodology of Testing the Impact of Using ICT Investment on Economic Growth

The strategies followed in this sections are as follow:

5.2.1 Co-Integration Tests
Co-integration test is a statistical test to study the existence of long run association between the variables. It is based on an analysis with variables that are integrated with order one and the investigation of the spurious regression's residuals. Pedroni (1999), Kao (1999) and Fisher (1932) are three co-integration tests. The hypotheses are:

$$H_0: \text{the variables are not cointegrated}$$
$$H_1: \text{the variables are cointegrated}$$

5.2.2 Dynamic Ordinary Least Squares Estimator (DOLS)
DOLS is a simple and effective approach to estimate the co-integrating relationship coefficients. The Stock and Watson's DOLS (Dynamic Ordinary Least Squares) model can be used to estimate long-lasting relations between variables based on the presence of the co-integration relationship between them (Stock and Watson, 1993). For panel data, the extension of the Stock and Watson (1993) DOLS estimator is proposed by Kao and Chiang (2000).

In panel DOLS, the equation of panel co-integrating regression is augmented with cross-section specific leads and lags to reduce serial correlation, the asymptotic endogeneity and give better approach to normal distribution.

5.3 Tests Results of ICT Usage Models

The results of the tests applied are represented in this section.

5.3.1 Stationary Tests Results for the Variables of ICT Usage Effects Models
Tables B5–B8 (See Appendix B) present the results of Fisher ADF, PP and LLC tests. They reveal that, under a level of significance of 5%, Log_GDPPC, Log_FBS, Log_IU, Log_MCS, Log_GFCF, Log_TO, and Log_LABOR in the four income groups are not stationary, and their first differences are stationary. Accordingly, the integration order of the variables are d = 1.

5.3.2 Co-Integration Tests Results
The results of Kao, Pedroni, and Fisher test of model I, II and III, presented in Appendix E, tables E1–E3 shows that the long term relation existed between the variables for high, upper middle, lower middle and low income Economies.

5.3.3 DOLS Estimation Results
Twelves regressions estimated and presented in tables 4–6, for high income economies followed by the like for the upper middle, lower middle and low income economies.

Table 4: DOLS Estimation Results – Model I

Economies Groups	High Income		Upper Middle Income		Lower Middle Income		Low Income	
Dependent Variable: Log_GDPPC								
Variables	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
Log_FBS	0.036155	(0.0345)	0.0862	(0.0000)	0.098491	(0.0000)	0.022137	(0.4384)
Log _LABOR	2.107323	(0.0000)	1.5366	(0.0000)	1.482143	(0.0000)	0.54619	(0.0027)
Log _GFCF	0.27295	(0.0063)	0.7889	(0.0000)	0.880948	(0.0000)	0.873836	(0.0000)
Log _TO	0.22333	(0.0000)	0.1633	(0.0585)	-0.025723	(0.8185)	0.650308	(0.0000)

Source: authors' calculation using Eviews

Table 5: DOLS Estimation Results – Model II

Economies Groups	High Income		Upper Middle Income		Lower Middle Income		Low Income	
Dependent Variable: Log_GDPPC								
Variables	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
Log _IU	0.171294	(0.0002)	0.1747	(0.0000)	0.224698	(0.0000)	0.054793	(0.0837)
Log _LABOR	1.858708	(0.0000)	1.3754	(0.0000)	1.766614	(0.0000)	0.570296	(0.0010)
Log _GFCF	0.398944	(0.0001)	0.8484	(0.0000)	0.545266	(0.0026)	0.743671	(0.0000)
Log _TO	0.223016	(0.0000)	0.1696	(0.0228)	-0.203004	(0.0645)	0.678877	(0.0000)

Source: authors' calculation using Eviews

Table 6: DOLS Estimation Results – Model III

Economies Groups	High Income		Upper Middle Income		Lower Middle Income		Low Income	
			Dependent Variable: Log_GDPPC					
Variables	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
Log _MCS	0.126255	(0.0635)	0.1985	(0.0000)	0.185173	(0.0006)	0.04919	(0.1081)
Log _LABOR	1.865013	(0.0000)	1.4009	(0.0000)	1.329972	(0.0000)	0.711453	(0.0001)
Log _GFCF	0.367448	(0.0020)	0.6920	(0.0000)	0.687048	(0.0016)	0.764929	(0.0000)
Log _TO	0.269481	(0.0000)	0.1772	(0.0387)	0.087354	(0.4933)	0.501979	(0.0022)

Source: authors' calculation using Eviews

According to the latest studies in econometrics especially for dynamic panel data models whereby dependent variable lag added to the formula, further stationarity tests for the residuals are conducted in order to check the robustness of the model. Therefore, the stationarity of residuals of these models is tested based on the ADF, PP, and Levine Lin & Chu. The results show that p-value of the three tests is <5 %, which prove that the residuals do not have a unit root and the models are not spurious for high, upper middle, lower middle and low income Economies (See Appendix B, Tables B9–B11).

5.4 Analysis and Discussions of ICT Usage effects Models

The empirical results produce interesting results that differ according to the level of income of the economies. In high income economies, a positive results appeared regarding the use of ICT infrastructure on economic growth impact, which are consistent with theories, literature review and ICT indicators expectations. This is explained by the adequate infrastructure that high-income economies built and the long history of experience that it had in how these assets should be used efficiently. The highest impact was recorded for the percentage of individuals using the Internet, suggesting that a 1% rise in the level of internet users would determine a rise in GDP about 0.17% across the high-income economies. Toader et al. (2018) argue the positive impact of technology and of Internet on the growth of economic of developed economies. Regarding the control variables, the results show a substantial impact on economic growth in all three models. The labor participation rate has a higher coefficient with a positive and significantly associated with economic growth, in line with the theoretical predictions that a rise in labor force raises physical capital's marginal output leading to a boost of economic growth. On the other hand, the results of gross fixed capital formation show that all estimated coefficients were positive and significant which is in line with the findings of Haftu (2018) and Pradhan et al. (2014). In addition a positive and closely related effect of trade openness on GDP per capita existed.

Results from the upper middle income economies confirm the positive impact that the three ICT infrastructures have on economic growth. The results show that the effect of mobile cellular subscriptions appears marginally greater than other ICT infrastructures for the time period covered. Mobile subscriptions yielded a 0.1985% rise in GDP per 1% rise in penetration, compared to 0.0862% for fixed broadband. This result implies that the upper-middle-income economies must concentrate on suitable ICT infrastructure to support the efficient use of it. The impact of macroeconomic control variables on economic growth has shown that in each of the three models they have a significant effect in line with economic theories, literature reviews and expectations for labor rate, gross fixed capital formation, and trade openness indicator.

For lower middle income economies, the findings also show a very optimistic and very important impact of the use of ICT infrastructure on economic growth. The comparative results show that in high and middle income economies the contribution of three ICT infrastructures to economic growth differs and a stronger effect of these infrastructures on economic growth appears in middle income economies indicating the efficiency of these economies' use of these assets. The outcomes in line with Majeed and Ayub (2018) who reported that the results for economic growth from internet, mobile telephones, and fixed broadband are noticed more in middle-income economies. In contrast, the results of the control variables' effects show that almost all have a positive impact on economic growth, except for trade openness. Additionally, the labor participation rate shows a bigger coefficient

in comparison to other controlling variables with a positive and significant relationship with economic growth that as a 1% increase in the labor participation rate, the GDP level will increase between 1.32 and 1.77 %.

In low income economies, the results show that the two ICT indicators: fixed broadband and mobile cellular subscriptions have insignificant impact on economic growth while the level of internet users have a little impact on economic growth at 10% level that as the level of internet users increases by 1%, the GDP per capita level will increase by 0.05%. The reason behind this result is that high income economies are better able to invest in new technology and enhance the efficient use of it than low income economies that are less likely to invest in new technology and use the available one for a consumption purpose rather than productive purposes. Regarding the association between control variables and economic growth, the results show a positive and significant relationship in all three models. The impact of gross fixed capital formation is the largest with coefficients between 0.74 and 0.87.

Overall, the analysis for four income groups, high, upper middle, lower middle and low income economies show that the level of the ICT infrastructure effect varies according to the type of technology studied and middle income economies are gaining more form the use of ICT infrastructure than high income economies with positive and strongly effect on economic growth.

6. Conclusion

The ICT revolution has spread quickly across countries and transformed how people live, interact and work. The growth in pace, reach, intensive use and reliability of information access, knowledge sharing, and interaction across countries are at the core of this transformation. It is predicted that these strong impacts will translate into economic results.

This paper has aimed to offer a discussion regarding the economic impact of ICT on 89 countries classified according to their income level to 7 low income economies, 20 lower middle income economies, 19 upper middle income economies and 43 high income economies. Accordingly, the first approach is to determine the impact of investment in ICT and non ICT assets on economic growth for a period 1990 to 2018. A panel model of ICT capital services growth rates, non ICT capital services growth rates, employment growth rate, export growth rate and per capita GDP growth is constructed and applied for each group. By comparing between pooled OLS, Fixed and random effect, the results show that the preferred model is fixed effects model and reveal that the non ICI capital is still have a higher importance in comparison to ICT. ICT capital still plays a major role in the richest countries in the world, and a weak significant impact of ICT capital appears in lower middle income economies, while no significant impact of ICT capital in the upper middle and low income economies. There is thus no convincing statistical evidence that middle and low income economies benefit more than high income economies from investment in ICT for the time period covered and that middle and low income economies must concentrate on suitable investment of ICT infrastructure. The results also show that growth in employment and exports in the different groups have an extremely important impact on economic growth.

The second approach is to examine the economic impact of using various ICT infrastructure to evaluate which one has the greatest impact on economic growth and how their effect level differs between the groups of economies for a period 2000 to 2018. A three ICT indicators are used and three panel models were built one for each indicators, these indicators are: number of fixed broadband Internet subscribers in one country per 100 people, the percent of people who used the Internet from every place in the last three months and the number mobile cellular subscriptions per 100 inhabitants in a country. In addition, each model controlled with three variables: participation rate of labor force, trade openness and gross fixed capital formation. Co-integration tests and DOLS estimation applied. The empirical results show that middle-income economies are gaining more form the use of ICT infrastructure than high-income economies with positive and strongly effect on economic growth. The highest impact was recorded for the percentage of individuals using the Internet in high and upper middle income economies, while the effect of mobile cellular subscriptions appears marginally greater than other ICT infrastructures in upper middle for the time period covered. In low income economies only the level of internet

users have a little impact on economic growth at 10% level. With regard to control variables in all models almost all, except for trade openness in middle economies, had significant impact on economic growth.

As the use of ICT infrastructures have positive and important economic development, the main focus of investments in middle and low income economies should be on suitable technologies to support the efficient use of it, in addition to the establishment of mechanisms and policies that improve the infrastructure of ICT, the use and the access to it. Moreover, as regards the negative coefficient of ICT capital variable in low income economies, the government should be proactive in reforming the ICT sector with major investments in order to make it a key engine that drives the economy towards a knowledge economy.

For future work, our modeling can be implemented at country level or at economy's lower parts, for example, companies that can contribute to deeper insight into the ICT productivity impacts in developing and emerging countries, on the other hand the work can be expanded by taking into account other ICT dimensions like artificial intelligence and the robotic economy. Nonetheless, one of the challenges is to collect and build time series or cross-section data series on the selected ICT indicator.

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Appendix

Appendix A: Countries List

Table A1: List of counties covered in this study

High Income		Upper Middle Income	Lower Middle Income	Low Income
Uruguay	Ireland	Turkey	Ukraine	Uganda
United States	Iceland	Thailand	Tunisia	Tanzania
United Kingdom	Hungary	Romania	Sudan	Tajikistan
United Arab Emirates	Hong Kong, China	Mexico	Sri Lanka	Niger
Switzerland	Greece	Malaysia	Philippines	Mozambique
Sweden	Germany	Kazakhstan	Pakistan	Mali
Spain	France	Jamaica	Morocco	Malawi
South Korea	Finland	Iran, Islamic Rep.	Moldova	
Slovenia	Estonia	Guatemala	Kyrgyzstan	
Singapore	Denmark	Ecuador	Kenya	
Saudi Arabia	Czech Republic	Dominican Republic	Indonesia	
Portugal	Cyprus	Costa Rica	India	
Poland	Croatia	Colombia	Ghana	
Norway	Chile	China	Egypt, Arab Rep.	
New Zealand	Canada	Bulgaria	Côte d'Ivoire	
Netherlands	Belgium	Brazil	Cameroon	
Malta	Barbados	Armenia	Cambodia	
Luxembourg	Bahrain	Algeria	Bolivia	
Kuwait	Austria	Albania	Bangladesh	
Japan	Australia		Vietnam	
Italy	Argentina			
Israel				

Source: United Nation (2019)

Appendix B: Stationary Tests Results

Table B1: Stationary Tests Results for the Variables of ICT Investments Effects Model - High Income Economies

Test Type		Variables									
		gGDPPC		gICT		gNICT		gEMPLOY		gExport	
		Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**
Levin, Lin&Chu	At Level	-16.5767	(0.0000)	-6.48425	(0.0000)	-7.99601	(0.0000)	-10.7796	(0.0000)	-15.9546	(0.0000)
ADF	At Level	434.015	(0.0000)	124.696	(0.0041)	159.193	(0.0000)	320.045	(0.0000)	421.61	(0.0000)
PP	At Level	437.068	0.0000)	125.394	(0.0036)	187.29	(0.0000)	307.18	(0.0000)	469.749	(0.0000)

Source: authors' calculation using Eviews

Table B2: Stationary Tests Results for the Variables of ICT Investments Effects Model - Upper Middle Income Economies

Test Type		Variables									
		gGDPPC		gICT		gNICT		gEMPLOY		gExport	
		Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**
Levin, Lin&Chu	At Level	-7.88129	(0.0000)	-4.80898	(0.0000)	-2.08316	(0.0186)	-8.17411	(0.0000)	-12.9567	(0.0000)
ADF	At Level	192.713	(0.0000)	71.4752	(0.0008)	67.7604	(0.0021)	175.174	(0.0000)	226.375	(0.0000)
PP	At Level	207.22	(0.0000)	64.9144	(0.0042)	53.9112	(0.0452)	235.78	(0.0000)	227.194	(0.0000)

Source: authors' calculation using Eviews

Table B3: Stationary Tests Results for the Variables of ICT Investments Effects Model - Lower Middle Income Economies

Test Type		Variables									
		gGDPPC		gICT		gNICT		gEMPLOY		gExport	
		Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**
Levin, Lin&Chu	At Level	-1.90918	(0.0281)	-4.3865	(0.0000)	-2.38652	(0.0085)	-5.04421	(0.0000)	-13.2775	(0.0000)
ADF	At Level	105.624	(0.0000)	72.9056	(0.0011)	57.9009	(0.0333)	110.66	(0.0000)	272.74	(0.0000)
PP	At Level	149.549	(0.0000)	71.2599	(0.0017)	37.2335	(0.5955)	221.563	(0.0000)	293.459	(0.0000)

Source: authors' calculation using Eviews

Table B4: Stationary Tests Results for the Variables of ICT Investments Effects Model - Low Income Economies

Test Type		Variables								
		gGDPPC		gICT		gNICT		gEMPLOY		gExport	
		Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**
Levin, Lin&Chu	At Level	-5.59715	(0.0000)	-3.98012	(0.0000)	-1.87686	(0.0303)	-2.74506	(0.0030)	-8.64134	(0.0000)
ADF	At Level	79.073	(0.0000)	38.8091	(0.0004)	25.6372	(0.0288)	40.0197	(0.0003)	95.1004	(0.0000)
PP	At Level	106.02	(0.0000)	39.8695	(0.0003)	19.9056	(0.1331)	40.7004	(0.0002)	95.3254	(0.0000)

Source: authors' calculation using Eviews

Table B5: Stationary Tests Results for the Variables of ICT Usage Effects Models - High Income Economies

Tests Type	At Level						At First Difference					
	Levin, Lin &Chu		ADF		PP		Levin, Lin &Chu		ADF		PP	
Variables	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**
Log_GDPPC	15.3552	(1.0000)	8.55363	(1.0000)	10.0369	(1.0000)	-12.8042	(0.0000)	324.768	(0.0000)	316.46	(0.0000)
Log_FBS	3.68141	(0.9999)	40.2091	(1.0000)	40.271	(1.0000)	-54.7947	(0.0000)	619.054	(0.0000)	646.822	(0.0000)
Log_IU	7.65031	(1.0000)	12.4085	(1.0000)	1.57373	(1.0000)	-22.7487	(0.0000)	493.358	(0.0000)	513.629	(0.0000)
Log_MCS	8.44949	(1.0000)	19.6975	(1.0000)	2.74652	(1.0000)	-20.7139	(0.0000)	502.94	(0.0000)	544.501	(0.0000)
Log_GFCF	-1.28835	(0.0988)	58.4527	(0.9900)	69.1981	(0.9072)	-21.6779	(0.0000)	569.142	(0.0000)	570.441	(0.0000)
Log_TO	3.65146	(0.9999)	26.6071	(1.0000)	25.6833	(1.0000)	-24.3111	(0.0000)	625.483	(0.0000)	650.109	(0.0000)
Log_LABOR	2.04646	(0.9796)	51.2365	(0.9989)	58.2896	(0.9904)	-18.6976	(0.0000)	497.178	(0.0000)	535.901	(0.0000)

Source: authors' calculation using Eviews

Table B6: Stationary Tests Results for the Variables of ICT Usage Effects Models - Upper Middle Income Economies

Tests Type	At Level						At First Difference					
	Levin, Lin &Chu		ADF		PP		Levin, Lin &Chu		ADF		PP	
Variables	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**
Log_GDPPC	10.8872	(1.0000)	2.45113	(1.0000)	1.24831	(1.0000)	-4.90417	(0.0000)	106.304	(0.0000)	112.459	(0.0000)
Log_FBS	-0.67623	(0.2494)	49.5107	(0.1000)	110.126	(0.0000)	-23.9331	(0.0000)	201.458	(0.0000)	197.233	(0.0000)
Log_IU	5.07278	(1.0000)	6.42885	(1.0000)	1.67912	(1.0000)	-11.2689	(0.0000)	160.599	(0.0000)	126.5	(0.0000)
Log_MCS	1.00184	(0.8418)	16.5985	(0.9990)	3.1776	(1.0000)	-14.0976	(0.0000)	188.732	(0.0000)	205.799	(0.0000)
Log_GFCF	1.21272	(0.8874)	19.9228	(0.9931)	21.8102	(0.9836)	-14.6238	(0.0000)	243.705	(0.0000)	253.102	(0.0000)
Log_TO	-0.44438	(0.3284)	29.1868	(0.8470)	33.6711	(0.6698)	-17.8793	(0.0000)	304.099	(0.0000)	311.248	(0.0000)
Log_LABOR	0.78607	(0.7841)	20.9532	(0.9887)	46.5624	(0.1606)	-8.75432	(0.0000)	245.89	(0.0000)	232.346	(0.0000)

Source: authors' calculation using Eviews

Table B7: Stationary Tests Results for the Variables of ICT Usage Effects Models - Lower Middle Income Economies

Tests Type	At Level						At First Difference					
	Levin, Lin &Chu		ADF		PP		Levin, Lin &Chu		ADF		PP	
Variables	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**
Log_GDPPC	22.5333	(1.0000)	1.75095	(1.0000)	0.35824	(1.0000)	-0.58632	(0.2788)	70.8971	(0.0019)	78.4345	(0.0003)
Log_FBS	-13.9597	(0.0000)	243.935	(0.0000)	239.527	(0.0000)	-11.8956	(0.0000)	212.05	(0.0000)	184.836	(0.0000)
Log_IU	2.61288	(0.9955)	11.51	(1.0000)	8.66758	(1.0000)	-11.8359	(0.0000)	159.508	(0.0000)	179.037	(0.0000)
Log_MCS	-1.65565	(0.0489)	29.6172	(0.8856)	5.99399	(1.0000)	-12.1207	(0.0000)	191.186	(0.0000)	179.448	(0.0000)
Log_GFCF	4.30632	(1.0000)	16.8062	(0.9995)	16.4046	(0.9997)	-15.3166	(0.0000)	270.742	(0.0000)	289.73	(0.0000)
Log_TO	0.00741	(0.5030)	31.2432	(0.8377)	43.7562	(0.3151)	-16.0148	(0.0000)	271.745	(0.0000)	298.127	(0.0000)
Log_LABOR	0.47799	(0.6837)	38.347	(0.5448)	31.4535	(0.8309)	-9.74701	(0.0000)	235.899	(0.0000)	230.139	(0.0000)

Source: authors' calculation using Eviews

Table B8: Stationary Tests Results for the Variables of ICT Usage Effects Models - Low Income Economies

	At Level						At First Difference					
	Levin, Lin &Chu		ADF		PP		Levin, Lin &Chu		ADF		PP	
Tests Type												
Variables	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**
Log_GDPPC	12.4823	(1.0000)	0.17972	(1.0000)	0.11237	(1.0000)	-4.18836	(0.0000)	50.9738	(0.0000)	65.9535	(0.0000)
Log_FBS	-2.63345	(0.0042)	19.3078	(0.1535)	17.4959	(0.2307)	-8.93119	(0.0000)	79.9183	(0.0000)	92.5504	(0.0000)
Log_IU	0.37999	(0.6480)	21.3147	(0.0938)	14.8024	(0.3918)	-5.06321	(0.0000)	47.0642	(0.0000)	56.4484	(0.0000)
Log_MCS	-0.5589	(0.2881)	10.1742	(0.7493)	6.07283	(0.9646)	-6.03204	(0.0000)	57.1756	(0.0000)	62.5884	(0.0000)
Log_GFCF	2.27047	(0.9884)	2.71739	(0.9995)	2.66998	(0.9995)	-9.16815	(0.0000)	91.2615	(0.0000)	103.519	(0.0000)
Log_TO	-0.15856	(0.4370)	12.8502	(0.5383)	12.8875	(0.5354)	-11.3318	(0.0000)	114.19	(0.0000)	109.495	(0.0000)
Log_LABOR	-0.31564	(0.3761)	13.1084	(0.5180)	27.9343	(0.0145)	-2.40323	(0.0081)	24.7825	(0.0368)	21.2629	(0.0951)

Source: authors' calculation using Eviews

Table B9: Stationary Tests Results for the Residual of ICT Usage effects Model I

| | | High Income | | Upper Middle Income | | Lower Middle Income | | Low Income | |
Test Type		Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**
Levin, Lin&Chu	At Level	-7.23776	(0.0000)	-6.57482	(0.0000)	-9.27297	(0.0000)	-2.93445	(0.0017)
ADF	At Level	197.134	(0.0000)	99.1242	(0.0000)	144.038	(0.0000)	26.7296	(0.0209)
PP	At Level	233.835	(0.0000)	110.322	(0.0000)	142.213	(0.0000)	74.1552	(0.0000)

Source: authors' calculation using Eviews

Table B10: Stationary Tests Results for the Residual of ICT Usage effects Model II

| | | High Income | | Upper Middle Income | | Lower Middle Income | | Low Income | |
Test Type		Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**
Levin, Lin&Chu	At Level	-7.92394	(0.0000)	-6.2026	(0.0000)	-12.7817	(0.0000)	-5.55558	(0.0000)
ADF	At Level	229.433	(0.0000)	98.436	(0.0000)	209.727	(0.0000)	65.7067	(0.0000)
PP	At Level	288.528	(0.0000)	129.748	(0.0000)	210.401	(0.0000)	62.1485	(0.0000)

Source: authors' calculation using Eviews

Table B11: Stationary Tests Results for the Residual of ICT Usage effects Model III

Test Type		High Income		Upper Middle Income		Lower Middle Income		Low Income	
		Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**	Statistics	Prob.**
Levin, Lin&Chu	At Level	-6.01384	(0.0000)	-6.18889	(0.0000)	-4.34112	(0.0000)	-2.4	(0.0082)
ADF	At Level	204.078	(0.0000)	98.3324	(0.0000)	72.231	(0.0013)	41.856	(0.0001)
PP	At Level	225.308	(0.0000)	105.857	(0.0000)	85.3509	(0.0000)	45.892	(0.0000)

Source: authors' calculation using Eviews

Appendix C: Panel Models Results

Table C1: Panel Models Estimation Results for ICT Investments effects Model - High Income Economies

	Dependent Variable: gGDPPC					
	Pooled OLS		Fixed Effect		Random Effect	
Variable	Coefficients	Prob.	Coefficients	Prob.	Coefficients	Prob.
C	-1.080935	(0.0000)	-1.0235	(0.0000)	-1.078274	(0.0000)
gICT	0.069051	(0.0000)	0.0530	(0.0000)	0.064631	(0.0000)
gNICT	0.100505	(0.0024)	0.0806	(0.1781)	0.092982	(0.0089)
gEMPLOY	0.130462	(0.3641)	0.2429	(0.0001)	0.188058	(0.0098)
gEXPORT	0.252971	(0.0000)	0.2476	(0.0000)	0.251312	(0.0000)

Source: authors' calculation using Eviews

Table C2: Panel Models Estimation Results for ICT Investments effects Model - Upper Middle Income Economies

	Dependent Variable: gGDPPC					
	Pooled OLS		Fixed Effect		Random Effect	
Variable	Coefficients	Prob.	Coefficients	Prob.	Coefficients	Prob.
C	-0.075819	(0.7994)	-0.4627	(0.1650)	-0.28536	(0.5281)
gICT	0.038975	(0.0043)	0.0192	(0.2268)	0.023565	(0.0584)
gNICT	0.300584	(0.0000)	0.4452	(0.0000)	0.403859	(0.0000)
gEMPLOY	0.18752	(0.1234)	0.3078	(0.0000)	0.264267	(0.0000)
gEXPORT	0.156066	(0.0000)	0.1338	(0.0000)	0.137883	(0.0000)

Source: authors' calculation using Eviews

Table C3: Panel Models Estimation Results for ICT Investments effects Model - Lower Middle Income Economies

	Dependent Variable: gGDPPC					
	Pooled OLS		**Fixed Effect**		**Random Effect**	
Variable	**Coefficients**	**Prob.**	**Coefficients**	**Prob.**	**Coefficients**	**Prob.**
C	0.615258	(0.0224)	-0.091325	(0.7717)	0.356034	(0.2672)
gICT	0.027577	(0.0152)	0.024382	(0.0498)	0.027452	(0.0133)
gNICT	0.186128	(0.0000)	0.336007	(0.0000)	0.239097	(0.0000)
gEMPLOY	0.276317	(0.0003)	0.318194	(0.0000)	0.255951	(0.0000)
gEXPORT	0.08778	(0.0000)	0.075469	(0.0000)	0.079325	(0.0000)

Source: authors' calculation using Eviews

Table C4: Panel Models Estimation Results for ICT Investments effects Model - Low Income Economies

	Dependent Variable: gGDPPC					
	Pooled OLS		**Fixed Effect**		**Random Effect**	
Variable	**Coefficients**	**Prob.**	**Coefficients**	**Prob.**	**Coefficients**	**Prob.**
C	0.717993	(0.3358)	-0.911854	(0.3524)	0.717993	(0.3178)
gICT	-0.019863	(0.2313)	-0.030234	(0.1675)	-0.019863	(0.2141)
gNICT	0.238222	(0.0020)	0.358686	(0.0001)	0.238222	(0.0014)
gEMPLOY	0.394082	(0.6064)	0.492159	(0.0694)	0.394082	(0.5928)
gEXPORT	0.047196	(0.0141)	0.047096	(0.0058)	0.047196	(0.0109)

Source: authors' calculation using Eviews

Appendix D: Model Selection Results

Table D1: Hausman Test results for ICT Investments effects Model - for All Income Groups

Economies Groups	Summary	Chi -Sq. Statistic	Chi -Sq. d.f.	Prob.	Result (preferred model)
High Income Economies	Cross section random	74.139705	4	(0.0000)	FEM
Upper Middle Income Economies	Cross section random	17.723141	4	(0.0014)	FEM
Lower Middle Income Economies	Cross section random	41.773539	4	(0.0000)	FEM
Low Income Economies	Cross section random	18.26366	4	(0.0011)	FEM

Source: authors' calculation using Eviews

Table D2: Wald Test results for ICT Investments effects Model - for All Income Groups

Economies Groups	Test Statistic	Value	df	Probability	Result (preferred model)
High Income Economies	F-statistic	5.04845	(42, 1125)	(0.0000)	FEM
	Chi-square	212.0349	42	(0.0000)	
Upper Middle Income Economies	F-statistic	10.1465	(18, 505)	(0.0000)	FEM
	Chi-square	182.637	18	(0.0000)	
Lower Middle Income Economies	F-statistic	7.147838	(19, 533)	(0.0000)	FEM
	Chi-square	135.8089	19	(0.0000)	
Low Income Economies	F-statistic	3.207285	(6, 165)	(0.0053)	FEM
	Chi-square	19.24371	6	(0.0038)	

Source: authors' calculation using Eviews

Appendix E: Co-integration Tests Results

Table E1: Co-integration Tests Results of ICT Usage effects Model I

		High Income		Upper Middle Income		Lower Middle Income		Low Income	
Pedroni Residual Co Integration Test		**Statistics**	**Prob.**	**Statistics**	**Prob.**	**Statistics**	**Prob.**	**Statistics**	**Prob.**
Within Dimention	V- Statistic	4.7766	(0.0000)	10.2740	(0.0000)	21.3231	(0.0000)	10.8787	(0.0000)
	Rho- Statistic	5.4396	(1.0000)	4.3498	(1.0000)	5.8932	(1.0000)	2.8514	(0.9978)
	PP- Statistic	0.9029	(0.8167)	1.5738	(0.9422)	0.5074	(0.6941)	-0.3032	(0.3809)
	ADF- Statistic	-2.3373	(0.0097)	-0.0923	(0.4632)	-1.0076	(0.1568)	-3.1273	(0.0009)
	V- Weighted Statistic	2.7540	(0.0029)	6.6576	(0.0000)	-3.7039	(0.9999)	4.0789	(0.0000)
	Rho- Weighted Statistic	4.6412	(1.0000)	3.9015	(1.0000)	6.9185	(1.0000)	2.5974	(0.9953)
	PP- Weighted Statistic	-2.5186	(0.0059)	0.2659	(0.6048)	-10.7175	(0.0000)	-3.2610	(0.0006)
	ADF- Weighted Statistic	-5.4115	(0.0000)	-1.1583	(0.1234)	-3.3460	(0.0004)	-4.1511	(0.0000)
Between Dimension	Group rho - Statistic	6.9878	(1.0000)	5.0712	(1.0000)	6.4161	(1.0000)	3.5869	(0.9998)
	Group PP- Statistic	-5.3187	(0.0000)	-3.7318	(0.0001)	-7.0059	(0.0000)	-4.6952	(0.0000)
	Group ADF- Statistic	-6.2411	(0.0000)	-2.1748	(0.0148)	-3.6025	(0.0002)	-4.6424	(0.0000)
Kao Residual Co-integration Test		**t- Statistic**	**Prob.**	**t- Statistic**	**Prob.**	**t- Statistic**	**Prob.**	**t- Statistic**	**Prob.**
	ADF	-2.3795	(0.0087)	-1.6516	(0.0493)	-1.6482	(0.0497)	-1.8165	(0.0346)
Fisher Residual Co-integration Test		**Fisher Stat.***	**Prob.**	**Fisher Stat.***	**Prob.**	**Fisher Stat.***	**Prob.**	**Fisher Stat.***	**Prob.**
	None	1858	(0.0000)	842.8	(0.0000)	839.9	(0.0000)	266.6	(0.0000)
	At most 1	1056	(0.0000)	491.4	(0.0000)	434.7	(0.0000)	132	(0.0000)
	At most 2	541.5	(0.0000)	243.9	(0.0000)	223.6	(0.0000)	86.23	(0.0000)
	At most 3	296.3	(0.0000)	118.3	(0.0000)	119.7	(0.0000)	61.9	(0.0000)
	At most 4	215.4	(0.0000)	69.33	(0.0000)	81.11	(0.0001)	46.98	(0.0000)
Results		Co-integrated		Co-integrated		Co-integrated		Co-integrated	

Source: authors' calculation using Eviews

Table E2: Co-integration Tests Results of ICT Usage effects Model II

		High Income		Upper Middle Income		Lower Middle Income		Low Income	
Pedroni Residual Co Integration Test		**Statistics**	**Prob.**	**Statistics**	**Prob.**	**Statistics**	**Prob.**	**Statistics**	**Prob.**
Within Dimention	V- Statistic	3.892182	(0.0000)	12.85981	(0.0000)	16.37491	(0.0000)	4.834301	(0.0000)
	Rho- Statistic	5.788827	(1.0000)	5.007844	(1.0000)	3.527623	(0.9998)	0.73833	(0.7698)
	PP- Statistic	0.20291	(0.5804)	2.088852	(0.9816)	-0.89376	(0.1857)	-2.28768	(0.0111)
	ADF- Statistic	-5.387473	(0.0000)	0.131115	(0.5522)	-2.4273	(0.0076)	-3.11521	(0.0009)
	V- Weighted Statistic	2.397315	(0.0083)	6.695869	(0.0000)	5.619311	(0.0000)	2.280773	(0.0113)
	Rho- Weighted Statistic	5.130025	(1.0000)	4.418576	(1.0000)	3.661797	(0.9999)	0.754229	(0.7746)
	PP- Weighted Statistic	-2.39049	(0.0084)	-1.75912	(0.0393)	0.014761	(0.5059)	-2.01746	(0.0218)
	ADF- Weighted Statistic	-4.825118	(0.0000)	-3.56352	(0.0002)	-1.8784	(0.0302)	-2.35276	(0.0093)
Between Dimension	Group rho - Statistic	7.548893	(1.0000)	6.281189	(1.0000)	4.435284	(1.0000)	1.678953	(0.9534)
	Group PP- Statistic	-4.083341	(0.0000)	-10.3628	(0.0000)	-4.88583	(0.0000)	-2.17992	(0.0146)
	Group ADF- Statistic	-6.165859	(0.0000)	-5.345873	(0.0000)	-4.736873	(0.0000)	-3.590678	(0.0002)
Kao Residual Co-integration Test		**t- Statistic**	**Prob.**	**t- Statistic**	**Prob.**	**t- Statistic**	**Prob.**	**t- Statistic**	**Prob.**
	ADF	-2.262008	(0.0118)	-1.52048	(0.0642)	-1.77114	(0.0383)	-2.53531	(0.0056)
Fisher Residual Co-integration Test		**Fisher Stat.***	**Prob.**	**Fisher Stat.***	**Prob.**	**Fisher Stat.***	**Prob.**	**Fisher Stat.***	**Prob.**
	None	1738	(0.0000)	774.7	(0.0000)	872.4	(0.0000)	178.4	(0.0000)
	At most 1	901.9	(0.0000)	385	(0.0000)	431.3	(0.0000)	92.48	(0.0000)
	At most 2	453.3	(0.0000)	222.2	(0.0000)	223.9	(0.0000)	61.27	(0.0000)
	At most 3	278.3	(0.0000)	136	(0.0000)	131	(0.0000)	52.68	(0.0000)
	At most 4	240.9	(0.0000)	98.98	(0.0000)	90.86	(0.0000)	_	_
Results		Co-integrated		Co-integrated		Co-integrated		Co-integrated	

Source: authors' calculation using Eviews

Table E3: Co-integration Tests Results of ICT Usage effects Model III

		High Income		Upper Middle Income		Lower Middle Income		Low Income	
Pedroni Residual Co Integration Test		**Statistics**	**Prob.**	**Statistics**	**Prob.**	**Statistics**	**Prob.**	**Statistics**	**Prob.**
Within Dimention	V- Statistic	3.4216	(0.0003)	16.58124	(0.0000)	24.09528	(0.0000)	4.765359	(0.0000)
	Rho- Statistic	5.446471	(1.0000)	4.985114	(1.0000)	5.516701	(1.0000)	0.894055	(0.8144)
	PP- Statistic	0.881281	(0.8109)	0.179747	(0.5713)	-1.45757	(0.0725)	-4.25915	(0.0000)
	ADF- Statistic	-1.306906	(0.0956)	-2.27296	(0.0115)	-2.3849	(0.0085)	-2.88419	(0.0020)
	V- Weighted Statistic	1.528707	(0.0632)	9.151405	(0.0000)	-4.53661	(1.0000)	1.995003	(0.0230)
	Rho- Weighted Statistic	5.234402	(1.0000)	4.887174	(1.0000)	7.299903	(1.0000)	0.984893	(0.8377)
	PP- Weighted Statistic	-0.949073	(0.1713)	-3.26999	(0.0005)	-4.29309	(0.0000)	-3.75456	(0.0001)
	ADF- Weighted Statistic	-2.651154	(0.0040)	-3.68088	(0.0001)	-2.34054	(0.0096)	-1.99646	(0.0229)
Between Dimension	Group rho - Statistic	7.402698	(1.0000)	6.127325	(1.0000)	6.13358	(1.0000)	2.329307	(0.9901)
	Group PP- Statistic	-3.167495	(0.0008)	-8.92939	(0.0000)	-9.84484	(0.0000)	-4.957	(0.0000)
	Group ADF- Statistic	-3.997933	(0.0000)	-3.92616	(0.0000)	-4.99821	(0.0000)	-4.40932	(0.0000)
Kao Residual Co-integration Test		**t- Statistic**	**Prob.**	**t- Statistic**	**Prob.**	**t- Statistic**	**Prob.**	**t- Statistic**	**Prob.**
	ADF	-2.788079	(0.0027)	-1.03131	(0.1512)	-0.72753	(0.2335)	-2.31976	(0.0102)
Fisher Residual Co-integration Test		**Fisher Stat.***	**Prob.**	**Fisher Stat.***	**Prob.**	**Fisher Stat.***	**Prob.**	**Fisher Stat.***	**Prob.**
	None	1705	(0.0000)	744.7	(0.0000)	789.7	(0.0000)	259	(0.0000)
	At most 1	945	(0.0000)	409.1	(0.0000)	456.9	(0.0000)	145.5	(0.0000)
	At most 2	488.8	(0.0000)	233.9	(0.0000)	250.8	(0.0000)	70.93	(0.0000)
	At most 3	263.3	(0.0000)	143.6	(0.0000)	142.4	(0.0000)	47.41	(0.0000)
	At most 4	205.2	(0.0000)	91.11	(0.0000)	96.81	(0.0000)	34.04	(0.0000)
Results		Co-integrated		Co-integrated		Co-integrated		Co-integrated	

Source: authors' calculation using Eviews

Accounting Symmetries on Indonesian Entities by Applying the Edgeworth's Box

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Abstract

Decisions making of entities in an economy are materialized into transactions to transform economic goods into monetary goods, maintaining a continued management of the corporate activity. The transformation of economic goods into monetary ones is a <<mutatis mutandis>> effect in which entities of the economic and financial market interfere with different impact in their respective financial statements. In accordance to the economic situation of the market, we can make a bigger/smaller association between such entities. This association is susceptible of being represented by accounting symmetries. Accounting symmetries are obtained to measure the positions taken by entities in an Edgeworth's Box. The entities that are object of study in this manuscript are banking entities, non-financial entities, and the entity-State, which represents the position of the Indonesian economy in the Edgeworth's Box. Later, the manuscript visually analyses the accounting symmetries between banking and non-financial entities, shorted by economic sectors.

Keywords: Symmetry Accounting, Accounting Methodology, Accounting Analysis, National Accounting

1. Introduction

1.1 Introduce the Problem.

The accounting transaction is defined in this manuscript as the registry of the value identity between economic and financial transactions, which intervene in a decision making of an entity in an accounting information system. The economic transactions can be part or counterpart of the financial transactions that perform as counterpart or part of the ones before mentioned. The conversion of economic or financial transactions into parts or counterparts implies the use of an accounting regulatory paradigm to convert them in accounting transactions. The structuring of the elements of the accounting paradigm establishes an accounting conceptual framework, which is included in the Accounting National System (ANS 2008) of the United Nations (UN 2009). ANS 2008 allows to elaborate macroeconomic variables of different countries and is adopted by different international organizations to make decisions on their economies, such as the World Bank (WB) (Lequiller, F. and D. Blades, 2014).

The Conceptual Framework of the ANS 2008 performs as a conceptual reference to develop the accounting national systems of countries grouped in international organizations. This strategy implies the standardization of the content of the accounting systems of the simplest units of activity, which enables the aggregation of their

accounting transactions to form macroeconomic variables. The annual accounts are the synthesis of the decision making adopted by entities belonging to a same economic-financial environment. The economic-financial environments are identified by the conditions that regulate the transactions, providing an economic culture that has an impact in the patrimonial situation of entities (Krugman, P.R., 1999. Krugman, P.R, & Obstfeld, M., 2006. Williamson, O.E., 2005, 2020).

The continued activity of entities seeks to transform the goods and services of their economic transactions into monetary goods. This <<mutatis mutandis>> effect implies the transformation of economic goods that are managed by non-financial entities into monetary goods that are managed by banking entities. The principle of quadruple entry defined in the ANS 2008 describes this transformation and justifies its analysis by visual representation of accounting symmetries.

The accounting symmetries relate the economic and financial indicators of the entities that measure their positions in an Edgeworth's Box. Non-financial, banking and State entities are added to the Edgeworth's Box. The State entity is the balance of transactions made within the Indonesian economy. The accounting symmetries visualize the level of economic and financial association of entities according to the extension and approximation of the symmetry axes to its centre. The measure of levels of economic-financial association has the explanatory ability of the evolution of the Indonesian macroeconomic variables. The analysis of symmetries can explain the behaviour of the economic sectors that affect the evolution of the Indonesian economy in the last section of this manuscript.

2. Method

2.1 Accounting Methodology

The accounting symmetries are built from both banking and non-financial entities. It is also considered the financial and economic position of these two entities regarding the State. The existence of the principle of quadruple entry in the ANS 2008 allows considering the relationship between economic and financial transactions made by entities belonging to different economic sectors. To measure the existing association level in this relationship in the Indonesian economy, the accounting symmetries are built with the economic and financial indicators that measure the positions of the mentioned entities in an Edgeworth's Box. Therefore, an economic indicator of one entity is related to the financial indicator of another entity, both belonging to different economic sectors (Pérez, 2019a, 2020).

The positions adopted by non-financial and financial entities in an Edgeworth's Box are presented in equations 1 and 2 respectively.

$$OR - VEA = VM - VFP \qquad (1)$$
$$OR - VEA = VFP - VM \qquad (2)$$

Equation 1 is the identity of the accounting variables of non-financial entities, representing the compensation between economic and financial transactions made at the end of a fiscal year. Equation 2 is the identity of the accounting variables of banking entities, representing the compensation between economic and financial transactions. The operation of subtraction between variables OR and VEA has the same meaning for both kinds of entities. OR is the economic cash-flow, obtained by correcting the accounting result of the annual accounts by the value of the parts that do not represent the accomplishment of economic transactions. VEA is the variation of the value of the economic accounting assets that have not been placed in the economic market at the end of an accounting exercise (Pérez, 2014).

The variables VM y VFP have the same financial significance, but with a different financial background depending on the kind of entity. VM is the monetary saving obtained from treasury variation of the accounting balance. However, it represents the variation of cash amount for non-financial entities. For banking entities, it represents the variation of the delivered deposits by their clients that may be compensated with the variation of the monetary cash value of the treasury in banking entities, and represents the misplaced cash value in the financial market. VFP is the variation of the financial positions of entities not transformed into cash at the end of a fiscal year. In the case of non-financial entities, it represents the value of financial products that are not paid at the end of the fiscal year.

In the case of financial entities, it represents the value of financial products negotiated in the financial market and not collected at the end of the fiscal year. (Pérez, 2015).

The transposition of elements in equations 1 and 2 provides the following equations regarding accounting equilibrium.

$$VEA + VM = VFP + OR \tag{3}$$
$$VEA + VFP = VM + OR \tag{4}$$

Equations 3 and 4 are accounting equilibrium equations for non-financial and banking entities respectively. Being accounting variations, they can acquire either negative or positive values. This manuscript uses the criteria of representing positive values in the Edgeworth's Box. In order to reach this goal, there is a change of origin in equations 3 and 4 when any of their values is negative. This change of origin consists of aggregating the bigger negative value among all to every accounting equation variable, multiplied by -2 (minus 2). Once the values are corrected, they are added to the Edgeworth's Box by applying a change of unit, dividing them by the sum of the variables of each one of the parts of the identity 3 and 4. This second transformation allows obtaining the percentage values of the relative weight of each one of the variables on the respective annual equations of accounting identity corresponding to equations 3 and 4.

There are four axes in an Edgeworth's Box. Variables RO and VAE are represented in the secondary x-axis and primary y-axis of the Edgeworth's Box, respectively. Variables VPF and VM of non-financial entities (equation 3) are represented in the primary x-axis and secondary y-axis of the Edgeworth's Box, respectively. In the case of banking entities (equation 4), VPF and VM are represented in the secondary y-axis and the primary x-axis of the Edgeworth's Box respectively. This way, the sum of variables represented in both axes is 100%, regardless of the position they acquire in the Edgeworth's Box.

According to the methodology applied, the result of the transformations for the companies of the sample is represented by a black dot and a cross (●, +). Black dot and triangle (●, Δ) have been used for banking entities. We can obtain the measuring of the relative positions of entities by applying equations 5 and 6, respectively.

$$LC = (VM/OR) - (VEA/VFP); GC = (VEA/OR) - (VM/VFP) \tag{5}$$
$$LB = (VFPB/OR) - (VEA/VMB); GB = (VEA/OR) - (VFPB/VMB) \tag{6}$$

L and G indicators measure the financial and economic positions of the accounting identity equations represented in an Edgeworth's Box. The LC indicator is the financial measure of the activity developed by commercial companies, and measures the monetary supply obtained in accordance to the generated operative result (VM/RO) corrected with the obtained financial position materialized in real assets (VEA/VPF) or acquired hedge risk. GC indicator is the measure of investment in real assets in accordance to the generated operative result (VEA/RO), corrected with the monetary value generated regarding the funds obtained from the financial market (VM/VFP). It is necessary that the goal of commercial entities is to capture monetary supply from the financial market in order to keep the continued management of their activity.

In the case of banking entities, their goal is to capture monetary supply from the financial market to give it as loans and facilitate the economic activity of commercial entities. The LB indicator measures the ability to offer credit to the market (VFPB) regarding the generated operative result (VFPB/OR) reduced by the monetary supply (VMB) destined to the acquisition of real assets or hedge of financial operations (VA/VMB). The GB indicator is the economic indicator of banking entities, which measures the investment on real assets generated by the result of the activity (VA/OR) diminished by the amount of loan conceded to the market regarding the generated monetary supply (VFPB/VMB). With that in mind, the GB indicator is also taken as the level of hedge (VA/OR) acquired by a banking entity corrected with the level of risk (VFPB/VMB) acquired in the transfer of credit to the financial market. The inverse value of this indicator is similar to TIER 1 of Basilea III (Pérez, 2019b).

L and G indicators are the value of the x and y in Cartesian axes of the positions acquired by entities in an Edgeworth's Box. These indicators are used to represent the effect of symmetry between economic and financial

positions acquired by entities. This way, entities belonging to different sectors are analysed under the same criteria of measuring in a same analytic space: the Edgeworth's Box.

2.2 Participant (Subject) Characteristics.
The accounting symmetries are established between the economic and financial indicators of entities which belong to banking and non-financial sectors obtained from the Edgeworth's Box. The high volume of operations of entities that intervene in the study of accounting symmetries grants, at some extent, the existence of the principle of quadruple entry among them. The width/concentration of accounting symmetries must consider how the economic environment affects their behaviour. This way, accounting symmetries are also established among entities from the sample and State-entity.

This manuscript considers the accounting information of annual accounts from banking and non-financial entities of the Indonesian economy. The accounting information of entities is added to the Edgeworth's Box after homogenizing its measuring and valuation. The accounting variables are valued as US dollars (USD) and measured in thousands of units. Moreover, the accounting model used for the obtaining of the accounting equilibrium variables in the Edgeworth's Box is based on considering the dynamic behaviour of entities. In the previous section, the accounting equilibrium equations contain the economic cash-flow and the variation of assets and liabilities as the result of the accumulation of made transactions. The addition of the behaviour of the Indonesian economy to the Edgeworth's Box has considered the macroeconomic variables obtained by accumulation of the set of made transactions on itself. This action allows considering the dynamic behaviour of the economic sectors. This way, we obtain homogeneous and verifiable values for the set of entities added to the Edgeworth's Box.

The macroeconomic variables included in the accounting equation for the Indonesian economy are described in table 1. These variables have been obtained from the World Bank database (WB) for the Indonesian economy, which codenames of variables are in the first column of Table 1, column *<<Variables WB>>* contains the codification of macroeconomic variables, column *<<Operations>>* contains the operations made between macroeconomic variables of SNA 2008 to control the obtained results, and column *<<Variables>>* contains the acronyms of accounting variables, which form the accounting equilibrium equation for the Indonesian economy.

Table 1. Accounting macroeconomic variables

Financial transactions	*Variables WB*	*Operations*	*Variables*
Net acquisition of financial assets (current LCU)	GC.AST.TOTL.CN	(+)	
Net incurrence of liabilities, total (current LCU)	GC.LBL.TOTL.CN	(-)	
Net lending (+) / net borrowing (-) (current LCU)	GC.NLD.TOTL.CN	(=)	
Economic transactions			
Gross savings (current LCU)	NY.GNS.ICTR.CN	(+)	*ORec*
Net lending (+) / net borrowing (-) (current LCU)	GC.NLD.TOTL.CN	(-)	
Non-financial assets	(4) = (1)+(2)+(3)	(=)	*VAEec*
1. Capital transfers	*(1)*		
2. Acquisitions less sales of non-financial non-produced assets	*(2)*		
3. Gross capital formation	*(3)*		
Treasury positions			
Net incurrence of liabilities, total (current LCU)	GC.LBL.TOTL.CN	(+)	
Broad money (current LCU) Liability (M3)	FM.LBL.BMNY.CN	(-)	*VMec*
Liability financial positions	*(5)*	(=)	
Net acquisition of financial assets (current LCU)	GC.AST.TOTL.CN (6)	(+)	
Net financial positions	*(7) = (6) – (5)*		*NFPec*

The accounting parity equation for the Indonesian economy is presented in equation 7, where VEAec is the variation of the non-financial asset, VFPec is the variation of the financial position, VMec is the monetary variation and ORec is the operative result.

$$VEAec + VFPec = VMec + ORec \qquad (7)$$

Variables of equation 7 are the result of the operations made using variables located in column <<Variables>> from table 1 and are extracted from the macroeconomic variables from ANS 2008 database. The variable for the control of data from ABS 2008 to check the results of the economic and financial activity is <<Net lending (+)/net borrowing (-)>>. This variable is the difference between transactions made between financial assets <<Net acquisition of financial assets>> and financial liabilities << Net incurrence of liabilities, total>>. The value of the subtraction financially obtained is also obtained by the subtraction of economic figures of <<Gross savings>> and the transactions with non-financial assets <<Non-financial assets>>.

The macroeconomic variables from table 1 are associated to the accounting variables from equation 7. This way, the economic variable <<Gross savings>> is ORec, and <<Non-financial assets>>is the accounting variable VEAec, which is the sum of variables <<*Capital transfers>>, <<Acquisitions less sales of non-financial non-produced assets>>* and << *Gross capital formation>> (BdE 2019)*. In relation to financial variables from the Indonesian economy, the monetary variation from equation 7 <<VMec>> is the macroeconomic variable <<M3>> and it is excluded from the value of the macroeconomic variable <<Net incurrence of liabilities, total>>. This operation allows obtaining variable <<VFPes>> in equation 7 by subtraction between macroeconomic variables <<Net acquisition of financial assets>> and the corrected value of <<Net incurrence of liabilities, total>>.

Once the macroeconomic variables are adjusted to the accounting variables from equation 7, positions of the Indonesian economy can be measured in the Edgeworth's Box with indicators from equation 8.

$$Lec = (VFPec/ORec) - (VEAec/VMec); Gec = (VAec/ORec) - (VFPec/VMec) \qquad (8)$$

Indicators from equation 8 have the same significance as those obtained for banking entities, but in a macroeconomic sense. The Lec indicator measures the level of financial products made available by the Indonesian economy in relation to the achieved economic savings (VFPec/ORec) corrected with the hedge of acquired risk (EAec/VMec), which is measured regarding the economic investment made on the obtained monetary supply (M3). The Gec indicator measures the level of economic activity reached, which measures the volume of economic investment made regarding the economic savings achieved (VAec/ORec) corrected with the investment in financial products on the obtained monetary supply (VFPec/VMec).

The indicators obtained from the measuring of positions of entities included in an Edgeworth's Box have the same economic and financial significance explainable according to the type of entity they belong. Table 2 explains the levels of risk adopted according to the area in the Edgeworth's Box where the accounting identity equation is located for every entity.

Table 2. Risk zones on Edgeworth's box

Indicator/zones	AA	AB	BB	BC	CC	CD	DD	DA
L	L>0	L>0	L<0	L<0	L<0	L<0	L>0	L>0
G	G>0	G>0	G>0	G>0	G<0	G<0	G<0	G<0
Quadrant	1	1	2	2	3	3	4	4
Tangent	|G|/|L|<1	|G|/|L|>1	|G|/|L|>1	|G|/|L|<1	|G|/|L|<1	1G|/1L|>1	|G1|/|L1|>1	|G|/1L|<1

The description of the risk areas is made considering the value of both L and G indicators at the same time. The lower risk area is the AA zone, and the higher risk area is the CC zone. In the AA zone, entities obtain or give credit, depending on the kind of entity (non-financial, banking or state), when L is bigger than zero (L>0). Simultaneously, there is a sustainable economic growth (G>0), because it obtains financing for such growth (L>G). The higher risk zone is the CC zone, where the contrary happens. The rest of zones perform as intermediate positions, which risk is measured regarding the value of both indicators at the same time, but indistinctly, maintaining them in a financial and economic sense. Finally, <<Quadrant>> shows the quadrant where the risk area is located by representing the positions of the Edgeworth's Box (figure 1) in coordinate axes (figure 2).

2.3 Sampling Procedures
The composition of the sample has been established according to the accounting symmetries to analyse. This manuscript regards the accounting symmetries between non-financial and banking entities and from the Indonesian

economy. Non-financial and banking entities have been obtained from the Orbis database under license of Universidad de Valencia and its annual composition is detailed in tables 3 and 4 respectively.

Table 3. Zones of Edgeworth's box for non-financial entities

Years/zones	AA	AB	BB	BC	CC	CD	DD	DA	SUMA	VARIABLE	P(CHI2)
2018	27	11	71	90	48	54	2	0	303	CHI 2/2018	0,033410377
2017	16	7	53	29	62	116	3	0	286	CHI 2/2017	0,309123871
2016	26	9	87	92	41	51	2	0	308	CHI 2/2016	0,250908197
2015	28	7	81	84	38	63	2	0	303	CHI 2/2015	0,294098535
2014	20	4	104	95	41	49	1	0	314	CHI 2/2014	0,813045964
2013	15	3	51	46	74	118	6	0	313	CHI 2/2013	1,44545E-05
2012	22	6	77	78	58	60	2	0	303	CHI 2/2012	0,239084821
2011	17	10	98	87	54	37	4	0	307	CHI 2/2011	0,861710234
2010	19	13	125	81	32	50	1	0	321	CHI 2/2010	0,93604844
2009	3	36	173	16	7	27	1	0	263	/	/
SUM	193	106	920	698	455	625	24	0	3021	CHI2/TOTAL	1,92798E-38

The annual compositions of the samples of commercial companies are in table 3, which is complemented with probable values of the distribution Chi2 obtained by means of contingency tables between risk areas and economic sectors to which the commercial companies belong, classified according to criteria NACE2. The P(Chi2) values show the level of significance of variable Chi2. When it is high, it shows independency from verified variables; and when it is not high or significant, it shows relation between the elements of the sample. The association of commercial companies is related to unstable years in the markets and companies do not have business alternatives outside their economic environment. When variables P(Chi2) are not important and their value is above 10%, they show that companies have business options alternative to the environment they are located, or this environment does not affect their activity. Years with economic struggle and association between companies are 2013 and 2018. In contrast, the years when companies have management alternatives are 2010, 2011 and 2014. In the first case, companies tend to occupy risk positions classified under letter C, and in the second case, companies tend to locate under in zone BB. In general, companies have taken bigger risk positions throughout the observed years, considering the sum of zones assigned with letter C (1.778) in opposition to those occupying zones of lower risk (1.243), providing as a result a significant value of Chi2 for the sample set of 1,92798E-38, showing the high levels of risk and association the commercial entities have maintained over the years of study.

Table 4. Zones of Edgeworth's box for banks

YEAR	A(AA&AB)	B(BB&BC)	C(CC&CD)	D(DD&DA)	SUM
2018	9	9	16	32	66
2017	7	8	26	22	63
2016	20	5	8	27	60
2015	18	6	8	32	64
2014	15	0	1	30	46
2013	5	1	20	15	41
2012	4	1	5	21	31
2011	18	0	0	12	30
2010	0	0	1	0	1
2009	0	0	0	0	0
SUM	96	30	85	191	402

The elements of the sample for banking entities are distributed by year in table 4 according to the areas of risk grouped in a less explicit way than for non-financial entities from table 3. Banking companies are the ones listed on the Indonesian stock market. It is possible to observe that they are not a high figure in the positions of risk C, in comparison to that observed for commercial companies from table 3 and, in the last years, they tend to acquire intermediate risk positions occupying zone D. The years where they are located in levels of risk are 2013 and 2017, which are similar to the results from table 3 for the commercial companies whose risk years are 2013 and 2018.

3. Results. Symmetry Effects

3.1 Accounting laboratory

The methodology used to obtain accounting symmetries has been developed in section 2 of this manuscript. This methodology analyses the dynamic behaviour of entities and it is made over past events. The registry of past events in accounting information system is materialized in accounting statements from which we can explain the dynamic behaviour of entities. The year-on-year variations of grouped accounts, extracted from an accounting model that explains the application the principle of double entry, are put through transformations to be included in a same analytical space: the Edgeworth's Box. The accounting equilibrium variables from entities located in the Edgeworth's Box are responses to changes in the markets.

The indicators that measure the relative positions of the Edgeworth's Box are independent to the action of the researcher, because they are based on being past events, and objective, given that they measure the relative position in the Box without intervention of the researcher. The nature of the indicators shows that the Edgeworth's Box is an accounting laboratory where any entity can be included under specific conditions that enable homogeneity in the valuation of their positions.

The Figure 1 is the Edgeworth's Box where the accounting equilibrium equations from different entities of the research are represented. The positions of banking entities are represented by a triangle (Δ), positions of commercial entities by a cross (+) and positions of Indonesian economy by a circle (○). Each position sums 100% when assets (x axis) and liabilities (y axis) are put together. Namely, each position has four explanatory variables that are related to the assets and liabilities of the accounting equilibrium equations from equations 5, 6 and 7 from section 2.

The Edgeworth's Box is a space of accounting analysis divided into eight zones by four diagonals. These eight zones have been measured according to the criteria established in table 2. The value of indicators L and G are represented in the Edgeworth's Box. The continuous line joining the highest values of the axes in the Edgeworth's Box represents the value of the L indicator when G is null. The dotted line is the G indicator. The representation of these indicators in coordinate axes is in Figure 2, where the x-axis is L and y-axis is G.

The positions of entities in Figure 2 are a rotation of the Edgeworth's Box. The positions of entities in Figures 1 and 2 have been obtained by accumulation of accounting equilibrium equations for the amount of annual entities in tables 3 and 4. The concentration of banking entities (Δ) in the centre of the coordinate axes shows a prudential behaviour for the banking sector, and the positions of commercial entities (+) in the CC zone show the constant risk position that have kept over the years of study. The positions of banking and non-financial entities confirm the comment made in the analysis of composition of the respective samples of entities in their tables. These positions of risk clash with the Indonesian economy performance (○) as a whole, which takes the AA zone of the Edgeworth's Box. Namely, the position of the Indonesian economy favours the prudential behaviour of the listed entities.
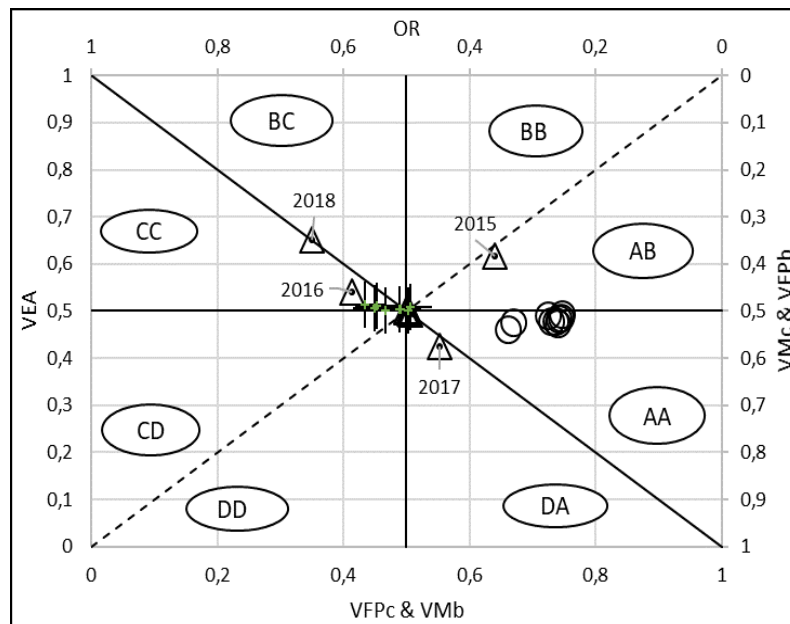
Figure 1. Edgeworth's box of Indonesian entities
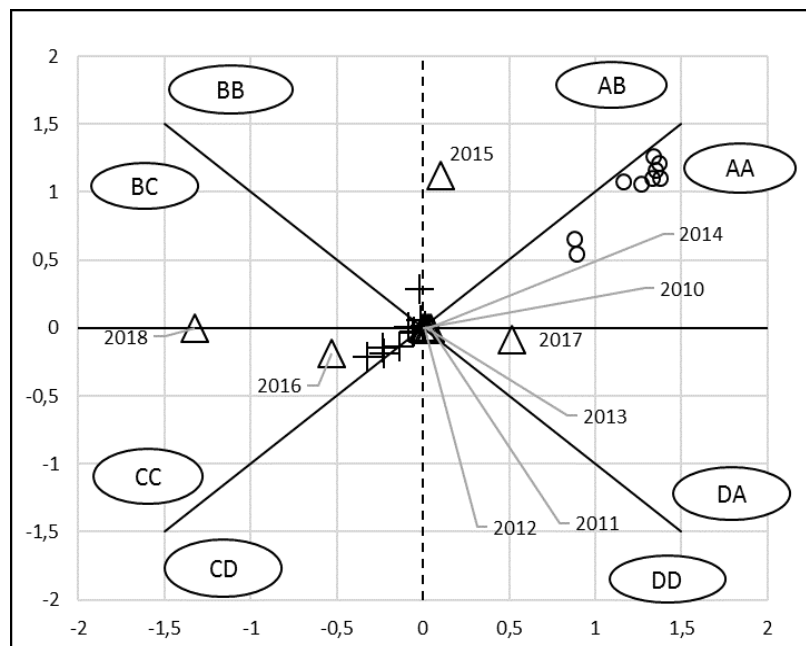
Figure 2. Accounting equilibrium equation

The evolution of indicators L and G in Figure 3 shows the level of prudential behaviour of entities and the high risk involved in 2003 in the continuous management of their activity. The symbols of the indicators for their respective entities in Figures 1 and 2 are used to identify the respective L and G indicators of entities. Besides, L and G indicators are represented by a continuous and dotted line, respectively. L and G for non-financial entities in Figure 3 in 2013 take negative values (L<0, G<0), G adopting a value higher than L (G>L), showing the mistrust of the markets on the credit granting to commercial entities. In that year, banking entities acquire a prudential position as it happens in 2010.When commercial entities adopt prudential positions in 2015 and 2016, banking entities adopt a non-prudential behaviour. It is concluded that there are compensations between prudential and risk positions between non-financial and banking entities in the Indonesian economy.
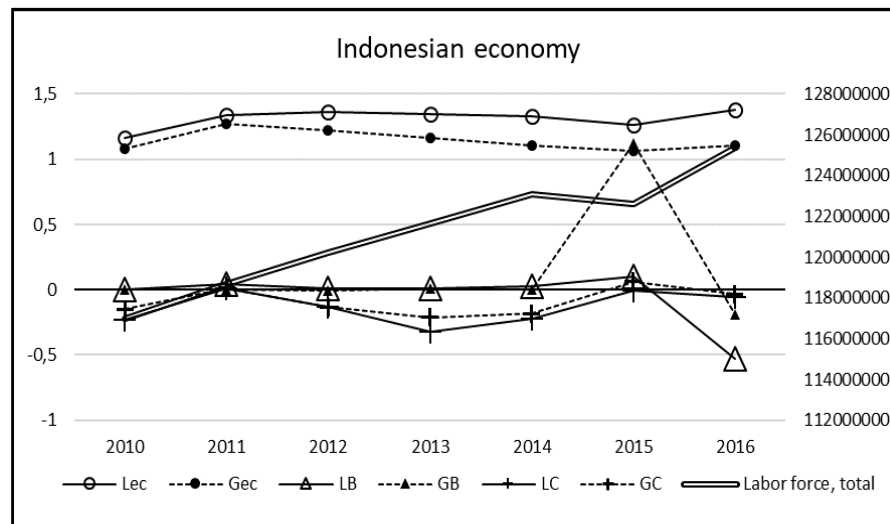
Figure 3. Evolution indicators Edgeworth's box

The evolution of the Indonesian economy remains with positive values for indicators L and G (L>0, G>0) and, moreover, the value of L is higher than the value of G (L>G). This behaviour of indicators places the Indonesian economy in the AA zone, and trigger a rise in employment, represented with parallel lines and with reference to the secondary axis of the graph in Figure 3. The evolution of employment has been obtained from the SL.TLF.TOTL.IN series from the World Bank (WB) without tampering with its numbers, given that it is the contrast variable used to validate the analysis of the consequences of being located in the zones of the Edgeworth's Box. Locating the activity of the Indonesian economy in the AA zone from 2010 to 2016 implies that it gives credit to the market that favours investment in economic assets and employment creation, while commercial and banking entities keep their prudential positions. In 2015 there is an alternation of prudential decisions. Banking entities rise their positions in intermediate risk zones in table 4, and non-financial entities improve their positions by raising their positions in the low risk zones in table 3. The rise of employment in the following years is associated to the rise of value of the indicators in the Edgeworth's Box for the Indonesian economy. (Pérez, 2014).

3.2 Accounting symmetries of Indonesian entities.
The accounting symmetries are generated relating the measuring of the accounting equilibrium positions of banking entities with the measuring of the accounting equilibrium positions of commercial entities. These relationships between indicators of entities belonging to different sectors are made from their respective representations in the coordinate axes in Figure 2.

The accounting symmetries are represented annually from 2011 to 2016 in Figure 4. Its representation is based on relating the economic indicators of non-financial entities (GC) with financial indicators of banking entities (LB). In the same way, economic indicators of banking entities (GB) are related with financial indicators of commercial entities (LC). The accounting symmetries between the respective entities of the sample and state-entity are represented to observe the effect of the economic environment in their decisions making. What is relevant is to visually analyse the level of association between the entities, considering that the biggest expansion of symmetries represents alternative options to the internal market and the concentration of accounting symmetries towards the centre implies the limitation of their activities in the internal market.

The accounting symmetries from Figure 4 have been built linking the annual positions of entities from Figure 2. To that end, the same symbols to identify the positions of entities in this analysis have been used. Thus, the triangle (Δ) represents the position of banking entities, the cross (X) represents the position of non-financial entities and the circle (●) represents the positions of the state-entities from Indonesia.

The annual symmetries of Figure 4 show the association between banking (Δ) and non-financial entities (X) of the sample, as well as the one between each one of them with the positions of the Indonesian economy (●). The

bigger/smaller association between the mentioned entities shows bigger/smaller alternatives for the development of their activity. The evolution of the Indonesian economy does not keep relation with the activity of the entities of the sample, while these keep a very associated behaviour. This shows that banking and non-financial entities do not find alternatives outside the environment in which they perform, and that the activity of the Indonesian economy favours their development. The most dangerous situation is present in 2011, where the accounting symmetry between entities of the sample shows a high association. In the following years, the symmetry axes between these entities expand, showing that there are business alternatives to the tight relationship between both entities. From 2011 to 2014, the prudential position of banking entities (Δ) has been favoured, quite close to the coordinate system centre, while non-financial entities have been positioned in risk zones. 2015 means a change of behaviour. The financial association is kept between entities of the sample and their economic relationship in abandoned by the width of their symmetry axes. Namely, there are financial difficulties and banking entities keep a greater economic association with the Indonesian economy, while non-financial entities keep their prudential position, close to the coordinate axes. These accounting symmetries are linked to the loss of employment in 2015, which is recovered in 2016. The activity between entities of the sample improves in 2016, once the symmetry axes were expanded between them and non-financial entities (X), adopt a better risk position than banking entities (Δ).

Figure 4a. Symmetry 2011   Figure 4b. Symmetry 2012   Figure 4c. Symmetry 2013

Figure 4d. Symmetry 2014   Figure 4e. Symmetry 2015   Figuref. Symmetry 2016

Figue 4.- Annual accounting symemeries
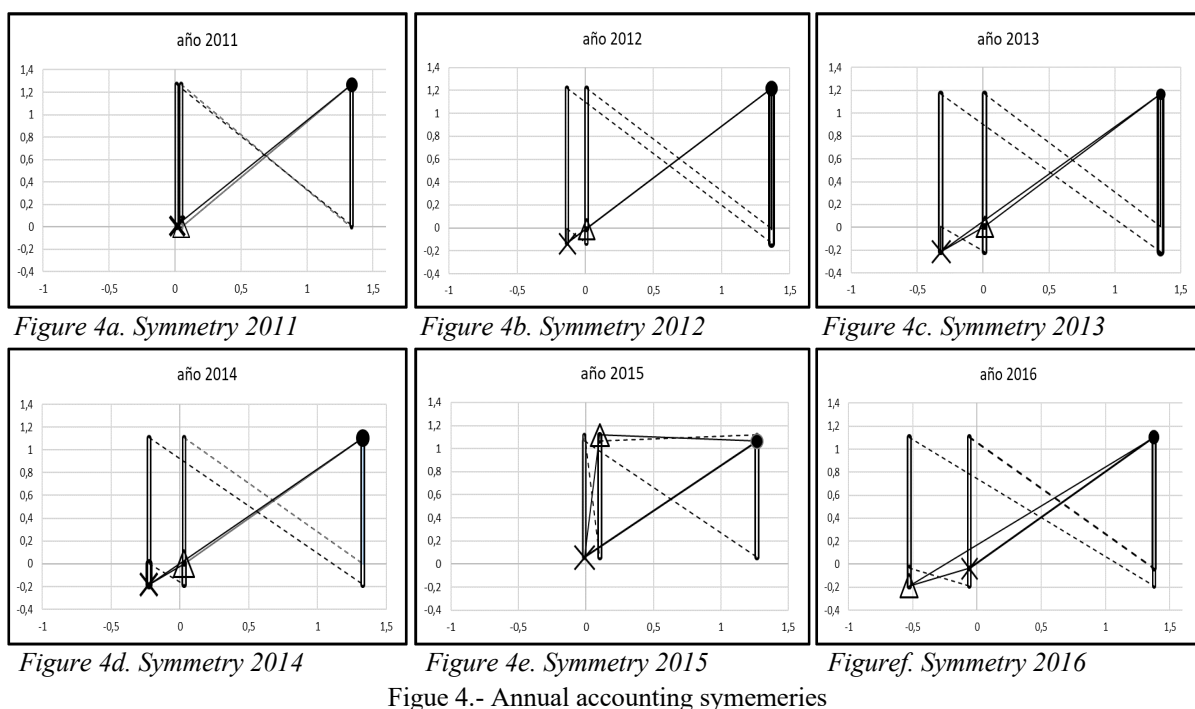
3.3 The centre of accounting symmetries.

The analysis of accounting symmetries can be done by making the set of observations, including coordinate centres, float around symmetries centres. In order to get this alternative representation, the symmetries centres of Figure 4 must be considered as changes of origin for the set of observations represented in them, modifying their position regarding both x and y axes. The result is the graphics of accounting symmetries in Figures 5, 6, 7a and 7b. In the respective graphics, the accounting symmetry centres are the centres of the coordinate axes, the coordinate axes from Figure 4 float around them, represented by a cross (+), the positions of banking entities are represented by a triangle (Δ) and the positions of companies are represented by a diamond (◊). Interpretations of the positions of risk of entities do not change when taking the positions of the coordinate axes (+) as reference, regarding symmetry centres. This way, when the coordinate axes (+) are in the third quadrant regarding the accounting symmetry centres, it shows that observations located in the first quadrant adopt a low risk position. In contrast, when the centres of the axes (+) meet in the first quadrant, the positions located in the third quadrant regarding symmetry centres adopt a high-risk position.

In the analysis of the accounting symmetries displayed in the following figures, the position of the coordinate axes (+) has relevance. This centre of coordinates allows assessing the positions of risk adopted by entities in an

Edgeworth's Box. The alternative representation of symmetries enables both singular and comparative analysis without losing the risk estimation adopted by an entity.

The symmetries in Figure 5 show the relationship between banking entities (Δ) and state-entities in Indonesia (●). Banking entities keep a financial and economic association during the analysed years except 2015 and 2016. The symmetry in 2015 is due to a high economic association, locating itself in the first quadrant of the coordinate axes centre (+). The symmetry in 2016 shows that the economic association is higher than the financial one, showing that there have been financial alternatives between both entities. A compared analysis of symmetries in Figure 5 shows that banking entities have kept prudential performances, locating themselves close to the axes except for the distortion showed in 2015 and 2016. The symmetries in Figure 6 show the relationship between non-financial entities (◊) and the state-entity of Indonesia (●). The companies are located in positions of risk and prudential positions during all the period when they are close to the coordinate axes. The bigger or smaller economic and financial association are altered during this period, in contrast to banking symmetries.
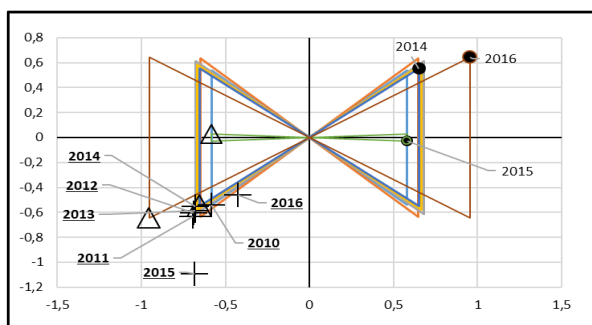
Figure 5. Accounting symmetries of banks
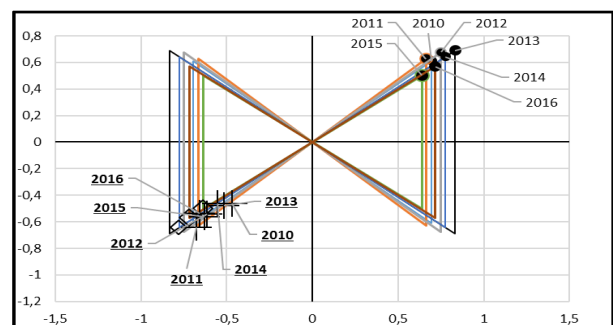
Figure 6. Accounting symmetries of companies
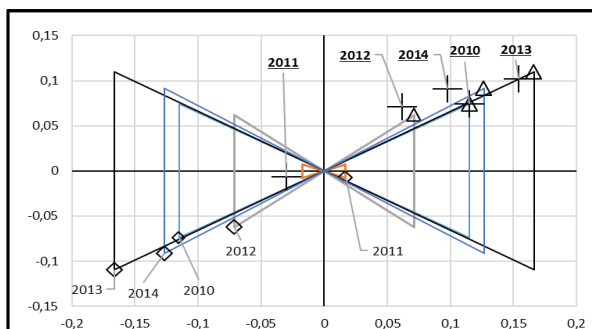
Figure 7a. Accounting symmetries 2010-2014
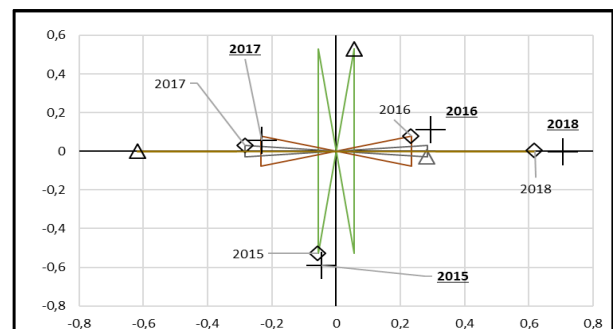
Figure 7b. Accounting symmetries 20++15-2018
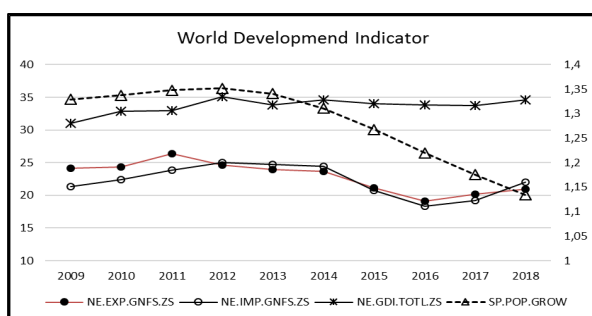
Figure 8a. Evolution of macroeconomic values
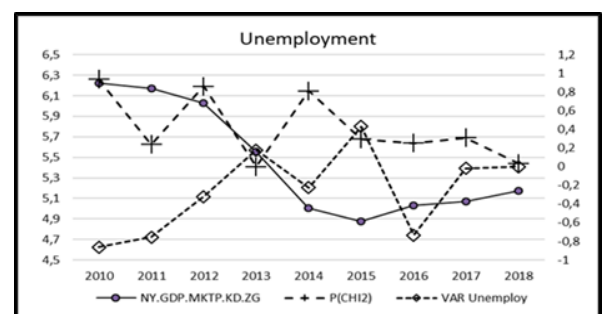
Figure 8b. Evolution P(chi2)

The symmetries of non-financial and banking entities are shown in Figures 7a and 7b. The symmetries of the period between 2010 and 2014 (Figure 7a) are more concentrated than from 2015 to 2018 (Figure 7b). The symmetries in Figure 7a are more concentrated than those in Figure 7b. This means that, from 2010 to 2014, they represent the responses of entities to market alterations when macroeconomic variables present a negative

evolution, shown in Figures 8a and 8b. The economic growth arrives in 2016, and the symmetries of the period between 2015 and 2018 have differentiated behaviour in every year in Figure 7b.

Considering the position of the coordinate axes centres (+) from 2010 to 2018, the axes centre of accounting symmetries from 2011 to 2015 are located in the third quadrant and represent positions of non-high for the entities of the sample. The symmetries in these years show a high financial association, leading to a reduction of GDP (NY.GDP.MKTP.KD. ZG), an increase of unemployment in Figure 8a, and of exports and imports (NE.EXP.GNFS. ZS, NE.IMP.GNFS. ZS) in Figure 8b, where the formers surpassing the latter. The coordinate axes centre (+) of 2017 represents an intermediate risk position, compensating the higher risk of non-financial entities with the lower risk of banking entities, according to their location in an Edgeworth's Box. In this year, exports and imports are increased and the former surpasses the latter (Figure 8 a), leading to an increase of GDP and the level of unemployment. And finally, the coordinate axes centre (+) of the rest of symmetries are located in the first quadrant, leading to locating the non-financial entities in high risk positions, which is compensated with the positions of banking entities. With this scenario, there is a continued decrease of GDP from 2011 to 2015 (Figure 8b) which is recovered starting from 2016. The 2018 represents the economic recovery with a high economic and non-financial association. This scenario repeats itself in 2013, being imports higher than exports. In both years, the distance of the perimeter axes shows that there are alternatives of financing different to those offered by the Indonesian banking.

The value of P(Chi2) measures the association of non-financial entities, and the accounting symmetries explain their nature. Table 5 contains the references of the positions of banking entities (L1) and companies (G1) in the accounting symmetries and explain the relationship between indicator P (Chi2) and the measure of association (MOA). The measure of association is determined by its nature, economic (Eco) or financial (Fin), which is obtained from the relationship between the distances of indicators L and G from the symmetry axes. This relationship compares EAD to FAD when the association is economic and, otherwise, there is an inverted relationship. The distances of the financial (FAD) or economic (EAD) association are obtained by multiplying by two the absolute value of indicators LB1 and GC1, and its lowest value determines the associative behaviour (ASSOC). Finally, the position of entities in the Edgeworth's Box is shown in columns LB and GC. LB measures the financial position of banking entities, and GC measures the economic position of non-financial entities. The changes of origin that are applied over LB and GC are Lo and Go, respectively. The change of origin is the average of financial and economic indicators of banking and non-financial entities, as explained in previous sections.

Table 5. Nature of accounting symmetries

Year	LB	Lo	GC	Go	L1	G1	FAD	EAD	P(Chi2)	ASSOC	MOA
2010	0,00	-0,11	-0,15	-0,07	0,12	-0,07	0,23	0,15	0,94	Eco	0,64
2011	0,05	0,03	0,01	0,01	0,02	0,01	0,03	0,02	0,24	Eco	0,45
2012	0,01	-0,06	-0,13	-0,07	0,07	-0,06	0,14	0,12	0,86	Eco	0,87
2013	0,01	-0,15	-0,21	-0,10	0,17	-0,11	0,33	0,22	0,00	Eco	0,66
2014	0,03	-0,10	-0,18	-0,09	0,13	-0,09	0,25	0,18	0,81	Eco	0,72
2015	0,10	0,05	0,06	0,59	0,06	-0,53	0,11	1,06	0,29	Fin	0,11
2016	-0,53	-0,29	-0,03	-0,11	-0,23	0,08	0,47	0,15	0,25	Eco	0,33
2017	0,52	0,23	-0,03	-0,06	0,28	0,03	0,57	0,06	0,31	Eco	0,10
2018	-1,32	-0,70	0,00	0,00	-0,62	0,00	1,23	0,00	0,03	Eco	0,00

Indicator MOA is related to indicator P (Chi2). The linear correlation between variables P (Chi2) and MOA is of 0.645487591 with a significance level of 0.8673541 for Student's t-test of two tails. The methodologic alternative shows the kind of association between entities of an accounting symmetry, increasing the explanatory capability of an observation in indicator P (Chi2). In the following section, the effect of the sectorial of the set of non-financial associations will be analysed.

3.4. Sectorial accounting symmetries of Indonesian entities.
The accounting symmetries of the economic sector to which the companies of the sample belong are analysed in this section and represented in Figures 9. The positions of banking entities (Δ), the position of companies (●) and the positions of the coordinate axes (+) are represented in Figure 4. The companies are sorted according to the first

digit of the listing of the economic sectors "*nomenclature statistique des activités économiques dans la Communauté européenne*" (NACE2) that is applied to identify the positions of banking entities (Δ) and the corresponding coordinate axes centre (+) by adding an asterisk (*).

The analysis of sectors is visually done, in accordance to the distortions they show regarding the set of non-financial entities of the sample in every Figure 9. The y-axis limits change in every Figure 9 and the values of the x-axis stay constant except for 2011 and 2015. Namely, the financial association keeps the same level of visualization in contrast to the random, which presents economic association in every graph.
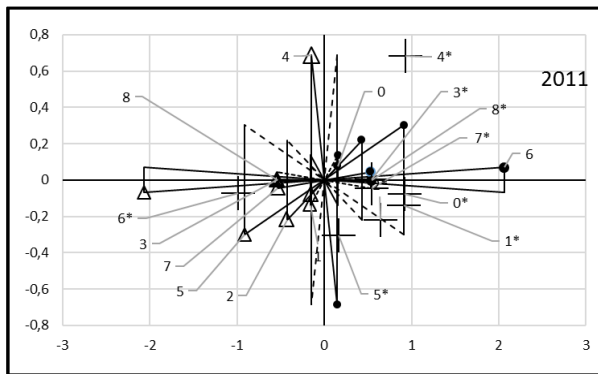
Figure 9a. Sectorial accounting symmetries 2011
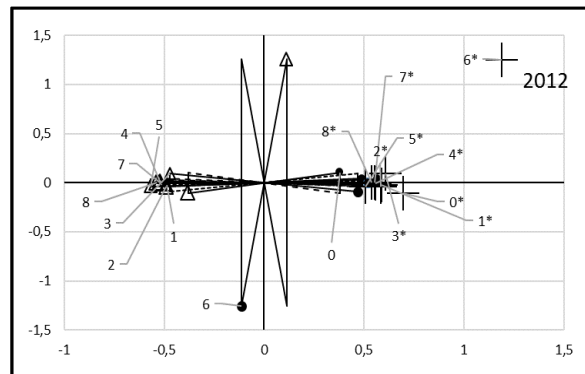
Figure 9b. Sectorial accounting symmetries 2012
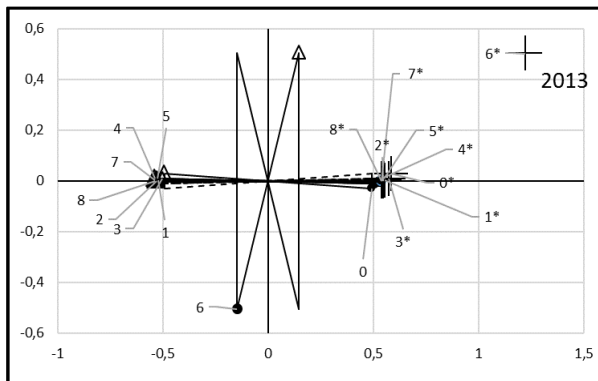
Figure 9c. Sectorial accounting symmetries 2013
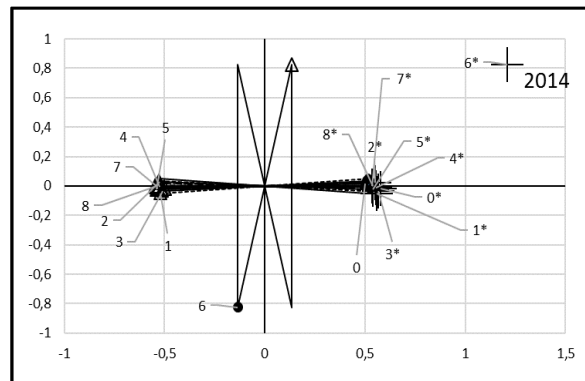
Figure 9d. Sectorial accounting symmetries 2014
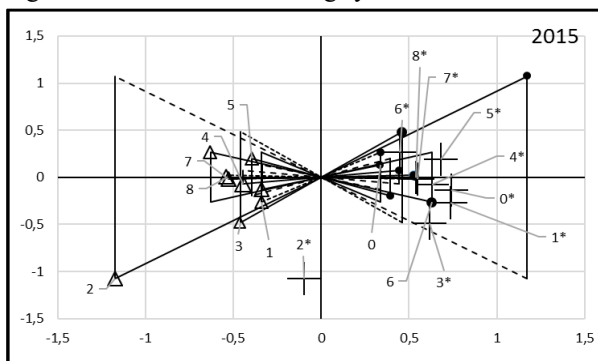
Figure 9e. Sectorial accounting symmetries 2015
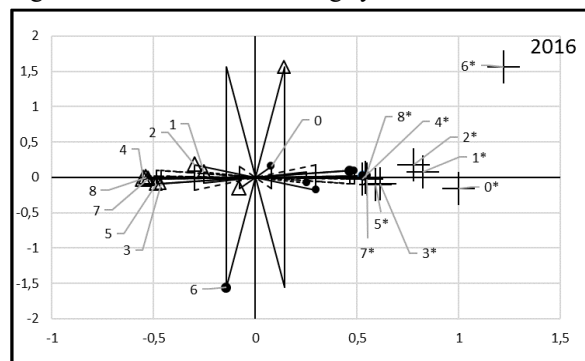
Figure 9f. Sectorial accounting symmetries 2016
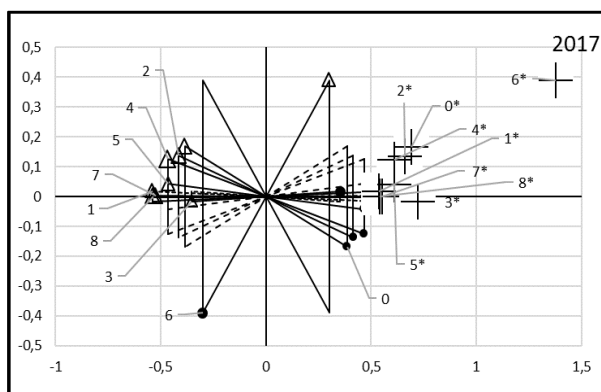
Figure 9g. Sectorial accounting symmetries 2017   *Figure 9h. Sectorial accounting symmetries 2018*
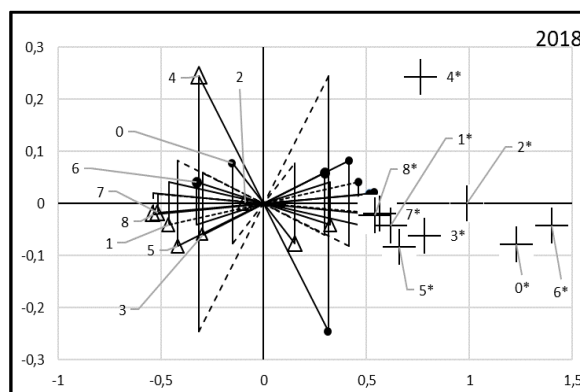
The sectors that show distortion on the set of elements of the sample are identified according to the criteria of the European Commission (Eurostat 2008) and of the United Nations (UN, 2008) and are detailed in Table 6.

Table 6. Classification activities

Division	ISIC Rev. 4/ NACE Rev.2
2	Section C - Manufacturing
41 to 43	Section F - Construction
45 to 47	Section G - Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles
49 to 53	Section H - Transportation and Storage
58-60	Section JA - Publishing, audio-visual and broadcasting activities
61	Section JB – Telecommunications
62 + 63	Section JC - IT and other information services
64 to 66 (1)	Section K - Financial and insurance activities
68	Section L - Real Estate Activities
69 to 71	Section M - Professional, Scientific and Technical Activities
(1)	*These sectors have not been considered in the research*

Sector 6 is the one showing greater distortion in the analyzed years, with different effect on each of them, being located in the first quadrant of its symmetry centre. Sector 6 is located in the third quadrant of the symmetry centres and adopts positions of risk in an Edgeworth's Box. It is well differentiated from 2012 to 2014 and from 2016 to 2017. The level of financial association is maintained from 2012 to 2014, and the economic associations show oscillations, reaching their highest level of concentration in 2013. Namely, 2013 shows more struggle in the activity of companies as they show greater concentration of accounting symmetries, and there is the highest rise of variation of unemployment of the analysed period (Figure 8b). The coordinate axes centres (+) of 2016 and 2017 are apart from the accounting symmetries, standing in the first quadrant. Companies from sectors rise their risk, and sector 6 shows greater economic association, greater than those from previous years. In this scenario, unemployment rises, GDP and exports overtake imports (Figures 8a and 8b). That is, the monetary policies have allowed maintaining the positions of risk of the sample, enabling facilitating the lower risk position in banking entities.

Sector 6 shows greater economic and financial association with banking entities in 2015, and sector 2 is differentiated from the rest. The coordinate axes centre of sector 2 (+) is located in the fourth quadrant, and sector 2 (●) is located in the lower risk zone in an Edgeworth's Box, damaging the position of banking entities (Δ). In this year, unemployment increases, the GDP variation decreases as well as exterior activity (Figures 8a and 8b). The lower association of the period occurs in 2015.

Sectors 6 and 4 are relevant in 2011 and 2018. Sector 6 shows lower financial association than sector 4 in 2011. The coordinate axes centre of sector 6 (+) is located in the third quadrant, and the one for sector 4 (+) in the first quadrant. Sector 6 increases its economic position and decreases the financial association with banking entities,

and sector 4 behaves in the opposite direction, being in the risk zone. The coordinate axes centres (+) are located in intermediate risk positions in both years. However, there is no compensation between sectors 4 and 6 in 2018. The evolutions of macroeconomic variables are different, showing that the activity in sector 6 determines the economic activity of Indonesia. Companies from sector 4 and banking ones adopt a lower position of risk comparatively with the symmetries of the rest of sectors. The response of the Indonesian economy in 2018 is an increase of imports regarding exports, increase of GDP and a stabilisation of employment. This evolution shows the opening to exterior market.

Table 7. Indonesian sectors

NACE2	N.COM	T% 6*	L 6x*	G 6x*	NACE2	N.COM	T% 4*	L 4x*	G 4x*
60*	60	9,49%	1,2346	0,5683	41*	140	27,29%	-2,7639	0,5470
61*	120	18,99%	-1,0453	4,0638	42*	30	5,85%	-1,1817	0,6550
62*	90	14,24%	0,4880	1,0933	45*	30	5,85%	1,0437	0,8847
66*	72	11,39%	0,2468	0,3039	46*	110	21,44%	-1,1451	2,8130
68*	290	45,89%	-2,9531	1,0312	47*	133	25,93%	-0,1745	-0,1989
					49*	70	13,65%	-2,4954	1,6531
SUM	632	100%	0,29995	0,35692	SUM	513	100%	-2,2659	0,8867

The analysis can be done with more detail, as shown in Table 7, where divisions 68 <<Real estate activities>>, 61 <<Telecommunications>>, 41 <<Construction of buildings>>, 46 <<Wholesale trade, except of motor vehicles and motorcycles>> and 47 <<Retail trade, except of motor vehicles and motorcycles>> have an economic weight of over 50% of the companies analysed in the respective sectors. The obtained values correspond to the period from 2011 to 2018. The economic divisions show mistrust from the markets to obtain financing (L<0) and the most significant position is presented in division 47, where G (-0.989) also adopts negative values. These sectors determine the activity of the Indonesian economy and get balanced, locating banking entities in lower risk situations.

4. Discussion

This manuscript shows the analysis of the Indonesian economy by means of comparing the activities of listed companies belonging to banking and non-financial sectors. Entities are analysed using the Edgeworth's Box as an observation laboratory, where the information about the Indonesian economy is added in order to consider the effect the environment has on the evaluation of the companies of the sample. The manuscript considers that the interior market has determined the evolution of the Indonesian economy with the level of association of the accounting symmetries of the entities of the sample. The level of association and its economic-financial nature has been measured by introducing an alternative indicator in the t-Student used in its analysis. The sectors that have influenced in the evolution of the economy are those that show accounting symmetries differentiated from the prudential behaviour of the rest of them. This behaviour has been compared to the evolution of the macroeconomic variables to provide the results of the investigation with analytic validity.

The analyses of accounting symmetry consider the principle of quadruple entry is made between entities of the sample and it explains its level of economic-financial association, according to changes in markets. The manuscript evolves analysing the accounting symmetries from a general approach to a more singular one to determine the economic sectors that have conditioned the evolution of the Indonesian economy. The accounting methodology used in the manuscript invites to consider the Positive Accounting as an economic science, and the Edgeworth's Box as its investigation laboratory.

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COVID-19 vs Bangladesh: Is it Possible to Recover the Impending Economic Distress Amid this Pandemic?

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Abstract

The whole globe is going under a devastating threat of economic depression amid impact of COVID-19 pandemic. Almost No country can deny the fact propelling to the economic ramification of this diseases suggesting a confirmed apropos plan to recuperate any unavoidable circumstance in forthcoming economic arena. Bangladesh with no exception is also capitulated under a significant threat of economic disparity navigating a colossal crisis during and after this epidemic. This paper attempts to reveal what those possible impacts are causing this economic crisis for Bangladesh and how government along with all other stakeholders will respond to sustain socio-economic developments achieved during the recent fiscal years in spite of being submerged by the depressing mode of major economic indicators such as inverse trade growth, vigorous revenue deficit, mounting non-performing loan, falling private sector investment, volatility of market interest rate, capital market unrest and imminent horrid of global economic recession.

Keywords: Pandemic, COVID-19, Economic Shock, GDP, Supply Chain, Volatility

JEL Classification Codes: E1, E2, E3, H4, H5, O4

1. Introduction

Since its inception at Wuhan located in Hubei State of China in December 2019, Novel Corona Virus titled with SARS-CoV-2 causing COVID-19 standing for Corona Virus Disease-2019 has been drastically spread and endangered the economic growth in almost 210 countries of the globe. Several Analysts, Researchers and Policy makers from all over the countries reveal their concerns regarding the forthcoming impacts of COVID-19 on the economic development of respective countries of the globe. JP Morgan has already lessened its estimates of US GDP for next quarter by 25% and projected an impending shock in economic growth followed by recession. The government of India has also cut down its forecast of economic growth from 5% to 2.5% for the year 2020. The UNCTAD standing for United Nations Conference on Trade and Development indicates a shortfall of USD 2 trillion incomes followed by bringing down of global annual growth to below 2.5% as per their preliminary estimates. The Asian Development Bank (ADB) forecasts that the world may lose from 0.089% to 0.40% of its GDP due to spillover impacts of COVID-19. The stark reality is when the disaster is a pandemic and continues to career towards becoming cataclysmic, the scenario unveils itself in a different style followed by economic crisis that commences brewing and later simmering in a number of countries after the initial shock of epidemic's

onslaught is tided over. Like other countries of the world, the economy of Bangladesh will also observe a stark hit sourced by the nationwide shutdown aimed at deterring the blowout of this highly contagious disease causing suspension of many economic activities related to national and international trade, Transport, remittance, consumption & supply chain of foods, informal job sectors and so on. ADB has already projected that this COVID-19 pandemic will wipe out USD 3.02 billion off Bangladesh's USD 300 plus economy in the worst case-scenario of a significant outbreak followed by a reduction of about 0.2% to 0.4% of GDP of Bangladesh. Moreover, it has added that COVID-19 pandemic could spoil the trend of growing domestic demand due to disruption in export demands, suppressed consumption and curbed remittance. Considering these upcoming inverse impacts on the economic cycle of Bangladesh, The government along with its stakeholder has announced several stimulus programs categorized with short term, mid-term and long term schemes intended to recover the economic fallouts.

2. Objective

This paper aims at imparting the possible economic consequences of out breaking of COVID-19 pandemic in Bangladesh followed by the initiatives taken by government along with all other stakeholders to combat against the impending economic shock.

3. Possible Impacts on Economy

The ramifications of COVID-19 pandemic, however, depend on the duration of the existence of this crisis as there are so many repetitive infected cases of patients across the globe divulging an uncertainty for the cessation of this disease due to not having any vaccine till now. The only solution to protect against this pandemic is to stay home to remain safe that will postulate a nationwide shutdown of almost all economic activities followed by lock-down of infected countries to deter the spread of this disease. The possible economic impacts of this lockdown in Bangladesh have been broached as mentioned below:

3.1 Shifting in Consumers' demand and Producers' supply chain:

The outraged COVID-19 may shift the consumers' demand as well as supply chain from producers because the rational consumers purchase more essential goods in short run (1st month) with a view to confronting disruption of food supply in short run (2nd Month) whereas the producers behave inversely as they forecast a possible price increase in short run (2nd month) due to the constraints in supply chain as depicted below:
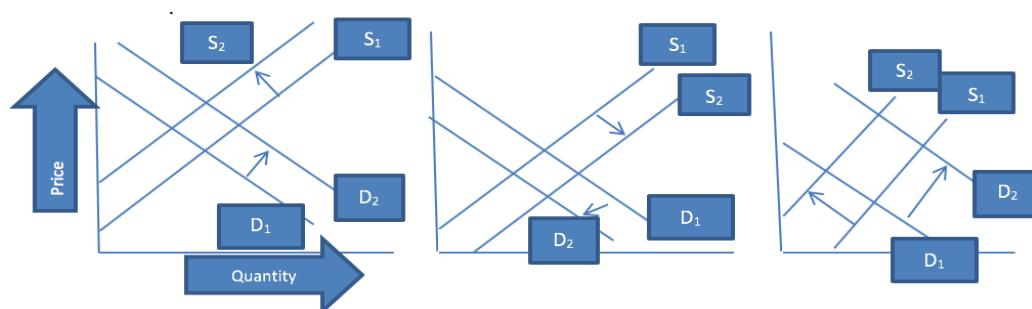

Fig: 3.1 (a): Short run (1st month)   Fig: 3.1 (b): Short run (2nd month) Fig: 3.1(c) Short run (3rd month)
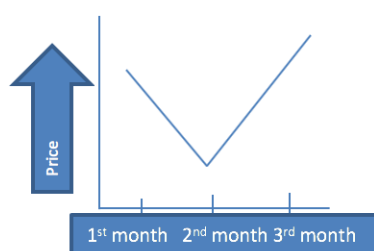

Fig: 3.1 (d): Movement of price over months

According to the figure 3.1 (a) reflecting the consumer behavior just immediate after the outbreak of COVID-19 in Bangladesh, the consumers of essential goods such as food purchase more in quantity as compared to their daily needs to confront any uncertainty in near future shifting the demand curve rightwards. On the contrary, producer being rational will either decrease or remain stagnant at current supply of essential goods shifting the supply curve leftward to reach a new equilibrium price in short term (1st month) market.

The 2nd month of short term market followed by figure 3.1 (b) is just the inverse impact of the consumers' and producers' behavior divulged in the 1st month of short term market shifting the demand curve leftwards due to lockdown of most countries deterring the public gathering to curb the spread of COVID-19 that will discourage mass people to visit the food market and shifting the supply curve rightwards due to repercussion of the price assumption presumed by the producers in the 1st month of short run to reach a new equilibrium provided that there will be no shutdown or interruption in the supply chain of these essential goods until the beginning of 3rd month of short term.

Figure 3.1(c) depicts the shifting of consumers' demand rightwards again in food market due to the fear of non-availability of essential foods in near future and shifting of producers' supply curve leftwards followed by the suspension of production due to the shortage of raw materials, temporary shutdown of factories, business firms, transport routes through air or sea to and from Bangladesh resulting in a partial or full-border locked down to reach a new equilibrium price at the end of 3rd month.

According to figure 3.1 (d), the movement of price on food market from 1st month of short term to 2nd month of short term is followed by an inverse relationship and from 2nd month of short term to 3rd month of short term is followed by a positive relationship.

3.2 Falling revenue from RMG industry:

Ready-Made Garment Industry becoming one of the most prominent contributors of economic development of Bangladesh is already confronting a total impact of order cancellation amounting to USD 1.5 billion which is almost 50% of average export revenue per month due to the shutdown of doors from all over the European and American companies such as H&M, GAP, Zara, Marks & Spencer, Primark that are major buyers of Bangladeshi RMG products. Insiders interviewed suggest that if this COVID-19 pandemic continues to affect global supply chains, buyers' demand, and off course health and safety of workers, by Q4 2020, loss in export revenue could reach at USD 4 billion (Sajid Amit 2020). Observing the largest export-oriented segment function properly has now become a major challenge to the government and apparel sector. Amid July 2019-January 2020, export earnings from Apparel items have been fallen by 5.71 % as compared to July-January, 2018-19. According to EPB (Export promotion bureau) data, earnings from RMG export for export performance (goods) for FY 2019-20 July-January is USD 19.06 billion. Earnings from woven garments fell by 6.29% to USD 9.44 billion in July – January fiscal year of 2019-2020 from USD 10.07 billion in the same period of last fiscal year. On the contrary, Knitwear export fell by 5.13% to USD 9.62 billion from USD 10.14 billion.

3.3 Falling growth of Remittance:

The outbreak of COVID-19 forced Bangladeshi expatriates working in several countries of Middle-East, Asia, Europe, Australia and United States to return their home amid stern impact of the disease so that there is a significant disruption in the flow of remittance even after existing 2% stimuli offered from government. Moreover, most of the countries where Bangladeshi workers are executing their jobs, are defying the COVID-19 by imposing partial or complete lock down or travel restrictions cascading the opportunity of both formal and informal jobs resulting out from shutdown of all economic activities. As a corollary, the remittance flow is expected to be decreased in the current year as compared to earlier years as depicted below:

Chart 01: Remittance flow in Bangladesh

Remittance flow (BDT in billion)
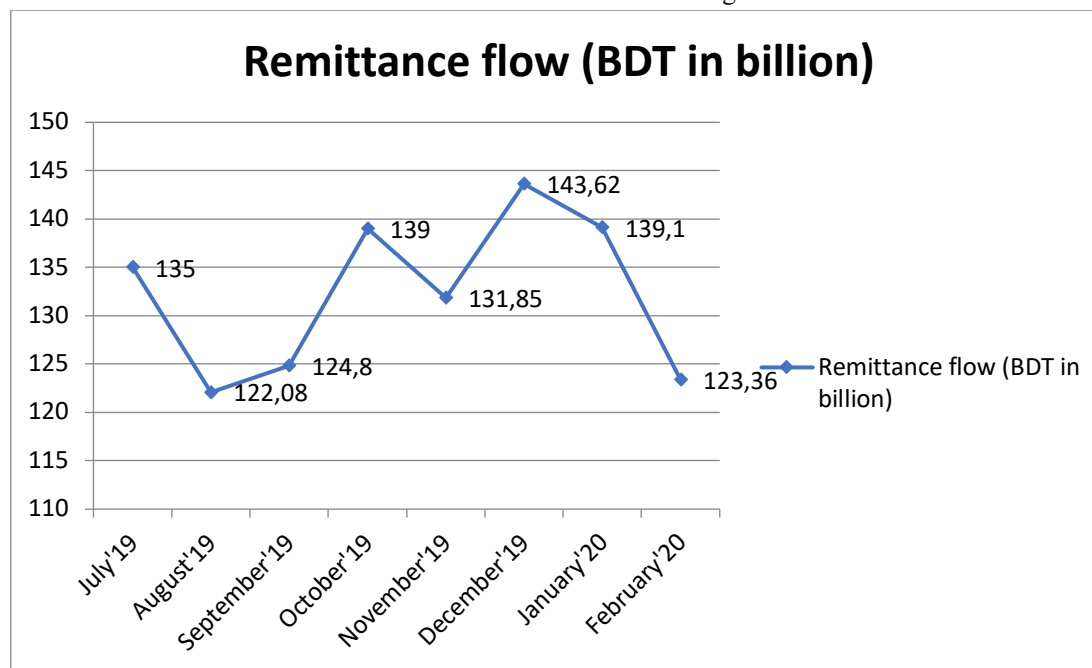
Source: Statistics Department, Bangladesh Bank

3.4 Falling opportunity for SME and Startup business:

The significant outbreak of COVID-19 will certainly deteriorate the opportunity of SME and Start up business considering the flat rate of 9% interest offered from commercial banks as per the guidelines of Central Bank. At this stage, Most of the commercial banks are reluctant to lend fund for SME and startup business at 9% interest rate due to high operating cost maintained for SME financing. According to the Monthly major economic indicators published by Bangladesh Bank (March, 2020), Total amount of SME loans disbursed by Banks and Non-Bank Financial Institutions increased by 12.86% and stood at BDT 205490.93 crore at the end of September, 2019 as compared to the same month of earlier year. However, high volatility in public equity and sharp depletion in gold price may impose a stark hit for financing startup business amid this pandemic.

3.5 Imminent Unrest in Financial Institutions:

Banks and other financial institutions in Bangladesh are suffered from a long peevish drawback of mounting amount of NPL (Non-performing Loan) expected to be increased further amid this pandemic as most of the institutional borrowers will be failed to repay the installments on time because of not generating sufficient operating revenue followed by less production and supply driven by suppressed demand, manufacturing hits and supply chain disruption. High growth of NPL will further abolish the capacity of banks to comply with BASEL-III capital accord consisting of maintaining minimum capital requirement, supervisory review process, market discipline and liquidity coverage with stable funding ratio. Moreover, high NPL consisting of the summation of doubtful, substandard and Bad/loss loans will reduce the operating revenue and increase the operating cost becoming a filibuster to sustain 6% and 9% flat rate imposed for banks and NBFIs propelling to less profitability and EPS of Listed banks in capital markets of Bangladesh. The current state of non-performing loan ratio in Bangladesh is mentioned below:

Chart 02: Non-Performing Loan ratio in Bangladesh

NPL ratio in Banking Sector of Bangladesh
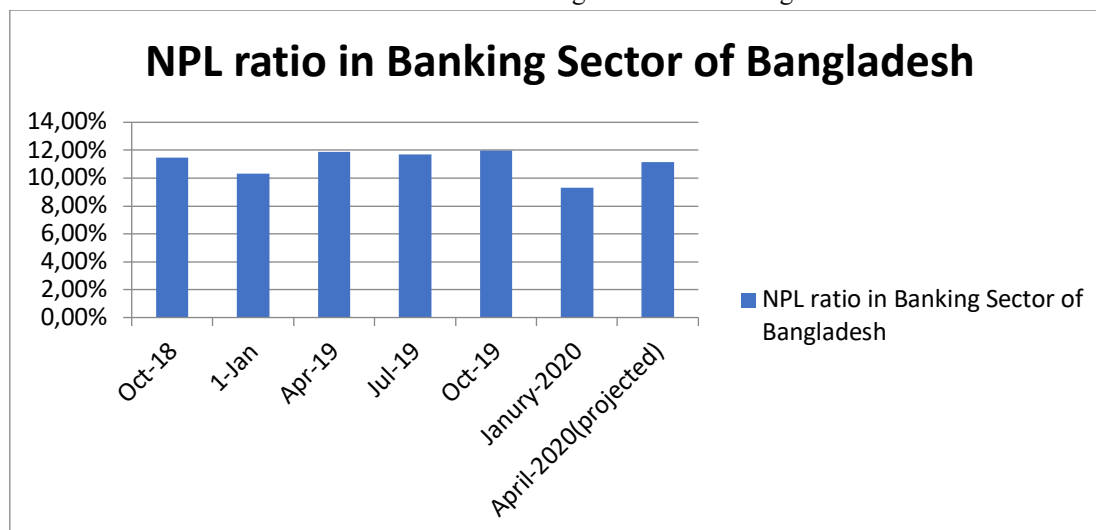
Source: CEICDATA.com / Bangladesh Bank

3.6 Volatility in Capital Market:

The outrage of COVID-19 has already calamitously affected the Capital markets in Bangladesh both in DSE standing for Dhaka Stock Exchange and CSE standing for Chittagong Stock exchange because most of the investors dumped their holdings of share amid concerns of spreading the disease as reflected from the following graph of DSE index:

Chart 03: Index Graph of Last 1 Year from 15th April, 2019 to 14th April, 2020

Source: Dhaka Stock Exchange, Bangladesh

3.7 Constant increase of trade deficit:

Since Bangladesh is experiencing a sustained trade deficit since 1976 due to high value of imports consisting of petroleum oil, food items, textile raw materials covering 11%, 11% and 10% of total imports respectively, The outbreak of COVID-19 will be further dreadful for accelerating the constant increase of the trade deficit as the export of most of the goods as depicted below is expected to be decreased:

Table 01: Export growth of major commodities

EXPORT PERFORMANCE OF MAJOR COMMODITIES
IN MILLION USD

	2018-19 July-January	2019-20 July-January	% Change
RMG	20,217.48	19,063.24	5.71 ↓
Leather & Leather Products	626.42	558.9	10.78 ↓
Home Textile	490.2	442.67	9.7 ↓
Engineering Products	199.36	194.82	2.28 ↓
Pharmaceuticals	79.27	85.7	8.11 ↑
Jute & Jute goods	498.66	602.49	20.82 ↑
Total Export	24,179.59	22,919.47	5.21 ↓

Source: Statistics Department, Bangladesh Bank

Moreover, falling revenue from RMG sector being a major source of export revenue for Bangladesh will accelerate the wheel of trade deficit in an untenable circumstance causing temporary unemployment and sluggish growth of economy amid this pandemic as presumed from the following chart of Balance of Trade position since April 2019.

Chart 04: Balance of Trade position for Bangladesh
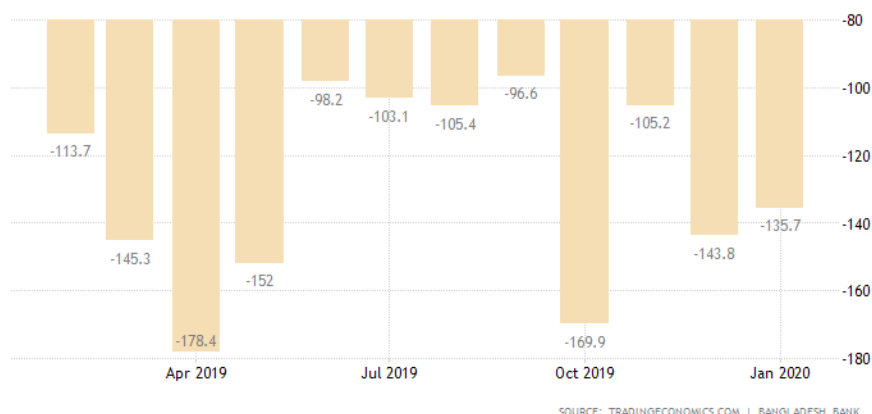
Apart from merchandise trade, services trade such as global tourism along with education and airlines industry have almost reached in a precarious and apprehensive position due to this COVID-19 pandemic deterring human contact to avoid community transmission of the disease. According to WTO (2020), the international tourists arrival could go down by 20-30% in comparison to the year 2019 expected to have a vigorous effect on the economic growth. Reports issued from ICAO (2020) revealing the consequence of cancellation of several flights from different airlines estimate that the revenue of airlines may be reduced by USD 4-5 billion in the first quarter of 2020.

3.8 Lack of Investors' confidence:

FDI standing for foreign direct investment flow is expected to be a quagmire as most of the foreign investors with losing confidence are disinclined to execute the decision of investment amid this pandemic provoking them to retain a strategy to stay back, watch and determine later on their plans of investment. As a consequence Bangladesh is also going to confront this circumstance followed by a decline or stagnant in the capital flows depending on the severity of outbreak of COVID-19 although FDI of Bangladesh increased by USD 1.6 billion in December, 2019 compared to the increase of USD 1.1 billion in the previous quarter as depicted below:

Chart 05: FDI (USD in millions) of Bangladesh from April 2017 to December 2019
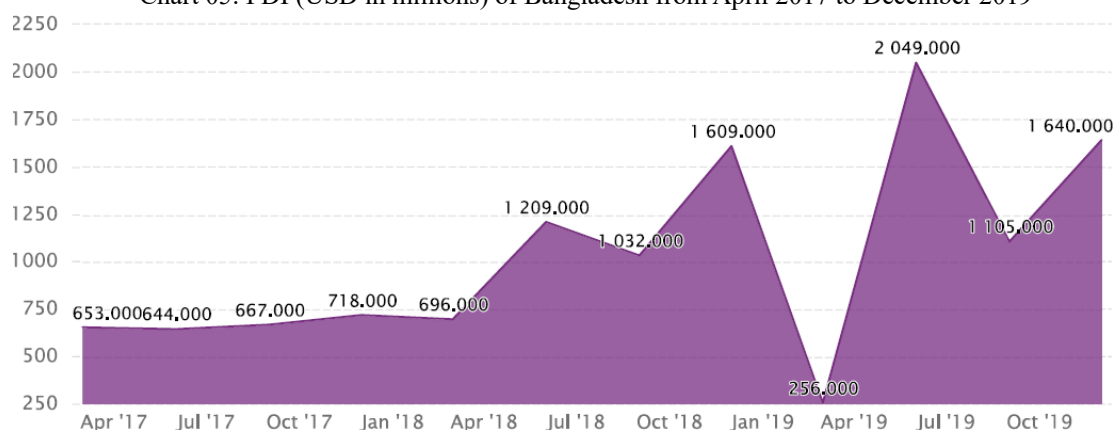

Source: CEICDATA.com

3.9 High unemployment rate:

The outburst of COVID-19 will certainly jeopardize the employment scenario of Bangladesh as almost all of the formal and informal job sectors are suspended due to the lock down or shutdown imposed by the government of our country to discourage the mass people for physical contact in order to resist the continues spread of this disease. As a consequence, people especially engaging in several semi-formal or informal job sectors having no job security such as Agricultural farming business, Day labors, transport service, RMG sector, sole proprietorship, sales personnel of different stores, wholesalers, retailers etc living hand to mouth are the most deleteriously affected stakeholders of COVID-19 crowding out from their job although the unemployment rate across Bangladesh was reduced by 0.1% in last year reckoning 4.2% in 2019 as compared to 4.3% in the year of 2018 as revealed from the following chart:

Chart 06: Unemployment rate in Bangladesh
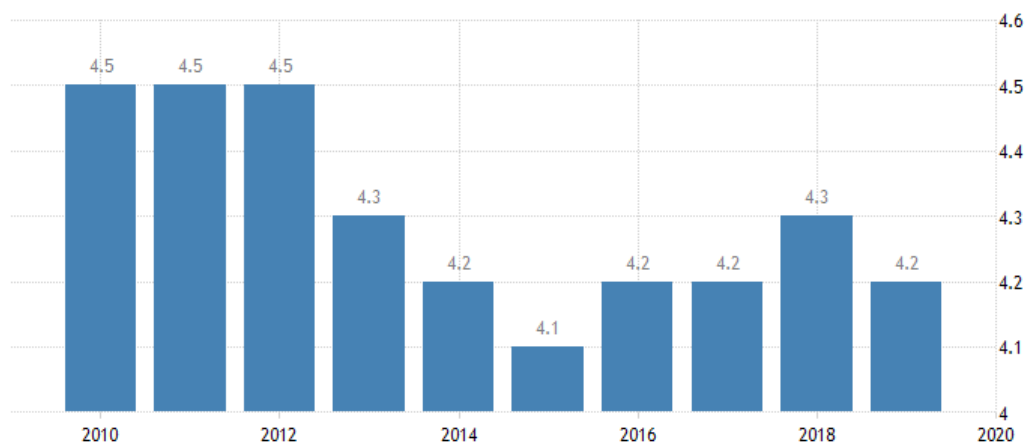
3.10 Depletion of GDP growth:

Amid Impact of COVID-19, all economic activities are temporarily suspended to deter the spread of the disease among the mass people suffered from job loses, running out of food and essential goods causing the halt of economic growth of Bangladesh although developed countries are also confronting the same circumstance originated by nearly 2.2% contraction in global economy triggered by lock down in Europe and North America till Mid of April. In addition, a report issued from world Bank (April, 2020) warns that massive scale loss of low paid work has driven a mass exodus of migrant workers from cities to rural areas spiking fear that many of them will fall back into poverty followed by a sharp economic slump caused by halting economic activities, collapsing

trade and greater stress in banks and financial sectors. However, the projected GDP growth of 8.2% for 2020 may decline by 2 to 3%-that is, economic growth may settle somewhere between 5 to 6% (Khandoker H. Bazlul, 2020). In contrast, the report from World Bank predicts economic growth may be fallen in between 2 to 3% for the fiscal year 2019-2020 amid impact of this pandemic in Bangladesh instead of projected 8.2% as depicted from the following table:

Table 02: Real GDP at Market Prices in %

Country	Fiscal Year	2019 (e)*	2020 (f)**	2021 (f)	2022 (f)
Afghanistan	December to December	2.9	-5.9 to -3.8	3.3 to 3.9	5.2 to 6.2
Bangladesh	July to June	8.2	2.0 to 3.0	1.2 to 2.9	2.8 to 3.9
Bhutan	July to June	3.9	2.2 to 2.9	2.0 to 2.5	3.1 to 3.5
India	April to March	6.1	4.8 to 5.0	1.5 to 2.8	4.0 to 5.0
Maldives	January to December	5.2	-13.0 to -8.5	6.3 to 7.3	5.0 to 5.5
Nepal	mid-July to mid-July	7.1	1.5 to 2.8	1.4 to 2.9	2.7 to 3.6
Pakistan	July to June	3.3	-2.2 to -1.3	0.3 to 0.9	3.2 to 3.3
Sri Lanka	January to December	2.6	-3.0 to -0.5	0.2 to 1.2	2.0 to 2.5

Source: World Bank, Note: The 2020 and 2021 numbers represent the lower bound and upper bound of forecast range followed by *= estimated and **= forecasted value

4. Steps Recommended by Policy makers, Researchers and International organizations:

The impact of COVID-19 will impose a stark hit on low – income people especially informal workers in hospitals, transport sectors and retail trade who have few or no access to healthcare and social safety nets followed by trenchant reinforcing of inequality in South East Asian countries. Therefore, several steps or initiatives are recommended by policy makers along with other stakeholders to defend against the economic shock amid this deadly pandemic:

4.1 Initiatives recommended by International organizations:

Several International organizations such as World Bank, World Economic Forum, Asian Development Bank (ADB), IMF have already suggested a number of seemly programs to shield against the deadly impacts of COVID-19 on economic growth of Bangladesh as mentioned below:

Figure 01: Initiatives recommended by World Bank, World economic Forum and ADB

World Bank (2020)	World Economic Forum (2020)	ADB (2020)
• providing safety nets and securing access to food, medical supplies, and necessities for the most vulnerable. • establishing temporary work programs for unemployed migrant workers • enacting debt relief measures for businesses and individuals • easing inter-regional customs clearance to speed up export and import of essential goods to minimze short term economic distress • Considering people worst hit by the freeze on activities, govt should adopt expansionary fiscal policies combined with monetary stimulus to keep credit flowing in their economies • adopting temporary spending measures and coordinate with international financial partners to avoid unsustainable long-term debt levels and fiscal deficits.	• The government should also consider an unconditional cash transfer program for an initial period of three months at a rate of $95 per month, which corresponds to the minimum wage for the formal sector in Bangladesh. This would cost the government roughly $14 billion, or 4% of GDP. • With inflation expected to cool across the world, the central bank should follow the steps taken by its counterparts across the world to inject further liquidity by reducing the Statutory Liquidity Ratio and further reducing its policy rate. This will not only help maintain liquidity within the banking sector but also provide small- and medium-sized enterprises in the country with access to cheaper working capital to keep their businesses afloat. • With a low debt-to-GDP ratio, Bangladesh has enough fiscal headroom to adapt an expansionary approach in the short run to fight off the economic and humanitarian aspect of this crisis. (Islam & Divadkar, 2020)	• The low revenue to GDP ratio in Bangladesh diminishes the country's capacity to sustain high economic growth and reduce poverty. Revenues thus need to be raised significantly through comprehensive tax reforms, by expanding the tax base and making resource mobilization more efficient to support much-needed public expenditure on infrastructure, health and social development. (Parkash, 2020)

Source: World Bank, ADB and World economic forum report (April, 2020)

4.2 Initiatives recommended by Researchers and Policy makers:

Several researchers, economists and policy makers have also advocated a number of steps to be initiated by the respective ministry of government of Bangladesh as depicted below:

Addressing the health risk and economic hazards of vulnerable people to COVID-19 should be the main focus of the stimulus packages offered from government. The budget of next fiscal year should focus on channeling

resources from traditional sectors such as energy and physical infrastructure to social protection, poverty alleviating programs, health insurance and universal health programs, as well as programs for small and medium enterprises (SMEs). The government may also increase current social protection allocation of 2.2 percent of GDP to about 5 percent of GDP during this crisis period. Employment generation and poverty alleviation programs should also draw higher allocations of the budget. The health sector budget should be permanently increased to 3 percent of GDP from the current allocation of less than 1 percent of GDP. Bangladesh Bank may create special funds to support SMEs to overcome the Covid-19 economic crisis. Operations of mobile financial service providers such bKash, Rocket and Nagad will be the key conduits for fast and efficient low-cost fund transfers that avoid human contact. (Khondker H. Bazlul, 2020)

Addressing the worst hit people especially working in informal job sector having no access to food and health security amid this lock down and distributing sufficient cash among them through mobile financial services to propitiate the crisis by capitalizing the unused fund from several ministries of government financed by existing budget already completed 10 months and remained 2 more months of current fiscal year. (Barakat Abul, 2020)

Apart from these recommendations, Centre for Policy dialogue (CPD) asks for a number of steps as mentioned below:
- Suppliers should discuss with their brands/retailers about possible cooperation in order to share revenue losses incurred for cancellation/deferment/withdrawal of orders,
- Minimum support to maintain day-to-day expenses i.e. support for retaining the staffs and workers and rationing support facilities for contractual workers,
- Export-oriented sectors, such as the RMG sector, needs cash flow support to retain workers, deferment of LC payment, deferment of import LC receipt, interest payment support to banks, low cost credit support from development partners,
- Reschedule loans on case by case basis for exporters. (CPD, 2020)

5. Initiatives taken by Government and other Stakeholders:

Government of Peoples Republic of Bangladesh has already announced the stimulus package of worth BDT 95,619 corers covering 3.3% of GDP to defend against the possible inverse impacts of COVID-19 on economic growth of our country as summarized below:

Table 03: Summary of Stimulus package against inverse impact of COVID-19

Segments of Allocation	Amount in corers	Description
Big Industries and service sector suffered loss amid this lock down	BDT 30,000	Distributed by commercial banks as working capital loan at 9 per cent interest rate with the government providing 4.5 per cent in subsidy
Small and Medium Enterprises (SME) including cottage industries	BDT 20,000	Working capital loan at 9 per cent interest rate with the government giving 5 per cent subsidy
Bangladesh Bank's Export Development Fund (EDF)	BDT 12,750	To facilitate raw materials imports under back-to-back Letter of Credit at 2 per cent from 2.73 per cent interest rate
Pre-shipment Credit Refinance Scheme	BDT 5,000	To facilitate the 'Pre-shipment Credit Refinance Scheme' at 7 per cent interest rate
RMG Industry	BDT 5,000	salary and wages of labors working in several garment companies having no

		capacity to pay wages due to falling revenue amid impact of COVID-19
Free food distribution program	BDT 2,503	distributed among low income people expected to be worst hit group amid COVID-19
Subsidy for Rice distribution	BDT 251	distributing rice at BDT 10 per KG among low income people dwelling in city area
Sending cash incentives among people living hand to mouth	BDT 760	cash incentives will be credited to the bank account of listed person to be worst hit amid lock down for COIVD-19
Social safety net program	BDT 815	Distributed among the aged persons and widows in 100 upazillas
House allotment	BDT 2,130	Constructing house for deprived and homeless people
Agricultural sector	BDT 1,060	Ensuring the justice to the farmers and purchasing agricultural equipment
Working capital for agricultural sector	BDT 5,000	Supplying working capital to agricultural sector at 4% interest rate especially to stimulate small and medium farmers
Agricultural Subsidy	BDT 9,500	earmarked only for agricultural sector

Source: The Business Standard on April 12, 2020

The government simultaneously took four programs under the work plan to be implemented in phases under categories such as immediate, short and long by increasing public expenditure, formulating a stimulus package, widening social safety net coverage and increasing monetary supply. These four programs are taken to cope with the possible economic impact of the COVID-19 outbreak on the country. Generating employment will be given priority in public expenditure while foreign tours and lavish expenditures will be strictly discouraged. Since the debt to GDP ratio of Bangladesh is much less (3%), so the higher public expenditure would not create any pressure on the macroeconomic circumstance of the country.

Apart from this, Bangladesh Bank, Central Bank of Bangladesh has already enacted the revised CRR (Cash Reserve Ratio) into 5% which was earlier at 5.5% to increase money supply in economy in collaboration with one of the four programs mentioned earlier. In Addition, Bangladesh bank has also reduced the repo rate to 5.75% from 6% with a view to boosting liquidity amid outbreak of COVID-19 pandemic.

6. Concluding Remarks

The outbreak of COVID-19 has already castigated a number of countries with harsh economic circumstance due to prolonged lock down imposed either partially or full-fledged shut down of all economic activities bringing the worst hit for the low income people losing jobs and having no access to food and social safety net programs. The government of Bangladesh initiating a massive stimulus scheme to be implemented in three phases as mentioned earlier in order to protect these mass people affected by the stark hit of COVID-19 crowding out them from Jobs and other activities due to lock down of country. In fact, Bangladesh has two extreme options to be executed for obstructing the impending economic shock amid this pandemic. First, as we don't have any idea when this pandemic is going to be ceased, following this complete lock down will bring a prolonged economic recession due to infinite suspension of activities propelling to a long term sufferings for the worst hit people due to not having sufficient access to food and social safety net programs as described earlier. Moreover, being a densely populated

area, it's quite cumbersome for Bangladesh to maintain this social distance especially for the migrant workers dwelling in several slums of city area followed by high fertility rate in our country as compared to other developed countries such as USA, UK, Italy, France, Belgium, China worst hit by COVID-19. As Almost two third of our people are eligible to work and employed in both formal and informal job sectors compared to these developed countries as mentioned earlier, deterring them from doing their respective jobs will bring a sluggish growth of economy resulting from a prolonged lock down amid this epidemic. In addition, WHO has recommended to implement strict social distancing by staying at home so that every country will experience a flattened curve of spreading this disease and arrange sufficient health care system to provide proper medical attention to the infected people which is also difficult to be feasible in Bangladesh due to insignificant budgetary allocation in health sector followed by less than 1% of total GDP. So, limited initialization of economic activities including both formal and informal job sectors by ensuring proper social distance depending on roaster duty system with a view to achieving herd immunity or social immunity protecting against infectious disease when a large proportion of population has become immune to an infection through previous infections thereby providing a measure of protection to the individuals who are not immune would be the first extreme alternative that Bangladesh can execute at this very moment to deter the forthcoming economic shock amid this pandemic accelerating a recession due to prolonged shutdown of activities. Secondly, government must have to take immediate step to distribute a lump sum amount of money (Say BDT 6,000 per head for next 2 months) using mobile financial services among these mass people especially engaging in informal job sectors such as transport, food, restaurant, sales personnel, tourism, farmers, wholesalers, retailers, house maid etc to purchase essential goods especially food items and stay at home without departing for their respective job. The number of these people working in informal job sectors lost their job due to lock down of country amid impact of COVID-19 is around 3 corers so that it may cost around BDT 18000 corers for government to protect them against COVID-19 by sending this money in their respective account using mobile financial services considering a list prepared on the basis of national database with NID (National Identity) verification for addressing the worst hit people amid this pandemic. In summary, it's the time to cooperate the government by maintaining social distance for preventing the further spread of this disease and in return government along with all other stakeholders will initiate the steps required for ensuring the interest of mass people.

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The Impact of Covid-19 Pandemic Crisis on Micro-Enterprises: Entrepreneurs' Perspective on Business Continuity and Recovery Strategy

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Abstract

Covid-19 pandemic outbreaks have led many countries to impose travel restrictions and movement controls. In Malaysia, the small business sector is one of the most directly affected by the movement's control order. In fact, the impact is more significant among micro-enterprises than its larger counterparts. Entrepreneurs experience business cancellation or closure and reduced income due to the closure of several supporting sectors such as retails and transportation. There is still a lack of study on the impact of a pandemic outbreak on micro-enterprises in developing countries, especially in relating to business continuity and recovery strategy. It is crucial to explore how micro-entrepreneurs experience crisis and what decision they make for business survival. This study represents the perspectives of two micro-entrepreneurs in the rural area of Sabah, about their business continuity strategy during movement control order. The results of unstructured phone interviews provide insights on business survival approach and recovery plan of micro-enterprises during and after a crisis. This study will hopefully contribute towards the creation of effective support mechanisms through associated entrepreneurial development organizations for micro - entrepreneurs to thrive during and after a crisis.

Keywords: Covid-19 Pandemic, Micro-Enterprise, Business Continuity Strategy, Business Recovery Plan

1. Introduction

1.1 Background to the Study

The Novel Coronavirus (Covid-19) acute respiratory outbreak crisis that originated from Wuhan, China in December 2019 has spread globally to more than 200 countries, including Asia, Europe, America and Australia. This outbreak has been categorised as a pandemic by the World Health Organization (WHO, 2019) as it shows an increasing human-to-human infection (Qiu, Rutherford, Mao & Chu, 2017) leading to over 200,000 deaths within three months since the start of the outbreak (WHO, 2020). In fact, Covid-19 recorded the highest infection rates and deaths compared to other coronavirus outbreaks like MERS-CoV, SARS-CoV and Influenza (Liu, Gayle, Smith & Rocklov, 2020; Peeri, et al, 2020). Previous studies have contended that movement

restriction is seen as the best approach to control the spread of infectious diseases like coronavirus (Chinazzi, et al, 2020; Sohrabi, et al, 2020, Smith & Freedman, 2020). For the Covid-19 outbreak, several countries have imposed travel restrictions, social distances, and postponements of events for at least 14 days in their respective countries, including Southeast Asian countries, such as Indonesia, Malaysia, Thailand, Philippines and Singapore. In many countries, the emergency or quarantine orders for preventing the spread of coronavirus has not only led to psychological impact like depression, anxiety and stress (Ghani, 2020) but also has an effect on economic activities such as the closure of retail premises and disruption of product delivery chains (Karabag, 2020). In Malaysia, for example, the 14-days movement control order (MCO) which started from 18 March 2020 and currently in its fifth extension, has disrupted the operation of several important sectors, including the food and beverages, agriculture, retails, transport and construction, and tourism sectors (Saari, 2020; Department of Statistics Malaysia, 2020).

Before focusing on the impact and strategies to reduce the impact, it is crucial to understand the definition of crisis. Booth (1993) defines crisis as a situation faced by an individual, group or organisation which they are unable to cope with by the use of normal routine procedures. There are three types of crisis, namely gradual threat, periodic threat and sudden threat (Booth, 1993). The Covid-19 crisis visibly can be regarded as 'sudden threat', as the crisis developed suddenly and it affects not only entire organisation, but also whole sectors of the economy. The impact of Covid-19 pandemic outbreak on global socio-economy can be acute, and it is crucial that recovery is essential to survive in a new normal way of living. However, little is known about the challenges and the process in which small enterprises respond during and after the outbreak crisis. This paper suggests that micro-enterprise should be a central focus for crisis management strategy, as the sector is the most important small and medium enterprise (SME) in the Malaysian economy. Micro-enterprise constitutes almost two-third of the SMEs in Malaysia (SME Annual Report, 2016), with less than five workers and annual sales turnover of less than RM300,000 (SME Corp Malaysia, 2014). It is contended in many previous studies that micro-enterprises in less developed areas are exposed to greater challenges than enterprises in urban and developed areas due to their remoteness, especially in terms of infrastructure constraints, labour availability and limited financial reserves (Siemens, 2012; North & Smallbone, 2007). Therefore, based on unstructured phone interviews with two micro-entrepreneurs in Kota Belud and Ranau, Sabah Malaysia, this study explores the business continuity and recovery strategy in response to the movement control order amid Covid-19 crisis in Malaysia.

1.2 Business Continuity and Recovery Strategy

There are many studies that have been conducted on business continuity strategy among large manufacturing-based companies (Kepenach, 2007) or in the developed region (Herbane, 2013). However, there are limited studies examining micro-enterprise in the less developed countries. Furthermore, most studies on crisis management processes are focused on managing the impact of epidemic disease outbreak (e.g. Ritchie, 2003), natural disaster (e.g. Flynn, 2007, Bresciani, et al, 2002; Fabeil, et al, 2019), economic and financial crisis (Devece, Ortiz & Armengot, 2016) and inadvertent disaster and terrorisms (Cook, 2015). There is still a lack of literature on the impact of new and emergent crisis like a pandemic outbreak on micro-enterprises. It is postulated that micro-enterprises in the less developed areas are exposed to greater challenges than larger enterprises or in urban areas, especially during a crisis.

The impact of crisis or disaster on a business enterprise should be of great concern to entrepreneurs as it affects current and future business performance. Statistics have shown that about 75% of businesses without a continuity plan will fail within three years after a disaster or crisis strikes (Cook, 2015). Quarantelli, Lagadec and Boin (2007) suggest the importance of managing and planning processes during disaster and crisis. They define managing as contingency tactics used in dealing with crisis, whereas planning refers to the strategies that need to be undertaken in facing the future situation. In this study, the authors deliberate business continuity as the entrepreneur's tactic in managing crisis, and business recovery plan as the planning process after a crisis. Business continuity strategy usually comes together with a crisis recovery plan which involves resumption and restoration of operation (Cook, 2015).

McCarthy (2003) in his study on crisis management of entrepreneurial firms, suggests that the experience of crisis leads entrepreneurs to become more rational and guided by planned behaviour in making a decision.

Entrepreneurs demonstrate their ability to innovate by undertaking survival mechanisms for managing the impact of crisis on their business, namely marketing innovation through alternative promotion or pricing (Naidoo, 2010), alternative distribution channel (Yu-Lian, 2008), product reengineering and use of cheap and effective online campaign (Bourletidis & Triantafyllopoulos, 2014). According to the Malaysian Institute of Economic Research (MIER) and the Malaysian Entrepreneurship Academy (AUM) (RTM, 2020), the economic stimulus package provided by the government to reduce the impact of crisis among SME entrepreneurs should not be treated as an adequate remedy for the long term. Hence, entrepreneurs must plan to continue to operate the business by embracing a new or innovative approach throughout the crisis management cycle – namely, responding, resuming, recovering and restoring (Cook, 2015). Many studies on crisis management include at least three standard phases, i.e. pre-crisis, during crisis and post-crisis (Pursiainen, 2018, Fabeil, et al, 2019), which are usually further divided into more detailed phases. These may include (i)risk assessment, (ii)prevention, (iii)preparedness, (iv)response, (v)recovery and (vi)learning, which are particularly used in the field of disaster reduction and business continuity as suggested by the notion of ISO standard (Pursiainen, 2018). This notion is used in analysing the results of the current study to understand the impact of crisis on business strategy throughout each phase of movement control order (MCO) amid Covid-19 in Malaysia.

1.3 The Research Problem
The Malaysian government has announced the forth extension of movement control order (MCO) which has started since March 18, 2020 (Prime Minister's Special Message, 2020) as the preventive measure in response to Covid-19 pandemic in the country. Among the prohibitions set out are the closure of government and private premises, except those related to key national services such as health and safety, telecommunications, retail, finance and transportation (National Security Council, 2020). In most states, the operating hours for some service sectors are limited to 8 to 10 hours during the MCO period. In Sabah, for example, retail premises such as farmer's markets, restaurants, gas stations, delivery services, supermarkets, and manufacturing factories are only allowed to operate until 6:00 pm (Kota Kinabalu City Hall, 2020).

There have been several reports in the media about the impact of the MCO on small businesses. Micro-entrepreneurs, for example, experience loss of daily income due to disruptive supply chain resulting from the closure of supporting sectors, besides lack of workers and declining in cash reserves (Dzulkifli, 2020; Aling, 2020). Many entrepreneurs began to shift to alternative approaches to continue their business operation. Among the alternative business continuity strategy adopted by entrepreneurs during the MCO period is by selling and promoting their products via social media and mobile applications like Facebook and Whatsapp. In addition, some of them decided to hire part-time transporter/runner to deliver their product to end customer and adopted cash on delivery (COD) transaction (Halim, 2020). Nevertheless, not all small businesses in rural areas are able to adopt this alternative strategy due to the constraints of business infrastructure support. In Sabah, the Ministry of Agriculture and Food Industry (MAFI) has assured to provide proper support and assistance to SME entrepreneurs, including the agri-based and food-based sector (Utusan Borneo, 2020). The MAFI recommendations include enabling the farmers market to function, coordinated as a collection centre for farm products by the Federal Agricultural Marketing Authority (FAMA), and ensuring logistic flexibility during the MCO to ease the supply chain for perishable products from end-of-businesses to end - users (Daily Express, 2020).

Business continuity strategy of micro-enterprises in dealing with crises has not been fully explored. There have been many previous studies on the effects of coronavirus outbreaks such as MERS, SARS and Ebola on business continuity; however, the study has focused on large-scale businesses in developed areas (Pine & McKercher, 2004; Cole & Watkins, 2015). Bartz and Winkler (2016) in their study of the performance of entrepreneurial firms during crisis found that micro-enterprises exhibit a relatively slow growth in crisis time, indicating fragility as compared to larger enterprises which grow faster and more flexible. It is argued that crises are detrimental to micro-enterprises; hence entrepreneurs need to think of strategies to manage and plan for alternative approaches to lessen the impact of the crisis on their business.

1.4 The Research Objectives

This study aims to explore from the perspectives of micro-entrepreneurs, the crisis management strategy during and after movement control order (MCO) due to Covid-19 outbreak. This study involves phone interviews with two micro-entrepreneurs, which takes place during the second and third phase of MCO in Malaysia (1-month duration). The focus of the interview is to understand their business continuity and recovery strategy during the crisis. This study recommends valuable insights to related agencies or departments involved in small business development programs, especially for micro-enterprises in the rural area, so that appropriate measures can be formulated in assisting the sector throughout crisis cycle.

2. Research Approach

This study involves unstructured phone interviews with open-ended questions, which was conducted in May 2020, during the fifth phase of movement control order in Malaysia. Unstructured interview was employed in this study as it allows the opportunity to gather the thoughts and beliefs of individual entrepreneur based on their life experience (Marshall & Rossman, 2006). Two micro-entrepreneurs were identified to participate in the study on the basis that they are the founder of a micro-enterprise with annual sales turnover less than RM 300,000. Respondents were identified purposively by their credible experience as key micro-entrepreneurs in Sabah, whom researcher believed to be able to provide relevant information befitting the research objective. Purposive sampling is supported by the parsimonious principle, which allows simplicity over complexity, and necessity over the excessive information to explain a given phenomenon (Allen, 2017). This allows the interviews to be conducted in 25-30 minutes in a free-flow but informative conversation (Miles & Huberman, 2019; Bryman, 2015). The questions were incorporated into a broader research measure to minimise participant fatigue and at the same time to fulfil the research objective. Memos were used to record the key points from the interview. The essence of the interview is to gather entrepreneurs' perspectives and experience on their business continuity and recovery strategy during Covid-19 crisis. Besides, in order to develop a better understanding of the concept of business continuity and recovery strategy during a crisis, the researcher made use of entrepreneurship literature pertaining to crisis management of small enterprises. The insights and thoughts gathered from respondent were examined and summarised into a proposed diagram to provide meaningful hindsight about how micro-entrepreneurs operate their business during a crisis and make a plan for recovery after the crisis.

3. Results

3.1 Business Continuity Strategy During Crisis

The interviews reveal that entrepreneurs employ multiple synchronous strategies to ensure continuous operation of their business during MCO, namely (i)shorten the supply chain through centralised synchronous distributors, (ii)produce emerging product to meet current customers needs (customers are looking for essential foods, and cleaning and sanitary products during MCO), (iii)use digitalised marketing through mobile applications and social media, such as Facebook and WhatsApp, (iv)employ 'collect on delivery' or 'cash on demand' transaction for the sale of goods, and (v)receive payment via bank transfer or e-wallet. According to the entrepreneurs interviewed, synchronous distribution approach allows entrepreneurs, especially in the agri-based business to earn decent income during a crisis. This strategy is parallel to omni-marketing channel approach which suggests the use of several channels in distributing goods to the customer, for example through distributors, mobile apps, and physical store, is more beneficial than single and independent channel approach (Palmatier, Sivadas, Stern & El-Ansari, 2020).

In addition, the result of the interviews proposes the establishment of 'centralised wholesale mart' selling essential perishable produces like fish, vegetables and fruits, which they label as 'frozen food hub'. This 'frozen hub' is seen by respondents as suitable to be located in several main high-traffic areas, and can be placed in government administration offices, higher education institutions or primary housing areas. This approach is in line with Yu-lian (2008) and Ping-hong (2009) who proposed the use of 'direct sales store' to market perishable and agri-based products. Figure 1 summarises the alternative distribution approach undertaken by entrepreneurs during normal time and MCO period. Interestingly, respondents viewed this approach as more economical and not necessarily appropriate during this disruptive time, but also can be implemented in the future.
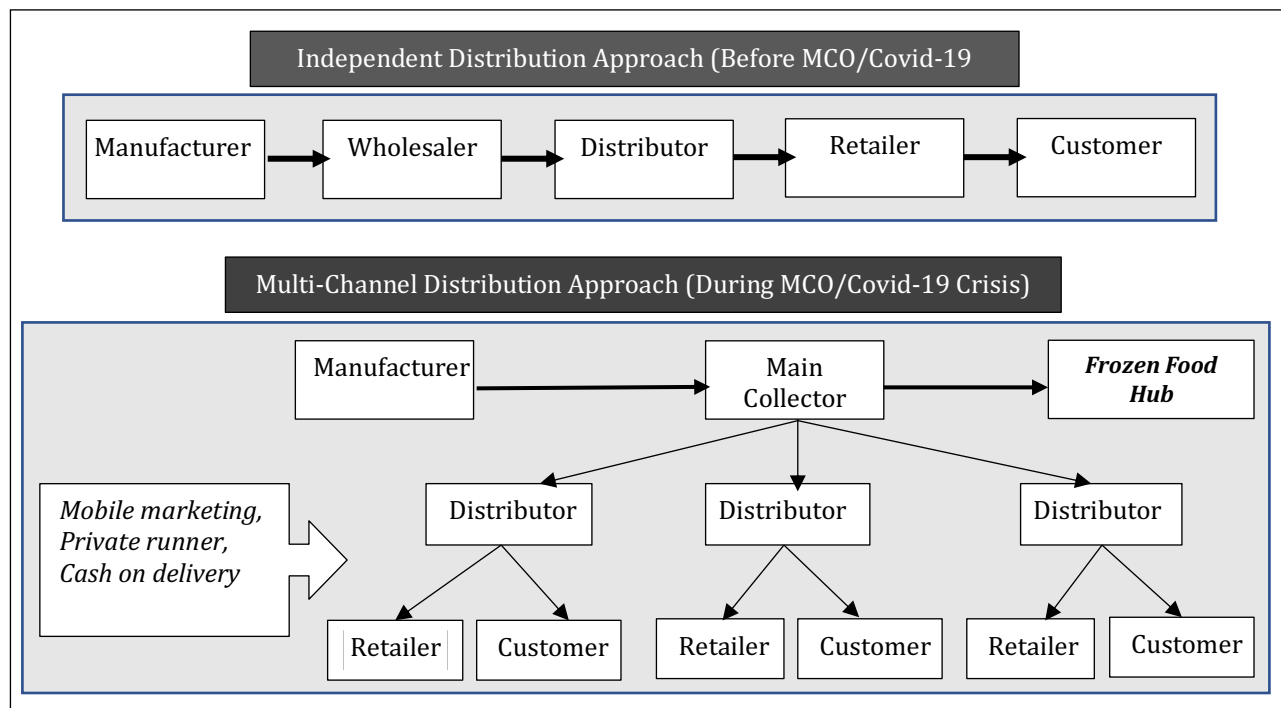
3.2 Business Recovery Plan After Crisis

The movement control order amid Covid-19 outbreaks in Malaysia has reached five phases, led to more than two months quarantine. Based on the interview, the result suggests the pandemic crisis has impacted micro-enterprises in different level of disruption throughout the MCO phases. Some enterprises began to experience business interruption for a month before MCO was imposed in Malaysia. In fact, the extent of impact was more extensive during the initial phase of MCO though started to demote throughout the later phases. The entrepreneur perceived the slow demand for their products as reactions from changes in consumer buying behaviour, that their buying intent on staples and sanitisation goods has been elevated during the crisis. In order to ensure continuous earnings, entrepreneurs need to be more flexible and make important adjustment in their business. According to Cook (2015), entrepreneurs' business recovery approach during crisis evolves in at least four stages, namely responding, resuming, recovering and restoring. This study explains the business recovery plan undertaken by interviewed entrepreneurs throughout the four phases of MCO in Malaysia. Table 1 depicts several alternative strategies for business recovery in time of crisis – before, during and after MCO

Table 1. Alternative Strategies for Business Recovery in time of Crisis

Crisis Phases	Pre-Crisis	During Crisis					Post-Crisis
MCO Phases	1 month before crisis	MCO Phase 1	MCO Phase 2	MCO Phase 3	MCO Phase 4	MCO Phase 5 or more	12 months after crisis
Level of Impact on income reduction	80%	90%	80%	60%	50%	20%	Less than 3%
Business situation	full-day open, business as usual	• full closure, • no staff • channel disruption	• half-day open • business from home	• half-day open • business from home	• half-day open • business from premise	• Full-day open (follow MCO SOP)	Business in the 'new normal' procedures

Impact-reduction approach	None	Business from home	• Business from home • self-deliver	• Self-deliver • community-based business • using mobile apps	• using multi-channel approach • mobile apps (e-hailing, e-bazaar, WhatsApp, Facebook) • hire private runner	Plan for 'new normal' business:- • Cash on delivery • Private runner • Community-based channel • Digital marketing	• Restructuring of business model/concept • Revising business plan (especially on cash flow and budgeting) • Investment on new business • Updating customer database
Crisis phases (Cook, 2015)	Warning	Responding	Resuming		Recovering		Restoring

Note. This data is based on interviews with two micro entrepreneurs involved in the study

Based on the interviews, it can be generalised that there is no formal crisis management planning or contingency planning employed by micro-entrepreneurs. However, a variety of approaches were used to deal with the impact of the crisis, including the operation of business from home, becoming own private runner, digital marketing, the multi-channel sales strategy and the penetration of the new market segment during a crisis by selling emerging essential products. The impact-reduction strategies undertaken by entrepreneurs in this study is parallel with crisis phases as suggested by Cook (2015), which involves responding, resuming, recovering and restoring. The interviewed entrepreneurs viewed post-crisis stage might only occur twelve months after the crisis ends, which can be regarded as 'restoring' phase. Presumably, during this stage, entrepreneurs are likely to have posessed more experiences, skills and resources to recover from the crisis. Such knowledge have become the basis for business recovery plan like the restructuring of business model or concept, revising the business plan, and updating market segments, as well to learn to do business under the 'new normal' procedures.

4. Discussion

This paper summarises findings from unstructured phone interviews with two local micro-entrepreneurs in Sabah, Malaysia, which was conducted in May 2020, during the fifth phase of movement control order amid Covid-19 outbreaks in Malaysia. The study focuses in two main areas from the entrepreneurs' perspectives, i.e. (i) to understand the business continuity strategy and (ii) the business recovery plan employed by micro-enterprise in coping with crisis impact. The Covid-19 crisis can be regarded as a difficult situation for micro-enterprises due to its abruptic threats. The results suggest that there is no systematic or formal management to crisis employed by micro-enterprises; nonetheless, their responses towards crisis are more ad-hoc to reduce the impact. Entrepreneurs seemed to demonstrate their ability to survive in their business by undertaking several business continuity approaches and recovery strategies, especially in terms of product delivery and marketing. This finding is parallel to McCarthy (2003), who suggested that the experience of crisis leads entrepreneurs to act more rational and engage in planning when making decisions. Interestingly, the respondents viewed the economic stimulus fund provided by the government as a non-paramount remedy to reduce the impact of the crisis. The accessibility to support and facilities is difficult among micro-entrepreneurs in less-developed areas, that they have to deal in a piecemeal manner. This issue is in line with Crushnahan (2004) who studied the impact of environmental crisis on a rural island tourism business in Indonesia. In order to ensure micro-entrepreneurs to manage their business in a crisis situation, specifically in a less developed area, it is crucial to provide assistance and support facilities that are more relevant to them, especially in terms of knowledge and skills on crisis management methods. The business knowledge like online marketing techniques, product delivery procedures, new product development, costing and pricing strategy during crisis and customer database management could serve as a basis of crisis management plan for micro-enterprises. This study is limited in that it focuses primarily on results from two respondents only. Nevertheless, the depth analysis of the interviews

contributed to the literature in relating to strategies for business continuity and recovery among micro-enterpriseFurther analysis using survey with larger group of respondents/audience is required in future studies to fully understand the survival mechanism adopted by micro-enterprises in response to the crisis.

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An Assessment of Financial Management Skills of Minibus Taxi Operators in the Cape Town Metropole, South Africa

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Abstract

Small businesses play a major role in the economic development of a nation. Studies conducted on small businesses in South Africa reveal 75% of new small businesses created fail within the first two years of operation, citing improper financial management as one of the reasons for failure. Irrespective of failures of small businesses, the minibus taxi industry in South Africa continued growing, which does not absolve them from failure. This study assessed the financial management skills of minibus taxi operators in the Cape Town Metropole, to assess their financial management skills and awareness of support structures. The study also provides recommendations on the gaps identified to sustain their businesses and stay competitive. The study targeted minibus taxi operators in the Cape Town area and deployed a survey method in a form of questionnaires to gather data. 100 taxi operators were interviewed. Nine financial management activities were identified and an exploratory descriptive study using a survey was conducted on these activities. Cross tabulations and chi-square tests were used to analyze and interpret certain data of interest. The study confirmed minibus taxi operators have limited financial management skills and there was no statistical significance between the number of minibus taxis owned and the different financial management activities assessed. Recommendations are provided on training intervention needed to up-skill minibus taxi operators on those limited financial management skills to ensure better management of their finances.

Keywords: Financial Management Skills, Small Businesses, Minibus Taxi Operators, Financial Management

1. Introduction

Throughout the world, small, medium, and micro enterprises (SMMEs) play a critical role in the economy, partly due to SMMEs being more labour-intensive and having a higher labour-absorption capacity than big businesses (Jacqui and Macquet, 2002). The South African National Small Business Act of South Africa (109 of 1996) classifies SMMEs in the transport sector as enterprises that employ people between one and one hundred employees. The focus of this study was on the minibus taxi industry which largely falls within the small business sector.

According to Sekhonyane and Dugard (2004), minibus taxis have never been part of the formal public transport system in South Africa. The minibus taxi industry in South African has evolved to compete with highly regulated and government-funded bus and rail services. The minibus taxi industry is not a new phenomenon in South Africa:

a basic transport need, coupled with an entrepreneurial attitude by black taxi owners, led to the establishment of what has become a permanent feature of the South African landscape. According to Monica and Van Zyl (2009), the minibus taxi industry in South Africa has been growing consistently in the past years. This growth could be attributed to several reasons, including high demand for public transport.

To compete with bus and rail services, taxi owners must possess financial management skills, as it provides minibus taxi operators with the required skills to manage their finances prudently and to sustain and grow their business. Kritzinger and Fourie (1996) state that without any knowledge of financial management and application thereof, small enterprises may not achieve success in sustaining and growing their businesses. Studies on financial management skills of the minibus taxi industry are scarce or unknown in South Africa. The study aimed to assess their financial management skills and awareness of support structures. The study assists in identifying areas for training to up-skill minibus taxi operators to better manage their finances. The findings will also benefit the minibus taxi industry and government institutions and other support institutions in developing support programmes for minibus taxi operators.

2. Background to the study

In the South African context, SMMEs play a significant role in the economy and society. In the study of Phenya (2011), it is reported the small business sector in South Africa represents 97,5% of the total number of the businesses, contributes 34,8% of the GDP, employs 56% (SEDA, 2017) of the labour force and approximately 42% of the total remuneration is generated by this sector. Road public transport is made up of buses and taxis. The taxi industry consists of two types of taxis, metered taxis, and minibus taxis. A Minibus taxi refers to a public transport vehicle designed to carry more than nine persons but not more than sixteen passengers including the driver (National Road Traffic Acts 93, 1996).

The minibus taxi industry plays a major role within the South African public transport system and more generally, in the South African economy. Even though it is a privately owned (and an unsubsidized) segment of the transport sector, the taxi industry is nevertheless often referred to as part of the public transport sector (Helen Suzman Foundation, 2018). According to the Department of Transport and Public Works (2012:4), minibus taxis carry 65 percent of passenger trips in the urban environment. According to Pillay (2014) 20 million people in South Africa take a minibus taxi every day, with estimated annual revenue of R39.8 billion. Booyse and Akpa (2013) further state in March 2011 the Road Traffic Report (RTMC, 2011) registered 285,858 minibuses on the road nationally.

Recently, in comparing the more general use of minibus taxis, buses and trains by households (as distinct from the more limited sphere of travel to work), 69% of households used taxis, 20.2% used buses and 9.9% used trains, during the calendar month preceding the survey (National Household Travel Survey 2013, published by STATS SA.) According to the Statistics SA 2013 Household Survey, taxi operators transport over 15 million commuters every day. Children get to and from school, every day, and adults can get to work so that they can provide for their families.

According to the Helen Suzman Foundation (2018), Transaction Capital, a JSE-listed company, which provides a range of financial and other services to the South African taxi industry, estimated in its 2017 results presentation that the industry's annual revenue amounts to approximately R50 billion. Transaction Capital also estimates that there are a total of more than 200 000 minibus taxis nationally; where the fleet is on average over 9 years old, requiring replacement and recapitalization.

In 2003, the Western Cape Government started a process of formalizing the public transport system. As part of the formalization of the public transport system, the Western Cape Government undertook a process of registering minibus taxis. As part of registration, minibus taxi operators and drivers were afforded opportunities to participate in Government funded training programmes to uplift the standard of operations and management (Ahmed, 2004). This training included improving the financial viability of minibus taxi businesses.

According to early reports by the City of Cape Town (2009), 70% of people are living and working in and around Cape Town and commuters spent between 40% and 70% of their monthly income on public transport, compared to the international norm of between 5 and 10%. Minibus taxis transport 332 407 (29%) passenger trips a day, which makes it the second-biggest public transport after rail (54%) in Cape Town (City of Cape Town, 2009).

In general, effective management of businesses is dependent on business management skills, such as operational management, financial management, personnel management, strategic positioning, relationship management, and risk management. This study focused on financial management skills and aimed to establish the types of financial management activities performed and lacking in operating the taxi business.

3. Literature review

Financial management is an integral part of a business. Nieman, Hough, and Nieuwenhuizen (2006) state that "financial management is responsible for acquiring the necessary financial resources to ensure the most beneficial results over both the short and the long term and making sure that the business makes the best use of its financial resources. Paramasivan and Subramaniam (2008) also define "financial management is the operational activity of a business that is responsible for obtaining and effectively utilizing the funds necessary for efficient operations". Being a major industry and still growing, financial management skills are important in managing the finances of minibus taxi operators and ensuring the minibus taxi industry stays competitive and continues to grow.

Various activities could be tested under financial management. To ensure the study was limited to the financial management skills of minibus taxi operators, nine financial management activities identified by Kritzinger and Fourie (1996) were used. In this study, the financial skills as listed by Kritzinger and Fourie (1996), were adopted for analysis with the taxi operators. It is envisaged studying these skills will provide an understanding of financial management in the minibus taxi industry, some of which are discussed below.

Recording of financial transactions is important for various reasons including having records and able to conduct financial statement analysis. There are various methods of recording financial transactions including computerised accounting systems, such as pastel accounting, QuickBooks, Easybooks or manually using journal books.

Financial statements may be drawn up manually or using computerised accounting systems. If computerised accounting systems are used, drawing up financial statements become easy. Computerised accounting systems assist with codifying, interpreting, and presenting financial statements. According to Maseko and Manyani (2011) accounting systems provide a source of information to owners and managers of SMMEs operating in any industry for use in the measurement of financial performance.

Financial statements are analyzed using ratios such as liquidity ratios, activity ratios, debt ratios, and profitability ratios (Beaumont-Smith, 2007). Financial statements analysis assists small businesses in preparing their financial budgets. Preparing financial budgets assist businesses to better manage their finances and can also be used as a guiding tool. There are various sources for preparing a financial budget in business, including determining capital requirements in the long term and working capital, in the short term.

The proper management of working capital, being the capital of a business which is used in its day-to-day trading operations, should give the desired impact on profitability, liquidity, or risk (Gitman, 2010). Padachi (2006) emphasized how critical it is for small businesses to manage their working capital. He further indicates small businesses, which include minibus taxi operators, are not good at managing working capital. The state of finances of minibus taxi operators could restrict or assist minibus taxi operators in accessing finances. Financiers might require minibus taxi operators to provide a financial statement, budget break-downs, and capital requirements.

According to the Ministry of Trade and Industry (1994) "extensive research revealed access to finance as one of the several important factors that are critical for business survival and growth". To address the problem of access to finance is to focus on improving financial management practices (Orford, Wood, Fischer, Herrington, and Segal, 2003). According to Mutezo (2005) experts in South Africa identified education and training as the most important

factor inhibiting entrepreneurial activity. Government and financial institutions play a significant role in facilitating access to finance, however, small businesses, including minibus taxi operators, understanding how to access finances is equally important.

Financial management also includes managing insurance, taxes, debts, and remuneration. In the minibus taxi industry, vehicle insurance is a necessity to protect the business and passengers from unforeseen business risks. According to KPMG (2013) insurance benefits an economy by encouraging businesses to better manage the risks of their everyday operations, thereby reducing failure rate (Chodokufa, 2009). Thus a sound insurance program is important for the proper protection of minibus taxi operators.

There are different forms and sources of debt. A loan can be used to finance the purchase of a taxi or operating expenses. In managing loans, businesses also should manage internal debt, including non-payment of salaries. If minibus taxi operators do not comply with their remuneration obligations, this can lead to high debt, thus resulting in cash flow problems and failure of the business. It is therefore important that minibus taxi operators understand how debt impacts their businesses. The minibus taxi industry is almost exclusively comprised of black individuals who are underserved by traditional credit providers.

According to Van Dyk, Nel, Loedolff, and Haasbroek (2001:148) training "is a learning experience, focusing on specific skills and abilities needed to perform a job or is a planned, systematic and organized process of providing employees with the specific knowledge and skills needed in their day-to-day work activities". Maphalla, Nieuwenhuizen, and Roberts (2009) in their study identified a lack of training and as one of five frequently mentioned perceived barriers experienced by township SMMEs. According to Perks and Smith (2006) poor skills level could be attributed to a lack of quality education, inappropriate public-funded training, and a low level of investment in training.

The primary objective of the study was to determine the type of financial management skills possessed by minibus taxi operators and provide recommendations for suitable training. To achieve this objective, the following secondary objectives were identified:
- To investigate the current business experience, training and education levels of minibus taxi operators;
- To investigate the financial management skills possessed by taxi operators;
- To identify financial management skills training needs; and
- Recommend possible suitable financial management training for taxi operators.

4. Research methodology

The study was exploratory as it explored the different financial management activities in the business of minibus taxi operators and descriptive as it provided an account of characteristics of minibus taxi operators. A survey method in the form of a structured questionnaire was used to gather data from minibus taxi operators.

A non-random sample of 120 minibus taxi operators was identified within the Cape Town Metropole. Before conducting interviews, appointments were secured with the respondents. Appointments with respondents were set either telephonically or in person after chain referrals by other respondents, thus using a snowball sampling method. Interviews were conducted at taxi ranks, and where appropriate, at home. A total of 100 questionnaires were deemed to be usable in the analyses. The questionnaire comprised the following main sections.

Section 1: About the business

Questions in this section were intended to determine whether the business surveyed could be regarded as small, based on the definition and description of the small business discussed in the literature review section. It also determined the growth of the business.

Section 2: Experience, training, and education

This section focused on the experience, training, and education levels of minibus taxi operators.

Section 3: Financial management skills

These questions dealt with the proficiency of the respondents about financial management skills. Respondents were required to rate the level of skills on the three-point Likert scale of No understanding or Little understanding of Full understanding.

Section 4: Financial management skills training needed

The section determined whether respondents required financial management training and the type of training required to enhance their financial management competence.

The following steps were taken to determine the validity of the questionnaire:
• The literature on financial management skills was used to determine the questions asked. This ensured content validity.
• The measurement instrument was tested on five participants not subject to the study. This ensure construct validity

The questionnaires used a combination of nominal, ordinal, interval, and ratios measurement data. Data were collected by five interviewers who were appropriately recruited and trained to collect data from the respondents. Due to the absence of a database, a non-random sample, using the snowball sampling techniques was used to gather the data. The study followed the normal ethical consideration, which included an information sheet and letter of consent and assuring confidentiality of the respondents. The study complied with all the ethical and legal requirements of the University of the Western Cape. Data captured were presented in tables and charts for analysis and interpretation. Cross tabulations together with the Chi-square test were used to determine the associations between certain variables.

4.1. Data analyses and interpretation

This section reveals the results from the survey considering the sections listed in the questionnaire. Data captured are presented in the form of tables for analysis and interpretation. Chi-square tests with cross-tabulations were used to understand the relations between certain variables.

4.1.1. Demographic data

Respondents were sourced from the areas included in the City of Cape Town.120 questionnaires were distributed to respondents, of which 100 were received, resulting in an 83% response rate. The respondents were widespread across the Cape Town Metropole, with the majority (42%) coming from the central area, followed by western areas (35%) and the least southern area (5%). The study further revealed that 91% of respondents, who were also the owners of the business, were involved in managing their businesses. On average, each taxi owner employed between 1 to 5 employees

4.1.2. Financial management activities in the business
This section focuses on financial management activities in the business.

a) Managing the financial management activities in the business
This section provides descriptive data on who manages financial management activities. A list of the activities was provided for the respondents to provide feedback on.

Table 1: Manage financial activities in the business

	Owner	Manager	Accountant	Tax Consultant	Other	Not applicable
Who manages staff salary payments?	81%	18%	0%	0%	1%	0%
Who manages tax matters in the business?	47%	4%	2%	25%	6%	16%
Who prepares cash budgets?	41%	2%	3%	0%	0%	54%
Who manages the collection of money owed in the business?	34%	3%	0%	0%	5%	58%
Who prepares financial statements	18%	0%	9%	0%	1%	72%
Who performs financial analysis?	13%	0%	3%	0%	0%	84%

According to Table 1, 82% and 87% of respondents do not prepare financial statements nor perform financial analysis respectively. 84% of the respondents also do not perform financial analyses and 59% do not prepare cash budgets. The findings reveal that most of them (well below 50%) are not actively involved in the financial activities of the business.

In this section the respondents were also asked to rate the growth of their businesses, using monthly takings and expenses, growth of minibus taxis of the past three years, and the current state of their businesses. 62% of respondents increased their number of minibus taxis in their businesses with between 1 and 5 minibus taxis over the past three years. It was also found 69% of respondents' experienced either stability or growth in their businesses. This supported the findings of Selekane (2014) "that the minibus taxi industry in South Africa experienced tremendous growth".

b) Factors affecting growth

The respondents were probed on the factors that restricted their growth in their business. A list of 12 factors was provided, as listed in Table 2 below. The results were then ranked from highest to the lowest factors affecting growth.

Table 2: Factors affecting the growth of the business

Rank	Category	Frequency
1	Tough competition	62%
2	Family responsibility	56%
3	Taxi violence	54%
4	Tough legislative and regulatory environment	48%
5	Lack of business support	44%
6	Culture conflict	43%
7	Lack of business training	42%
8	Lack of financial management skills	35%
9	Location	33%
10	Lack of finance	26%
11	Other	7%
12	None	2%

According to Table 2, respondents ranked tough competition, family responsibility, and taxi violence, tough legislative and regulatory environment as the five highest factors affecting growth in their businesses. This supported the findings of Boudreaux (2006) that tough competition and unsupportive institutional environment undermines the growth of minibus taxi operators in South Africa.

As regards to financing their minibus taxis, 37% used their savings, 31% from business partners, 27% of loans were from family and friends. 5% of respondents applied for a bank, of which 56% of respondents were successful in securing a bank loan,

Approximately 11% have passengers who owe the business money and there seems to be no debt collection plan. As regards employment relations, 58% of respondents didn't have employment contracts with their employees and 84% did not have any knowledge about the laws governing employment contracts.

c) Experience, training, and education

This section provides the business experience, training, and education of the respondents. It focused on the age of the business started, the educational qualifications of the owners, business, and financial training of respondents. 41% of respondents had been in business for the past 6 years and the remaining 59% were more than 6 years in operation. According to Fatoki and Garwe (2010), in South Africa, a new SME can be described as an SME that has been in existence for less than forty-two months (three and a half years). In the study, more than 86% of respondents had been in business for more than forty-two months, thus they were deemed to be established SMEs.

As regards qualifications, up to 83% of respondents had up to a grade 12 qualification and only 13% had post grade 12 qualifications. The results also indicate that 86% and 94% of respondents had not attended any business and financial management training respectively in the past three years, supporting the findings of Jefthas (2002) who identified 'minibus taxi operators in South Africa are lacking education, skills, and training'. An important finding is that most of the mini-bus operators did not attend any business-related training.

d) Labour and financial management skills

This section measures the levels of understanding of respondents in financial management. A list of the different aspects related to financial management aspects was provided for the respondents to rate their understanding of them. Respondents were asked to rate their financial management skills on a scale of No understanding, Little understanding to Full understanding.

Table 3: Level of financial management skills proficiency

Skills	No understanding	Little understanding	Full understanding
Labour Relations legislation - Labour Relations Act	78%	15%	7%
Labour Relations legislation - Basic Conditions of Employment Act	77%	16%	7%
Analysis of financial statements	59%	35%	6%
Preparing financial statements	53%	44%	3%
Managing debt	51%	39%	10%
Preparing cash budgets	48%	43%	9%
Obtaining of finance	32%	46%	22%
Managing insurance matters	25%	51%	24%
Managing tax matters	23%	52%	25%

According to Table 3, the five highest financial management skills which respondents had no understanding of were: labour relations (78%), basic conditions of employment (77%), analysis of financial statements (59%), preparing financial statements (53%) and managing debt (51%). Also, respondents had little understanding of managing tax matters, managing insurance matters, and obtaining finance.

4.1.3. Financial management training needed

This section illustrates the types of financial management training required by taxi operators. A list of the various financial management activities was provided, as listed in the table below.

Table 4: Training needed by respondents

Training needed	Frequency
How to record financial transactions on a computer systems/ manual journal	75%
How to analyze financial statements	70%
How to manage staff-related matters	65%
How to manage business tax matters	60%
How to prepare cash budgets	55%
How to manage day-to-day working capital	50%
How to manage business insurance matters	40%
How to apply for a loan	35%
Others	10%

In the survey, 61% of respondents indicated they needed training. As shown on Table 4, the top five training needs were identified as how to record financial transactions (75%) on a computer systems/ manual journal, how to analyze financial statements (70%), how to manage staff-related matters (65%), how to manage business tax matters (60%), and how to prepare cash budgets (55%). In general, the findings reveal an overwhelming need to be trained in the various aspects of financial management.

The study further probed to determine associations between some of the variables, using cross-tabulation. The size of the business (number of taxis owned) was cross-tabulated with some of the financial management activities. The next section provides the statistical analysis used to analyze data collected.

4.1.4. Cross tabulations

This section provides the statistical analysis used in the study. Cross tabulation was used to identify the relationship between variables and the chi-square test was used to test whether the observed variables differ from the expected variable, testing for the association, using a 5% significance level (p=0.05).

The analysis tests were undertaken to assess the relationship between:
- Number of minibus taxis owned by respondents and preparation of financial statements;
- Number of minibus taxis owned by respondents and performing financial analysis;
- Number of minibus taxis owned by respondents and preparation of cash budgets (monthly/ yearly);

a) Relationship between the number between minibus taxis in the business and preparation of financial statements.

Table 5: Cross-tabulation on the relationship between the number minibus taxis in the business and preparation of financial statements

	Prepares financial statements

		No	Yes	Total
Number of minibus taxis in the business	% within 1 to 3	75%	25%	100%
	% within 4 to 10	87%	13%	100%
	% within 11 to 20	77%	23%	100%
Total	% within number of minibus taxis in the business	80%	20%	100%

Evident in the cross-tabulation Table 5, 80% of the respondents were not preparing financial statements, the lowest being by owners of 4 to 10 taxis.

In the analyses using the chi-square test, there is no statistically significant (p=0.86) relationship between the number of minibus taxis owned by respondents and preparing financial statements. Therefore, one can conclude that there are no differences between the size of the business and preparing financial statements.

b) Relationship between the number of minibus taxis in the business and performing financial analysis

Table 6: Cross-tabulation on the relationship between the number of minibus taxis in the business and performing financial analysis

		Perform financial analysis		
		No	Yes	Total
Number of minibus taxis in the business	% within 1 to 3	81%	19%	100%
	% within 4 to 10	87%	13%	100%
	% within 11 to 20	85%	15%	100%
Total	% within number of minibus taxis in the business	84%	16%	100%

Evident in the cross-tabulation in table 6, over 80% of the respondents were not performing financial analysis. There was no statistically significant relationship (p= 0.9967) between the number of minibus taxis owned by respondents and performing financial analysis. Therefore, one cannot conclude respondents who had more minibus taxis in the business are performing financial analysis.

c) Relationship between the number of minibus taxis in the business and preparation of cash budgets (monthly/ yearly)

Table 7: Cross-tabulation on the relationship between the number of minibus taxis in the business and preparation of cash budgets (monthly/ yearly)

		Prepares cash budgets (monthly/ yearly)		
		No	Yes	Total
Number of minibus taxis in the business	% within 1 to 3	43%	57%	100%
	% within 4 to 10	67%	33%	100%
	% within 11 to 20	62%	38%	100%
Total	% within number of minibus taxis in the business	55%	45%	100%

About 55% of taxi owners do not prepare cash budgets. There is no statistically significant relationship (p=0.3074) between the number of minibus taxis owned by respondents and preparing cash budgets. Therefore, there is no association between the number of taxis owned and the preparation of cash budgets. Thus preparing cash budgets was not affected by the number of taxis owned. With regards to cash shortages, it was established that about 45% experienced some sort of cash shortage, during their operation of their business.

5. Conclusion of data analysis and interpretation

This study investigated the financial management skills of minibus taxi operators in the Cape Town Metropole and to provide recommendations. Respondents, in general, do not prepare financial statements and their businesses were growing. Most taxi owners were financed by savings and personal loans. Taxi owners seemed to lack employment contracts and knew little of the laws governing employment contracts. It was found more than 86% of respondents were deemed to be established SMEs and most of the owners had a grade 12 qualification. Based on the cross-tabulation and chi-square test, the study found there is no statistically significant relationship between the number of minibus taxis owned by respondents and preparing financial statements, performing financial analysis, preparing budgets, and experiencing cash shortages.

It can be concluded minibus taxi operators in Cape Town have limited financial management skills. Sixty-one percent of respondents expressed a need for financial management training. Respondents identified how to record financial transactions on a computer systems/ manual journal, how to analyze financial statements, how to manage staff-related matters, how to manage business tax matters, and how to prepare cash budgets as the top five training needed they needed.

6. Recommendations

The following recommendations are provided regarding appropriate training interventions to support the minibus taxi operators. Efforts should be made to develop financial skills to ensure sustained growth and competitiveness of the minibus taxi industry. In light of the above findings, the following recommendations are made:

(a) Non-formal qualification
Minibus taxi operators to invest in computerised accounting systems to record their financial statements and undertake transactions. The services of a bookkeeper can be secured to undertake financial transactions in the business.

b) Minibus taxi operators who have access to the internet may study basic financial management via the learning management system which is facilitated online, by private or public institutions.

c) Minibus Taxi Association(s) and/ or Federation(s) and/or Government and/or Non-Government institution(s) should organize workshops and exhibitions on financial management customized for minibus taxi operators.

d) Mini-bus taxi owners who need to expand their business could source funding from SA Taxi. SA Taxi fills a critical funding gap, providing credit to entrepreneurs who would otherwise be excluded from the formal economy.SA Taxi should also provide more small business training, financial management courses, and self-help tools to SME owners.

7. Suggestion for future research

Further similar survey research studies can be conducted nationally in South Africa across provinces on financial management techniques used by minibus taxi operators, or similarly, longitudinal studies can be conducted on those minibus taxi operators who were subject to this study and have attended skills training recommended in this study to assess improvement in their financial management in the businesses and impact on businesses.

8. Research limitation

At the time of writing this report, the researcher couldn't access up to date the number of minibus taxis operators in the Cape Town Metropole. The sample might not be representative and small as the exact number of minibus taxi operators is not known.

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Capital Market of Georgia: The Reasons of Fail

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Abstract

The study examines the financial and economic reality and backwardness of Georgia. It reflects the monopoly on the financial market owned by commercial banks thanks to the steady support of the state and the central bank, which ultimately does not allow for the attraction of alternative financial capital and is one of the main reasons for the country's failure. In this respect, the possibility of developing an economy is directly linked to this problem. Developing an economy requires large financial investments and a resources. Based on our research we have come up with a number of proposals to be introduced and to change the situation and to build a competitive financial market. The ultimate goal is to weaken / end the monopoly position of commercial banks and neutralize the negative activity of the National (Central) Bank of Georgia as the regulator of this market. This is the only way to create the independent and competitive sources of finance and investment in Georgia. Ultimately, this will increase market capitalization and eliminate the economic backwardness that exists between Georgia and a number of leading countries in the field of financial market and its infrastructure.

Keywords: Stock Market, Monopoly of Commercial Banks, Economic Growth, Capital Market

BACKGROUND

This study represents more than 20 years of personal involvement and observations on activity of Georgian Stock and Securities Market done by the Author as the founder, shareholder, CEO of several brokerage companies and the member of the Steering Board of Georgian Stock Exchange and Georgian Central Depository. The author wish to thank all those whose support had a contribution in the production of this study. Included in the list of valuable support are members of Georgian Stock Market, colleagues from Caucasus University, Partners from Brokerage industry and Local Authorities.

INTRODUCTION
(Georgian Capital Market – On-Going Trends and Development)

Problem Statement

The mission of the research proposal is to find out the real solution to rapidly developing countries like Georgia based on modern capital market tools. Economic progress and improving living standards of the population depends largely on the provision of high economic growth. Due to study of (Aslanishvili, D. (2020) WORLD EXPERIENCE:) Recent trend of the leading countries with well-developed financial markets and its

infrastructure heavily depends on efficient capital market using its tools to green economy via green bonds and regulatory requirements.

In that field, the first step is to have the well-developed and competitive financial market. In our study, we have overviewed the present conditions and challenges faced the Stock Market of Georgia.

The Stock Market of Georgia –from the beginning to the present

Based on research of (Aslanishvili, D. (2016). Market foundation) development, economic growth and raising the standard of living in the country are all linked directly to capital market development. One of the real levers, and the most acceptable and practical forms of investment are to invest in equities through the stock market. It is clear for the developed world how important the organized stock market is. This includes Western Europe, USA, Canada, Japan, China and other countries with powerful stock industries such as the New York Stock Exchange; Euronext; NASDAQ OMX; the London Stock Exchange and many others. The well-known and successful mediation businesses and/or brokerage-investment firms include Merrill Lynch; Morgan Stanley; Goldman Sachs; J.P. Morgan; Barclays Capital and many other investment banks.

In the modern world, any innovative idea, business idea or technological breakthrough is directly related to monetary resources. At the modern stage of human development, celebrities such as Bill Gates, Mark Zuckerberg, Steve Jobs and many others are clear examples of this. They had an idea, but no capital and had been convinced by the intermediary structures of the stock market to go through public placement (to issue the bonds and stocks). That way of financing materialized their ideas, and make the lives of every member of society better. Today, we can't even imagine life without cell phones, computers, Windows, Facebook or any other technological or everyday stuff.

The Georgian Stock Exchange (GSE) was established with the financial support of USAID and Barents Group in 2000. Immediately after its establishment, the Law of Georgia on Securities Market was developed and in 2000-2006 there were 42 brokerage firms in the country. These, under Georgian legislation, are institutions equal to investment banks. As it was studied by (Асланишвили, Д. (2015). Фондовый рынок Грузии), due to tightened regulations that came into effect after 2008, their number actually dropped dramatically and currently there are only seven members of the GSE left, of which just one noncommercial bank entity and others are subsidiaries of commercial banks. Over the years this trend looks like this:

Figure 1:

Year	2000	2001	2002	2003	2004-2005	2006-2007	2008	2009	2010-2011	2012-2020
Number of brokerage companies	42	38	35	26	16	17	16	9	8	7

(sources: Annual reports of Georgian Stock Exchange, www.gse.ge; National Bank of Georgia, www.nbg.gov.ge, Own calculations)

If we look at the picture from 2004 to 2008, the number of brokerage companies is stable, but due to the tight rules that have been enacted since 2008, their numbers have actually fallen and continue to decline to the number of seven from 2012 until present time.

There are several direct reasons for this. Here are some of the main reasons and the factors that cause this:
- Normally the activity of a brokerage firm is directly connected with public trading at a stock exchange, and carried out in an open and transparent environment. This process is related only to market price. In 2000-2007 Georgia faced the problem of "closed bidding." Lately, the rules of bidding were changed at the stock exchange and the so-called "N parameter" was abolished. In the study, conducted by (Aslanishvili, D., & Omadze, K. (2016). Origins and the Reasons), shortly thereafter the ruling political and economic teams implemented decisive measures against free price formation in Georgia. Research

has ascertained that Georgia failed to achieve results anywhere near those of developed countries, with miserable results caused by problems between the two basic means of attracting monetary resources-- bank loans and the stock market.

As it was stated by (D Aslanishvili (2016) Market Foundation) In financially successful and developed countries, these two mechanisms--bank loans and the stock market—are designed to attract money and create a mutually beneficial synergy. In Georgia, there is only one mechanism to attract money resources –the bank loan. In general, the Georgian commercial banking system tries its utmost to prevent the use of the second mechanism, the stock market, since it is considered a main competitor.

The analysis of the structure of owners of Georgian Stock Exchange (source: securities registrar JSC Kavkasreestri – www.kavkasreestri.ge) shows that 58% of shares of the stock exchange is in the hands of its competitor – Georgian commercial banks/holdings. There is another stock exchange - Tbilisi Stock Exchange, where owners are just commercial banks/holdings and Georgian Stock Exchange as minority shareholders itself (fully under control of Commercial Banks/holdings).

It means due to (D Aslanishvili (2016) Market Foundation) that Georgian commercial banks will not allow the development of their competitor—the stock market-- as it threatens their own preferential and successful financial position. According to this analysis, the situation is further complicated by the fact that under the legislation amended in 2008, both spheres of the monetary market have one mega regulator – the National Bank of Georgia.   It should be noted, that an essential attribute of the stock market – the National Securities Commission of Georgia (NSCG)– was abolished in 2007-2008. The power of the NSCG was transferred to the regulator of Georgian commercial banks and lobbyist of their interests - the National Bank of Georgia.

Simultaneously, very tough policies were enacted against non-commercial banking structures - brokerage firms, registrar companies, and market participants. As a result—there is practically no non-commercial banking funding ability to attract finance in Georgia.

Statistics of Trades and Stock Market Activity (2000- 2013)

According to the study, (D Aslanishvili (2016) Market Foundation) the statistical results of Georgia's stock industry are as follows:
- In 2000-2002, the shares of 282 Georgian joint stock companies were admitted to trading on the Georgian Stock Exchange, while 147 joint stock companies were potentially discussing the admission of shares to the stock exchange. This amount actually remained unchanged by 2007.
- In 2003 there were 278 joint stock companies admitted to trading at GSE; in 2004 – 276; in 2005 – their number was reduced to 253 and in 2006 – to 242. A small number of companies was included in so-called 'Listing A' and 'Listing B' tiers. The "JSC Bank of Georgia" was trading on two exchanges – the Georgian Stock Exchange and London Stock Exchange.

The number of stocks traded, the number of shares and the cash flow increased steadily, as shown in the table below:

Figure 2:

Year	2000	2001	2002	2003
Stocks traded	4354640	10862784	11418196	7826980
Money Turnover (GEL)	5,892,326 (2.5 mln USD)	13,077,244 (5mln USD)	8,401,206 (4 mln USD)	1,693,234 (0.8mln USD)
Number of Deals	601	1591	1343	912

Year	2004	2005	2006	2007
Stocks traded	30510783	32385702	68421921	84670905
Money Turnover (GEL)	46,676,153 (21mln USD)	62,362,181 (35mln USD)	169,137,895 (100mln USD)	167,359,523 (100 mln USD)
Number of Deals	1094	1358	5553	7856

(sources: Annual reports of Georgian Stock Exchange, www.gse.ge; National Bank of Georgia, www.nbg.gov.ge, Own calculations)

During the same period, the largest operator of the world's stock exchanges - Group OMX (NASDAQ OMX) Ltd makes a proposal to acquire the Georgian Stock Exchange.

This meant Georgia's direct global integration into the world stock market, and Georgian companies, intermediaries and investors had the chance to become an integral part of the world financial industry. The question arises as to what happened at this crucial moment in Georgia.

In 2007-2008 Country ruling team and related interest group(s) diminished Stock Market and trading activity by Legislation, refused to establish OMX Group (NASDAQ OMX in Georgia) in the Country and Georgia lost its chance to be the Regional financial center in the Caucasus (for information, after the group OMX (NASDAQ OMX) moved to Armenia, where with support of the local government and its legislative and financial support created the single financial center - NASDAQ OMX ARMENIA).

(The purpose of this paper is not to clarify why the Georgian political and financial management team of 2007-2008 delayed the chance of establishing a regional financial center to Armenia to the detriment of Georgia).

Consistently, the situation has evolved in the following way (unfortunately, this trend continues in the current period). 2007 - 2008 Parliament of Georgia is making changes to the law on the securities market. It was argued, that excessive brokerage fees are the problem to stimulate market and abolished the requirements from investors to buy/sell public securities through licensed brokerage companies. So called fixing (deals fixation rule) was established. This change essentially eliminated the essence of the brokerage company and brokerage, put an end to the market price, and introduced in Georgia such an uncomplicated form of bargaining that clearly shows signs of manipulation, fraud, and - possibly - money laundering. (some clear examples of fixing, due to own experience is given here into separate subsection of a description of a number of transactions concluded through fixing, which by their very nature fall directly into such categories.)

As it was noted by (Aslanishvili, D. (2014) Stock Market in Georgia) since 2008, there has been no longer any sale or sale of shares in Georgia. You can sell/buy any public stocks just on paper, without any auction or trade - it is important to sign the document (or in many cases you will be advised to "do the right thing" and assure that it is so good ...) and you have no longer the property. Most importantly, cash transaction control is vague in this way.

As a result, a number of financial and economic governing oligopolies were created and established in the country, and most of the wealth of the country was under their control. That is, we came to the classic axiom - the absence of a stock market means a non-transparent economy and the absence of a middle class in the country. This, in turn, leaves no prospects for the country's future development and progress.

Since 2008, when the restrictive legislative amendments were approved, there has been no "civilized" possibility for equity trading in Georgia, meaning that if there is a willingness to trade, securities admitted to the stock exchange can be transferred by simple inscription on paper, without any auction or trading – it is enough simply to sign the document. What is most important, this method has made the process of monitoring cash transactions absolutely opaque.

According to (Aslanishvili, D. (2014) Stock Market in Georgia), it means that the country's stock market was replaced by a grey, non-transparent, "wild-liberal" market. Georgia's stock exchange has lost its key function as a foundation for price formation in the stock market. Therefore, any trading in shares or other securities has become senseless.

As the analysis shows, in parallel with the changes taking place in 2007-2008, the management of joint stock companies gradually lost any interest in equity trading in an open and transparent environment, once the law didn't require it.

Thus, in 2006 there were 242 companies in the stock exchange's trading system (without listing), in 2007 their number was reduced to 161 and in 2013 reduced to 129. During the same period, the stock exchange turnover radically decreased in Georgia.

As it was studied by (David Aslanishvili, Omadze Kristine (2019) Green Economy), the problem of the Georgian stock market has been further aggravated by the global economic crisis. During global crises a civilized state tries to support businesses, which did not happen in Georgia. Following the worsening economic, legislative and market situation, the regulator - National Bank of Georgia - increased the authorized capital requirements for brokerage firms, which had already been left without any function or their main sources of income. To make matters worse, the NBG abolished three types of licenses and only recognized General License for which requirements in practice could be met only by commercial banks and their subsidiaries.
Capital requirements new tools and rules been introduced for brokerage firms to maintain its license. According to this complicated scheme of capital recognition, only money resources are considered as a source of capital replenishment, which--against the background of market failure--does not enable an independent brokerage firm to compete with subsidiaries of commercial banks. Thus, the actual disappearance of the securities market industry as an alternative to a bank loan is now a fact. Study shows it is used by the National Bank of Georgia to promote the obedience of the securities market to the commercial banking sector (i.e. competitive structure). It was argued by the National Bank of Georgia as the requirements of European Union Associate agreement with Georgia and to be in line with International standards. (source: www.nbg.gov.ge – official letter and announcement)

The catastrophic fall in the Georgian stock market is noteworthy. If the turnover of the trading system of the exchange market in 2006-2007 (i.e. transactions in open and transparent environment, despite the obstacle of N parameter) was GEL 167 - 169 million, in 2008 it decreased 14 times! It is falling (i.e. 1400 percent decline) and continues to decline in the following years.

According to the results of 2013, the country's stock market turnover is 530,491 GEL, which is 338 times less than in 2007! With the 2013 turnover, the Georgian Stock Exchange has established an anti-record in its history - such a small volume it has never had since its inception. The table below shows this process over time:

Figure 3:

Year	2008	2009	2010	2011	2012	2013
Stocks traded	12480863	12667601	41641272	12077996	9950399	27170709
Money Turnover	10,584,246 (7.2 mln USD)	3,112,576 (1.75mln USD)	5,117,755 (3 mln USD)	2,503,705 (1.3 mln USD)	8,847,355 (5 mln USD)	530,491 (0.3 mln USD)
Number of Deals	2321	1304	2372	860	339	283

(sources: Annual reports of Georgian Stock Exchange, www.gse.ge; National Bank of Georgia, www.nbg.ge, Own calculations)

Fixing

As a result of legislative changes in 2008-2014, Fixation of deals was introduced, instead of market trading.The table below shows this process over time:

Figure 4:

Year	2008	2009	2010	2011	2012	2013
Stocks traded	70669027	2954953076	1663935776	90352271	49101717	225508802
Money Turnover	245,978,780 (174 mln USD)	95,757,903 (56 mln USD)	96,051,894 (57 mln USD)	16,840,554 (10 mln USD)	726,721,480 (427 mln USD)	51,955,237 (30 mln USD)
Number of Deals	857	572	835	421	538	230

(sources: Annual reports of Georgian Stock Exchange, www.gse.ge; National Bank of Georgia, www.nbg.ge, Own calculations)

As for the number of transactions made outside the stock exchange and any transparent environment, "fixing" amounted to 3453 trades in Georgia in 2008-2014 according to our research. Total amount in shares was 5,054,520,669 units, and the total value was GEL 1,233,305,848 (720 mln USD). This means that the "grey" market exceeded the amount of the open market 24-fold in 2008, 32-fold in 2009, 19-fold in 2010, 8-fold in 2011, *90-fold in 2012 and 100-fold in 2013.*

In fact, the entire stock market of the country has been replaced by the gray, non-transparent "wild-liberal" market. There are hundreds of such out of market deals and cases since 2008. We have studied several of it:
- In December 2008, as a result of legislative amendment, there were two transactions per day on the JSC „Caucasus Energy and Infrastructure". According to the Fixing Sheet, one investor sold stock at price of 0.167 GEL each to the definite investor and in the same date and time, that investor re-sold that portion at price of 1,741 GEL per stock.

Figure 5:

DATE	Number of Trades	MIN PRICE PER STOCK	MAX PRICE PER STOCK	VOLUME IN STOCKS	Money Turnover
December 31, 2008	2	0.1665 (GEL) (0.1 USD)	1.7414 (GEL) (1 USD)	799658	762,833.75 (GEL) (448,725 USD)

(sources: trades of Georgian Stock Exchange, www.gse.ge; Own calculations)

If we study this fixed deal, it looks that 799,658 shares were traded. From it, 383,329 shares were sold at 63,824 GEL (37,543 USD), and the same number - 383,329 shares were sold on the same day at price of 667,529 GEL (392,665 USD). It turns out that one investor "surpassed" the other by more than 600,000 GEL (more than 350,000 USD) on the same day and in the same amount of shares. It is impossible to conduct such "trade" during the open auction and public trade and such deal goes beyond any norms;

- In May 2009, Joint Stock Company "Khidmsheni" (Bridge Construction) also transferred 131415 shares with a total amount of 2,490,314 GEL (1,465,277 USD). At first glance, there is nothing special about the price - it is 18.95 GEL (11.15 USD) per share. Interestingly, neither before (since 2000) nor after this fixing did these equity brokerage activities cost so much. Neither the number of shares is any special nor the equity. The stock price range for 2007 - 2009 was 0,10 - 0,50 GEL (0.06 – 0.35 USD) and in June 2009 the stock was worth 0,50 GEL (0.35 USD). According tour study, it is unclear why did the investor pay 2,490,314 Gel (1,465,277 USD) in the gray market (the real money turnover is unknown) when the commodity was valued at 80,000 - 90,000 Gel (47000 – 53000 USD)?

Figure 6:

DATE	Number of Trades	MIN PRICE PER STOCK	MAX PRICE PER STOCK	VOLUME IN STOCKS	Money Turnover
October 29, 2007	1	0.10 (GEL) 0.06 (USD)	0.10 (GEL) 0.06 (USD)	120000	12,000 (GEL) 7,200 (USD)
July 8, 2008	1	0.50 (GEL) 0.35 (USD)	0.50 (GEL) 0.35 (USD)	159492	79,746 (GEL) 55,822 (USD)
February 17, 2009	1	0.30 (GEL) 0.20 (USD)	0.30 (GEL) 0.20 (USD)	26853	8,056 (GEL) 5,370 (USD)
May 5, 2009	1	18.95 (GEL) 11.15 (USD)	18.95 (GEL)	131415	2,490,314.25 (GEL) 1,465,277 (USD)
June 2, 2009	1	0.50 (GEL) 0.35 (USD)	0.50 (GEL) 0.35 (USD)	180576	90,288 (GEL) 63201 (USD)
June 4, 2009	1	0.50 (GEL) 0.35 (USD)	0.50 (GEL) 0.35 (USD)	898270	449,135 (GEL) 314,394 (USD)

(sources: trades of Georgian Stock Exchange, www.gse.ge; Own calculations)

- In July 2011, there was a remarkable "pricing" by fixing. 30,697 shares of JSC "Becdviti Sityvis Combinati" (Printing Press) were traded in a single day totaling 2,495,269 GEL (1,467,805 USD). Most striking is the transfer price of the shares shown during this fixing. A total of three deals were concluded, and the fixed price (this is not a trade) ranged from 1.30 GEL (0.765 USD) to 83,4879 GEL (49.1 USD). Due to our research, the difference in price paid (as shown in papers) by investors were 64 times differs from one to another.

Figure 7:

DATE	Number of Trades	MIN PRICE PER STOCK	MAX PRICE PER STOCK	VOLUME IN STOCKS	Money Turnover
July,2011	3	1.3 (GEL) 0.765 (USD)	83.4879 (GEL) 49.1 (USD)	30697	2,495,269 (GEL) 1,467,805 (USD)

(sources: trades of Georgian Stock Exchange, www.gse.ge; Own calculations)

- In 2011, also through the fixing and the opaque pricing, a large share of the Joint Stock Company "United Telecommunication" was acquired. 42,848,963 shares (or 41.5% of the enterprise share) were transferred through fixing, totaling 6,000,331 GEL (3.5 mln USD). It should be noted here that a similar share was disposed of on December 15, 2006 at GEL 89,722,692 (54 mln USD). That is, after the privatization in 5 (five) years its price has fallen almost 15 times. Details of this deal, as well as many other fixings, are unknown.

The listing of such facts caused by this legislative amendment of 2007-2008 may not be complete. As a result of research, it was identified the problems and answered the questions why investors do not want to invest in Georgia, what are the reasons that stock market does not work and why there is no market price for any stock in the country.

Due to study, conducted by (Aslanishvili, D., & Omadze, K. (2019). Green Economy) any comment here is superfluous. Goal of this study is to find out the answer and explain the purpose of Author(s) of this fixation, its introduction and the advocates of this law in today's reality. It is difficult to show an example of country which can attract investments and reach the prosperity using this approach as fixing such "deals".

RECENT DEVELOPMENT (2014- 2019)
(organized market)

As it was mentioned by (Aslanishvili, D., & Omadze, K. (2019). Green Economy) starting October 2014, the banking oligopoly of Georgia fully controls Steering Board, Management and activity of Georgian Stock Market. It should be noted, that Georgian corporate bonds (commercial banks bonds and its affiliated structures) are eligible in Clearstream from September 2018.

Clearstream Banking S.A. started offering settlement, custody, and asset servicing for selected Georgian corporate bonds, together with securities issued by the Government of Georgia and international financial institutions (the "IFIs"). By offering new services in Georgia, Clearstream further enhances the access to the Georgian capital market for international investors and is the sole international central securities depository (the "ICSD") to offer such services. Non-resident corporate, non-resident individual and resident individual holders of Georgian listed corporate bonds issued prior to 2023 are exempt from capital gain and interest income (withholding) taxes.

More than 2 billion Gel (1 billion USD) successful placements of IPO done in Georgia during the last five years: FMO (Nederlandse Financierings – Maatschappijvoor Ontwikkelingslanden N.V), Black Sea Trade and Development Bank, Bank of Georgia, Liberty Bank, M2 Real Estate, TBC BANK, EBRD bonds, ADB bonds, Georgian Leasing Company, Nikora, Zedazeni and others).

According to (Aslanishvili, D., & Omadze, K. (2019). Green Economy) several and most memorable deals are:
* On June 28, 2019 - TBC Capital (brokerage of TBC BANK) has listed the largest Eurobond issue on the Georgian Stock Exchange. TBC Bank has successfully priced a debut US$300 million 5-year 5.75% (6% yield to maturity) senior unsecured notes issue (the "Notes");
* On July 12, 2019 - The Asian Development Bank (ADB) raised 60 million GEL (about $21m/€18.70m) from two new issues of local currency bonds. The proceeds of the bond issues will be on-lent to Credo Bank to launch new products including home improvement and mortgage loans to lower-income households in rural areas and on the outskirts of the Georgian capital, Tbilisi.
* TEGETA MOTORS LTD - On May 22, 2019, GEL 30 million worth of 3-year bonds issued by the Tegeta Motors LTD have been admitted to the category A listing of the Georgian Stock Exchange.

We have studied if any positive changes took place regarding market or intermediary service (brokerage companies). As our study shows the situation almost the same as it was in 2008. Totally, six brokerages on the market and due our study the ownership of five brokerage companies is the following:

* "Cartu Broker" LTD –JSC "Cartu Bank" structure;
* "Galt & Taggart" JSC – JSC "Bank of Georgia" structure,
* "TBC Capital" Ltd- JSC "TBC Bank" Branch;
* "Silk Road Bank" JSC – itself commercial bank on Stock Market
* "Heritage Securities" LTD – JSC "Liberty Bank" affiliated structure

We have studied the recent figures of the stock market. As we have mentioned, in 2013, the country's stock exchange turnover amounted to GEL 530,491 (0.3 mln USD) or 338-fold less compared to 2007. In the period from January 1, 2014 – July 14, 2019 due to trading results of Georgian Stock Exchange:

Figure 8:

DATE	Number of Trades	VOLUME IN STOCKS	Money Turnover
2014 - 2019	667	32666230	2,770,069.42 (GEL) 1,3 mln (USD)

(SOURCE: www.gse.ge).

According to (Aslanishvili, D., & Omadze, K. (2019). Green Economy) an average turnover was 461,678 Gel (215,000 USD) per year. Unfortunately, approximately all trades and deals went on banking stocks and bank's affiliated companies.

We have studied the Bond Market of Georgian Stock Exchange. In the period from January 1, 2014 – July 14, 2019 due to figures of Georgian Stock Exchange:

Figure 9:

DATE	Number of Trades	VOLUME IN BONDS	Money Turnover
2014 - 2019	140	13243	13,810,668 mln (USD)

(SOURCE: www.gse.ge)

As we can see, an average turnover per year was 2,301,781 USD. Due to research, approximately all the trades went on Banking Bonds and affiliated companies.

Gray market (Fixed deals and OTC turnover)

In our study, we paid special attention to the fixed deals and OTC market to compare its level and turnover to the organized one. In the period from January 1, 2014 – July 14, 2019, the figures of "Gray market" were the following:

Figure 10:

DATE	Number of Trades	VOLUME IN STOCKS/BONDS	Money Turnover
2014 - 2019	2319	6031596962	2,323,965,196.85 (GEL) Appr 1 billion (USD)

(SOURCE: www.gse.ge).

At an average per year – 38,732,603 GEL (15,810,000 USD) turnover. Here also, Most of deals and turnover go on Banking Stocks/Bonds and affiliated companies(SOURCE: www.gse.ge). Our study shows, that tendency is the same and at present conditions the "gray market" surpassed the organized one by 73 times at average per year.

We can state that the country's stock market was replaced by a grey, non-transparent market. At this stage Georgia's stock exchange has lost its key function as a foundation for price formation in the stock market. Therefore, any trading in shares or other securities has become senseless.

Fixation of Deals out of Market (gray Market, OTC) represents the alone way of funds attraction. As research and practice shows, Commercial Banks distribute the adopted offer of stocks/bonds inside the banking/holding structure for their own clients and submit the fulfilled IPO to Stock Exchange. Stock Exchange act as Notary, but not as the Stock Exchange as it should be (David Aslanishvili, Omadze Kristine (2019) Green Economy...)

Any suggestion on legislative amendments as a solution in order to save and develop independently from Commercial bank's Georgia's stock exchange had been many times stopped and blocked by the Georgian government, National Bank and Commercial Banks, working together to keep the current trend. ((D Aslanishvili(2016) Market Foundation...)

The alone way to get finance in Georgia is to be loyal to Commercial Banks and its affiliated structure(s) and show the readiness to give them access to your company share structure and management to receive funding. (Aslanishvili, D. and Omadze, K. (2016) Origins and the Reasons) suggested that legislative amendments as a solution in order to save and develop Georgia's stock exchange, a package of amendments to resolve the situation should be introduced based on recommendations done by our research and study

Conclusions

As the summary, we can conclude that current market conditions can be summarized in the following manner:

- Commercial Banks/Holdings fully control the non-commercial source of funding – "Georgian Stock Exchange"- 58 percent of Stake of GSE and 100 percent control of "Tbilisi Stock Exchange."
- Licensed by NBG and GSE the Brokerage Companies – almost all in property of Commercial Banks/holdings;
- All emissions and successful placements of companies (Bonds/stocks) are done only by Commercial Banks and for their and affiliated companies
- There are no alternative sources of funding in Georgia, except commercial bank loans directly or indirectly (via their "green light" to issue bonds/stocks for Banks of affiliated companies);
  - Main sources of funding in Georgia are Commercial Banks and affiliated structures;
  - Capital market – stock and bond markets in Georgia-is are not developed as an alternative source of funding for any noncommercial banking structure;

In that field and due to current tendencies - there is a lot of real benefits of non-bank financing, including for clean energy projects and the SME sector (e.g., small hydro, energy efficiency). In our view, the Government of Georgia should intervene and change the "rule of games" on Capital market and to introduce the real Glass Steagal/Dodd–Frank/The Gramm–Leach–Bliley Acts in action, not just in papers.

At the same time, Georgia needs an independent from Commercial Bank/Holdings and National Bank of Georgia the Supervisor and Stock Market structure - to have the real alternative source of funding. Commercial Banks/Holding should be prohibited from Stock Market activity (depositors risk mitigation- international practice). We think, that the international community (donors, IFIs, international organization) should supervise the practical implementation of the abovementioned steps in Georgian reality to support Georgia's efforts to have the developed capital markets, available to finance businesses.

Obviously, the research is based on certain assumptions, and all project implementation will require some period of development and with the growth of the current economy, their contribution to economic growth in other equal conditions will be reduced. However, the potential economic benefits of projects are more visible.
The survey unfortunately reveals that the chances to have a successful startup and success in Georgia are low, with the main problem being the absence of competition between two main sources of cash flow.

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The Impacts of Climate Change on Food Security –

Case Study: Egypt

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Abstract

This study analyses the impacts of climate change on food security in Egypt. The study depends on using ARDL model (Auto regressive distributed lag model) in order to estimate the impacts of climate change on food security dimensions in Egypt. The study found that there is a negative and significant impact of temperature on food production as increasing temperature leads to decreasing some crops' production. Also, there is a positive and significant impact of temperature on food access as increasing temperature leads to increase food prices. These findings showed that unless sufficient adaptation, Egypt will suffer from negative effects on food production and food access and that will result in a high insecurity of food. This study reached a recommendation of enhancing a comprehensive adaptation system in order to lower the negative impacts of climate change on food security.

Keywords: Egypt, Food Security, Climate Change, Agro Biodiversity

Introduction

Food security is one of the most important challenges in all countries. The world food summit (1996) defines food security as "situation when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. "Food insecurity is a vital challenge that the Egyptian authority faces as 20% of Egyptian population have food insecurity.

According to Global Food security Index 2019, Egypt rank 55 out of 113 countries with overall score 64.5 that consists of food affordability 57.6, food availability 70.2 and quality & safety 65.9. Agricultural sector in Egypt represents about 17% of GDP of Egypt, employs 50% of the labor force and gives about 50% of the country's food. Therefore, any problems in the agricultural sector will have negative effects on food security that has a negative effect on national security and political stability. Climate change will lead to negative effects on the four dimensions of food security: food Availability, food access, food utilization and food stability.

This paper aims to investigate the impacts of climate change on food security. So, this study is organized as follows. Section 1 literature review to illustrate some of the previous studies that estimate the impact of climate change on food security. Section 2 discuss the impacts of climate change on the 4 dimensions of food security

(food availability, food access, food utilization and food stability). Section 3 Illustrates the impacts of Agro biodiversity on food security. Section 4 illustrates different estimates of costs of adaptation to climate change. Section 5explainsn the situation of food security in Egypt and the impact of climate change on the 4 dimensions of food security. Section 6explainsn adaptation cost in Egypt and climate finance and section estimateste the impacts of climate change on food security in Egypt through ARDL model (Autoregressive distributed lag) model.

1. literature Review

(Laila Yassin, 2016), this study concentrates on the effect of climate change on food security by focusing on the agricultural sector and the food production system in Egypt. This study depends on deep interviews with people who are specialized in the agricultural field from governmental, local and international organizations.

This study investigates the agricultural system and the problems that the system faces because of climate change. In addition, this study also analyses management of adaptation policies in order to lower the negative impacts of climate change on food security in Egypt. This study reached that the current mechanisms are not efficient due to absent legal policy, no coordination among stakeholders and the low standard of awareness. The study did a recommendation of enhancing a clear comprehensive legal policy that may lead to enhancing cooperation among different stakeholders. There is also another study (Fahim M.Aet altal, 2013) which analysed effects of climate change by relying on findings in the field study and results of projects activity in Egypt.

Risks analysis of climate for crops in food insecurity areas in Egypt was done to know priorities of adaptation relying on statistical models of crops and projections of climate for 2030. The findings of the study show that unless good measures of adaptation, Egypt will suffer from negative effects on a lot of important crops for a lot of people who suffer from food insecurity. There is also a study of (Helmy M. Eid & et. al, 2007) which analyses the effects of climate change on net revenues of farms in Egypt. This study depended on a regression model of net revenues of farms in case of a lot of variables such : climate, soil. Socio economic and hydrological in order to know the variables that have effects on net revenues of farms. A survey was conducted by doing interviews for 900 households in 20 governorates.

The findings indicated that raising temperature will be a constraint on production of agriculture sector in Egypt. Technology and irrigation are recommendations for adaptation. Warming also has an impact on water resources and may be other obstacle for production of agriculture sector. Another study (Matto Bocci & et. al, 2019) examined the effects of climate change on agriculture sector in the Eastern countries (Egypt, Israel, Lebanon, Jordan and Palestine) and Western countries (Morocco, Algeria and Tunisia) of the Southern Mediterranean. The study reached that there are depressing effects of climate change on the agriculture sector and may increase in the future especially the negative effects on water resources & agricultural systems.

The study recommended that support of policies for adaptation is a solution in order to lower the negative effects of climate change on the agricultural sector, increasing the need for increasing national technical capacity for assessing and planning the needs of local systems of farming in plans and policies of development on the sectorial side. Finally, studies that analyses the impacts of climate change on food security in Egypt are limited, therefore this study tries to estimate the relationship between food security (food availability through food production and food access through food inflation) and climate change (temperature & CO2 emissions). It also tries to analyses policies of adaptation of agriculture sector in order to lower the negative impacts of climate change on food security.

2. The Impacts of climate change on food security

The Food and Agriculture organization (FAO) defines food security as a "food security exists when all people at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 1996). This definition consists of four components of food security: food availability, food access, food utilization and food stability.

2.1 Impacts of climate change on food Availability

Food availability means availability of sufficient food quantities on a stable way. It includes production, processing, packing, transport, storage of food and all necessary systems included in doing those procedures (USDA, 2015: 53). Variability of climate has a direct impact on production of agriculture sector, because of sensitivity of agriculture sector to conditions of climate and its vulnerability to risks and effects of global climate change (Greg E Edame & et al, 2011: 211). Climate change has an indirect impact on production of agriculture sector by having an effect on growth and income distribution and therefore affects the demand of agricultural products (Josef Schmidhuber & Francesco N. Tubiello, 2007: 19703).

Effects of climate change on food availability have been analyzed in several studies. RSIS policy brief[1] discuss potential consequences of disturbances of climate change on crops and global production by 2030, 2050 and 2080. This report showed that by 2030, stress of heat can lead to significant decreases in quantities of rice production in South and Southeast Asia. Temperatures of warmer nights affect rice yield in a greater negative way. +1ºC above critical temperature (>24 C) may cause 10 % decrease in grain yield and biomass.

By 2030, production of rice in North eastern Thailand can be decreased by up to 17.8% without adaptation. Increasing world temperature will have an effect on production of wheat in all countries that produce wheat. As an example, In India, heat by 2050 will lead to decrease of 50% of its growing area of wheat. A temperature rise of 20 c in India could lower yield of rice by about 0.75 tons per hectare in the areas that have high yielding.

This study explained that yield of wheat will be decreased by – 24.1 ± 7.1 percent between 2050 and 2080 in South East Australia. Warm temperatures can lead to depressing changes of yield from -25 to -29 percent. And by 2080, North East Thailand may have a depressing yield in changes of rice from 8.6 to – 32.2 percent. Nelson (2009) also shows findings that analyze the effects of climate change and evaluate the results for food security.

Increasing temperature and rainfall systems changes affect yields of crop directly and indirectly by changes of irrigation water. Climate change in developing countries will lead to decreases in yield for the most vital crops. Irrigated Wheat and rice are the most crops affected. On average, yields of developing countries are affected more than those in developed countries. 2050 availability of calorie is not only less than the no climate change. It lowers relative to 2000 levels throughout the whole world. In a developing country, the average consumer decrease is 10 percent relative to 2000. The decreases with fertilization of co2 are 3 percent to 7 percent less severe but are still high relative to scenario of no climate change. Study of (Ray D.K & et al, 2009) constructed linear regression relationships relying on data of weather and reported crop to estimate the expected effect of climate change on the yields of the top world crops.

The study found that yields of crops are expected to lower according to climate change scenario. They result that the effect of world climate change on yields of various crops from trends of climate was from -13.4% (oil palm) to 3.5% (soybean). For the top three world cereals, yields have lowered for rice (-0.3%) or -1.6 million tons yearly and wheat -0.9% or -5 million tons yearly and 0% for maize. This shows a yearly 0.4%, 0.5% and 0.7% decline in consumable calories of food available from rice, wheat and maize respectively.

2.2 Impacts of climate change on food Access
Food access is achieved when all people have enough resources to get food by sufficient amount, quality and varieties in order to reach nutritious diet. This relies on the quantity of people resources and prices (Ray D K, 2019: 1). Access to food is affected by climate change in a negative way because of a decrease of production of agricultural sector, increasing prices of food and lowering purchasing power. The impacts of climate change could cause a decrease in incomes and an increase in prices of food and that influences economic access of persons, especially poor persons, to food.

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[1] Paul P.S. teng & et al (2015), Impact of climate change on food production: options for Importing countries, RSIS , policy brief.

Climate change could also affect rural incomes, as agriculture sector is highly sensitive to climate change, temperature and rainfall changes can lower rural incomes (Jobbins G. & Henley G., 2015: 8). Study of (Nelson, 2010) indicates that increasing prices is a sign of imbalances between demand and supply and increasing scarcity of resources because of factors of demand like increasing population and income, or factors of supply like decreased productivity because of climate change. The study estimated that real prices will raise by 87- 106 % for maize, 55-78% for rice and 54-58% for wheat by 2050 relative to the 2010 baseline because of the effects of climate change.

Another study by FAO[2] assesses the negative impact of climate change on food prices, with a lot of the raises from 5-25% in 2050. A study of (Hertel & et al, 2010) shows that price of a lot of staples increases by 10- 60% by 2030 and rises levels of poverty by 20-50% in many areas of Africa and Asia under these changes of prices. This paper shows three scenarios of effects of climate change on agricultural sector by 2030 (effects leading to low, medium or high productivity) and asses the changes in world prices of goods, national economic welfare and poverty in 15 developing countries. There is also a study of (Ivanic & Martin, 2008) that showed the relationship between increased world prices of food and poverty. By doing an approach of ten detailed surveys, the study evaluates the effect of increased prices of food on poverty in nine low income countries. The results show that raising of prices of food lead to an increase in poverty in low income countries. The average of the estimated impacts on national rates of poverty (US 1$/ day) in the sample is a rise of 4.5 percentage. It is translated to a rise in the poverty of 105 million people (out of 2.3 billion people in low income countries).

2.3 Impacts of climate change on food Utilization

Food utilization means that there is an access of persons to an enough diverse amount of food to meet their needs. Food utilization is the capability of persons of using the food they access well. This will be done by a sufficient diet, clean water, sanitation and health care which will lead to meet all their needs whether physiological or nutritional needs. Climate change will negatively affect food utilization through impacts on human health and illnesses spread in areas which did not have previous effects. Climate change will raise hunger and malnutrition because climate change will negatively affect farmers, forest dependent and fishers living conditions. Therefore, hunger and malnutrition will rise (Greg E. Edame, 2011: 214).

A study of (Nelson & et al, 2009) discussed that climate change increases child malnutrition and lower consumption of calorie. This study assessed that a decrease in availability of calorie will lead to a rise in malnutrition of children by 20 percent by 2050 comparative to the scenario that does not have climate change. Climate change will lead to a decrease in the improvement in child malnourishment levels that may happen in the case of not having a climate change. There is another study (Jobbins G. & Henley, 2015) which analysed problems that nutrition and food utilization face like illnesses from infections and poor quality of water. Diarrheal illness has a correlation with raising temperatures and poor quality of water can come from droughts & floods. This paper found that malnourished children under age of five years in MENA countries were estimated to decrease from 3 million to 1 million between 2000 and 2050. However, 2 million malnourished children could continue by 2050 as a result of climate change.

Another study (Simon J. Lioyed & et al, 2011) depended on data of current national availability of food and nutrition to estimate a world model, by relying on a way driven approach depended on approximation of the relationship between food lack and stunting. This study found that climate change will rise a moderate stunting of 1-29% in 2050 relative to scenario of future with no climate change. Climate change will lead to a higher effect on severe stunting rates, which are estimated will rise by 23% central SSA to 62% South Asia.

2.4 Impacts of climate change on food stability

Food stability indicated security of food as all persons must have access to sufficient food for all times. They should not have a risk of not getting access to food as a result of sudden shocks like economic or climatic crisis

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[2] FAO (2018), how climate change may affect global food demand and supply in the long term, FAO, Global perspective studies team

or cyclical problems like seasonal insecurity of food (FAO, 2006: 1). The term stability is concerned with the dimensions of food security: availability and access to food. Agriculture is having vulnerability to external shocks like economic crises, raises of prices of food and emergencies like droughts, floods, pests and outbreaks of illnesses.

Stability of food availability: several crops have yearly yields and cycles have fluctuations with climate change, especially rainfall and temperature. Droughts and floods are a special risk to stability of food and could lead to insecurity of food. They are estimated to be more frequent, more existed as a result of climate change. (Nathan Akila loks, 2015: 806)

Stability of food Access: world markets of food may have greater volatility of price. Which have an effect of returns' stability to farmers and access to buy food of poor persons who are farming and non farming. Climate change is related that availability and access to food can be more volatile in the future. So, achieving a stable availability and access of food can only by attained by suitable adaptation and mitigation of climate change.

Figure 1: The Impacts of climate change on food security
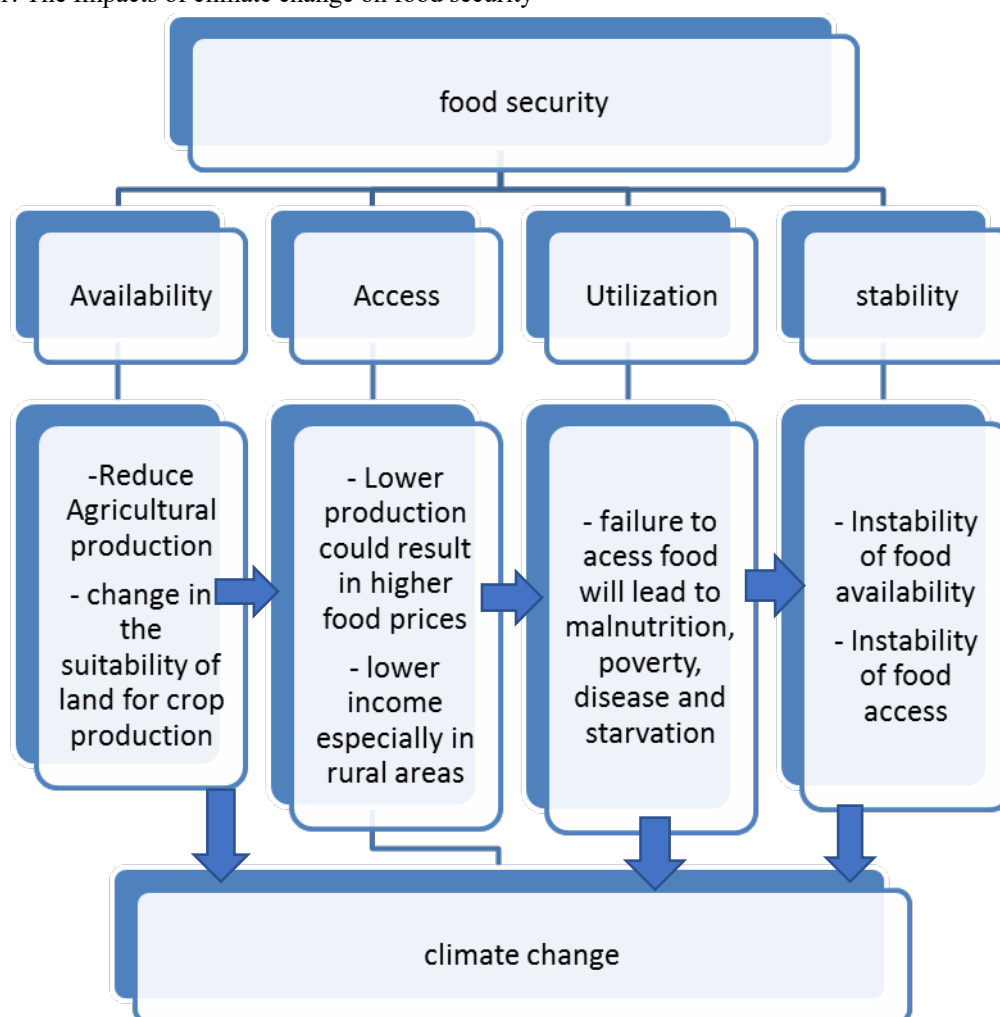
3. The Impacts of Agro biodiversity on food security

Biodiversity of agricultural sector, also. Named Agro- biodiversity, is a vital sub set of biodiversity. Agro biodiversity is component of biodiversity concerned with agricultural sector and food production and non food natural resources. FAO[3] defined Agro biodiversity as "the variety and variability of animals, plants and micro-

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[3] FAO (2004), what is Agro biodiversity?, available at http://www.fao.org/tempref/docrep/fao/007/y5609e/y5609e00.pdf

organisms that are used directly or indirectly for food and agriculture, including crops, livestock, forestry and fisheries. It comprises of diversity of genetic resources (varieties, breeds) and species used for food, fodder, fibre, fuel and pharmaceuticals. It also includes the diversity of non harvested species that support production (soil micro- organisms, predators, pollinators) and those in the winder environment that support agro ecosystems (agricultural, pastoral , forest and aquatic) as well as the diversity of the agro- ecosystems."

3.1 Agro- Biodiversity and food availability

Biodiversity of the agricultural sector is a means for production and supply of food. Farmers utilize biodiversity for crops' adaptation to various and changing environments of production. Biodiversity of agricultural sector is related to a greater production of agricultural sector and decreases risk (Salvatore di falco, 2012: 208). Agro biodiversity (biodiversity of the agricultural sector) makes a possibility of utilizing infertile land in a productive way, hence sharing in security of food for persons who are vulnerable to poverty and hunger and therefore to improves world production of farms. Genetic diversity is important for agricultural sector for adaptation to climate change and changes in the environment. For instance, crops that can tolerate heat and drought (Federal Ministry for Economic cooperation and development, 2011: 5).

Food and agriculture biodiversity can enhance production system resilience by lowering vulnerability to shocks, lowering their effects and supporting adaptation. Biodiversity increases resilience of production systems and livelihoods to shocks, involving to the impacts of climate change. It is important in efforts to enhance production of food while decreasing negative effects on the environment. It contributes to a lot of persons' livelihoods, often lowering food need and producers of agricultural sector to depend on external inputs that are costly and environmentally harmful. Systems of production that are not diverse can have more vulnerability to negative effects from shocks like illness and outbreaks of pest than those that are more diverse (FAO, 2019 A: 23).

3.2 Agro- Biodiversity and food Access

Agro biodiversity enhances the access of persons to food in various ways:

First: Agro biodiversity leads to increase production of agricultural sector. Enhancing production of agricultural sector leads to enhancing access of people of farm to food, by subsistence production of food and giving higher cash incomes that can be utilized to purchase food.

Second: natural ecosystems agro biodiversity can be a direct food source for people, especially for those who live inside or on such ecosystems fringes.

Third: natural ecosystems agro biodiversity can be cash incomes source for people, which can lead to enhance their access to food (FAO,2019 B: 17).

3.3 Agro- biodiversity and food utilization

Persons need to eat diets that are balanced to become healthy. Diets give them all the nutrients they want. Biodiversity is a source for making dietary diversity, which in turn is a key of good nutrition and health. (FAO,2018:47). Agro biodiversity leads to a different and wide range of nutrient foods and dietary parts with vital health specifies (Biodiversity International, 2011: 33). Management of biodiversity plays an important role in enhancing practices of sustainable agricultural enhancing and policies against malnutrition (Alvaro Toledo & Barbara Burlingame, 2006: 12). Biodiversity of agricultural sector has played an important role in achieving security of food nutrition, health, and livelihood all over the world.

3.4 Agro biodiversity and food stability

Biodiversity is important for stability, at level of a person and at large scales, in that the existence of a variety of food producing spices, varieties and breeds that have different cycles of life and different adaptive properties lead to keep supplies of food during year's seasons and during variations inter year in challenges of rainfall, temperature and illness. Biodiversity leads to stability by lowering the effects of disruptive challenges and risks

like floods, droughts, illness and pest out breaks that may have an impact on production of food. Biodiversity can also lead to keep income stability in the case of risks related to market (FAO, 2019 A: 53).

4. Costs of adaptation to climate change

4.1. Different estimates of costs of adaptation to climate change

Several of analysts have tried to estimate the adaptation costs for the world and for developing countries. Report of UNFCCC (2007) found that need of finance for adaptation could be to 49$- 171$ billion annually by 2030 for the world, of which 27$- 60 $ billion would be in developing countries.

Table 1: costs of adaptation to climate change- UNFCCC

sector	Global cost	Developed countries	Developing countries
Agriculture	14	7	7
water	11	2	9
Human health	5	Not estimated	5
Coastal zones	11	7	4
Infrastructure	8-130	6-88	2-41
Total	49-171	22-105	27-66

This study concentrated on sectors of agriculture, forestry and fishery, supply of water, human health, coastal and infrastructure. The largest cost sector is investment of infrastructure that accounts for three quarters of overall costs. Another study (stern, 2006) relied on estimate of World Bank 2006 which depended on an estimate of the current flows of finance development, merged with very rough estimates of the percentage of those investments that have sensitivity to risk of climate and the addition cost to lower that risk to account for climate change (5-20% was a very rough estimate)

Table 2: Estimate costs of adaptation- stern

Item	Amount per year	Estimated portion climate sensitive	Estimated costs of adaptation	Total per year (US$ 2000)
ODA and concessional finance	100 $ bn	20%	5-20%	1-4 $ bn
Foreign Direct investment	160 $ bn	10%	5-20%	1-3 $ bn
Gross domestic investment	1500 $ bn	2-10%	5-20%	2-3 $ bn
Total adaptation finance				**4-37 $ bn**

A study of (UNDP, 2007) analysed the requirements of funding in 2015 for adaptation to climate change as follows:-
   a) Development investment of climate proofing: fulfilling detailed costing exercises for existing infrastructure protection. Building on the methodology of World Bank, climate proofing development investment and infrastructure costs are at least US $ 44 billion yearly by 2015.
   b) Adapting programs of reducing poverty to climate change: the incremental risks made by climate change require a more extensive reaction involving public health support, development of rural and community relied on protection of environment. The aim of 2015 should be a commitment of at least US 40 $ billion annually that is around 0.5% of GDP for low income countries for enhancing programs of social protection and increasing aid in other key areas.

c) Enhancing the response system of disaster: provisions should be done for a rise in a disaster response related to climate of 2$ billion annually in bilateral and multilateral aid by 2015 to prevent development aid diversion.

Table 3: Investment in adaptation to climate change- US billion 2015

Climate proofing development investment	44
Adapting poverty reduction to climate change	40
Strengthening disaster response	2
Total	**86**

A study of (World Bank, 2010) found that the cost of adaptation between 2010 and 2050 to an about 2° c warmer world is between 70$ billion to 100$ billion annually by 2050. This study has used the additional costs of public sector that will be wanted for countries for adaptation to climate change through 2 scenarios. The drier scenario (CSIRO) wants less total cost of adaptation than does the wetter scenario (NCAR), due to the less costs of infrastructure, that out weight the greater costs for management of water and flood. The paper included agriculture, forestry, fisheries, infrastructure, resources of water, health, coastal areas and extreme events of weather sectors.

 Table 4: World Bank study scenarios

	NCAR (Wettest)	CSIRO (driest)
Infrastructure	27.5	13.0
Coastal zones	28.5	27.6
Water supply& flood protection	14.4	19.7
Agriculture, forestry, fisheries	2.5	3.0
Human health	2	1.5
Extreme weather events	6	6.4
Total	**81.5**	**71.2**

A report by (UNEP 2016) assessed that adaptation costs are two to three times greater than previous world estimates by 2030 and four to five times greater by 2050. This study showed that adaptation costs could be between US $ 140 billion and US $ 300 billion by 2030 and from US$ 280 billion to 500 $ US billion by 2050. However, overall bilateral and multilateral funding for a climate change adaptation achieved US$ 25 billion in 2014, of which US$ 22.5 billion related to developing countries. Most funding come from institutions of development funding (US $ 21 billion or 84 percent and 26 percent of the overall cost respectively). Developing countries in East Asia and the pacific have almost half of the finance (some 46 percent of the overall finance). Over half of the overall funding (55 percent) is related to management projects of water and wastewater.

4.2 Why cost Estimates differ?

There have been various estimates of adaptation costs to climate change.

Table 5: Estimates of the costs of adaptation to climate change

source	Cost of adaptation in US $ billion	comments
World Bank (2006)	9-41 by 2009	Cost of climate proofing FDI, GDI and ODA flows
Stern (2006)	4-37 by 2009	Update with slight modification of world bank 2006
UNDP (2007)	86-109 by 2015	World bank 2006 plus costing of climate proofing poverty reduction strategies and better disaster response
UNFCCC (2007)	49- 171 by 2030 (of which 27-66	This estimate aggregates costs from

	bn in developing countries)	sectoral studies of agriculture, water, human health, coasts and infrastructure.
Oxfam (2007)	50 billion by 2009	This estimate is based on world bank 2006 but adds additional costs derived from developing country National Adaptation programs of Action (NAPAS) and civil society projects
World Bank (2010)	75-100 bn (2010-2050)	Higher estimates under the wetter NCAR scenario than the drier CSIRO scenario. Assumes a 2 degree warmer world.
UNEP (2016)	140-300 bn by 2030 280-500 bn by 2050	The cost of adaptation are likely to be two to three times higher than previous global estimates by 2030 and potentially four to five times higher by 2050

The above studies indicate a large range of adaptation cost with the lowest at 4$ billion and the highest at above 300$ billion. The estimates indicate that tens of billions of dollars annually will be wanted and the recent studies show that real costs may be greater. Generally, estimates are extremely not certain because of unknown impacts of climate change. The various estimates are closely correlated in methodology. A lot of studies are relied on the ways determined in World Bank 2006 that concentrates on the cost of financial flows of climate proofing for development. More new studies have tried to take an approach of sector by sector to estimate the cost of adaptation. There are some factors that affect the estimation cost of adaptation and the causes why cost estimates differ.

   a) **Coverage:** adaptation cost relies on the sectors and risks coverage. Studies with larger coverage will lead to greater estimates as they involve a large number of effects.
   b) **Goals and methods of Quantification:** adaptation costs estimates are affected by the aim or objective determined, and trade off degree between the effects of a climate change, adaptation costs and the residual costs after adaptation.
   c) **Uncertainty:** studies that involve uncertainty consideration in general have greater costs in the case of comparing them with studies that do not involve it and use optimal policies. **(**UNEP ,2016**:** p14-16)
   d) **The baseline:** It is important to define a baseline (the case without fulfilling an intervention of adaptation) and the project line (the case with successful application of adaptation) to know the costs by doing a comparison of the two cases. **(**UN,2010:20)
   e) **Scales of time:** the costs' analysis timeframe choice of climate change adaptation will likely have an effect on the total estimates of cost, with a longer timeframe that makes higher costs than would a shorter one. The timeframe up to 2050 was determined as it expected climate change and its effects on the economy.

5. Food security and Climate change in Egypt

Agricultural sector is one of the greatest sectors in the Egyptian economy, representing 13.7% of GDP. Agriculture employs 30% of all labor force. Egypt is subject to problems resulting from climate change, studies show that Upper Egypt will be exposed to temperature raises from 1.5- 2 degrees by 2040, 1.9- 2.2 degrees by 2060 and 3- 3.5 degrees by 2100 (WFP, 2018: 23). Climate change will influence all four dimensions of food security: food availability, food access, food utilization and food stability.

5.1 Food Availability and climate change in Egypt

Production of food in Egypt will be affected by climate change through three ways:

First: raise in temperature will lower yields and production of food. A study by EEAA, 2010 shows projected crop yields changes, depended on several field studies, projected a decrease in the major crops' production in Egypt as a summary of a lot of studies.

Table 6: Projected changes in crop production of some major crops in Egypt under climate change

Crop	change	
	2050s	2100s
wheat	-15	-36
Rice	-11	
Maize	-14	-20
Soybeans	-28	
Cotton	+17	+31

Source: EEAA (2010), Egypt second National communication under the United Nations, Egypt Environmental Affairs Agency, Cairo.

All crops of which are predicted to lower except cotton. Yields of soybeans in Egypt predicted to lower by 28%, wheat to lower by 15% and Rice yields by 11%.

Second: Raise in temperature will properly increase water demand and irrigation change. A study of (Attaher & Medany, 2008) found that the requirements of water for crop of the essential strategic crops in Egypt are going to rise under climate change range from 5% to 13% during the 2100s.

Third: a rise in Sea level (sea level Rise SLR) could lead to low lying and unprotected agricultural lands along the Mediterranean coast which is the most productive agricultural area in Egypt. The impacts of sea level rise on the Nile Delta coast would lower the cultivated area and hence most likely have a negative impact on the productivity of agricultural sector.

There are also direct and indirect ways that climate change could influence production of food in Egypt. A climate change could impact pests and illness. Also, a world change in supply and demand for some crops could impact production in Egypt (UNDP, 2012: 18).
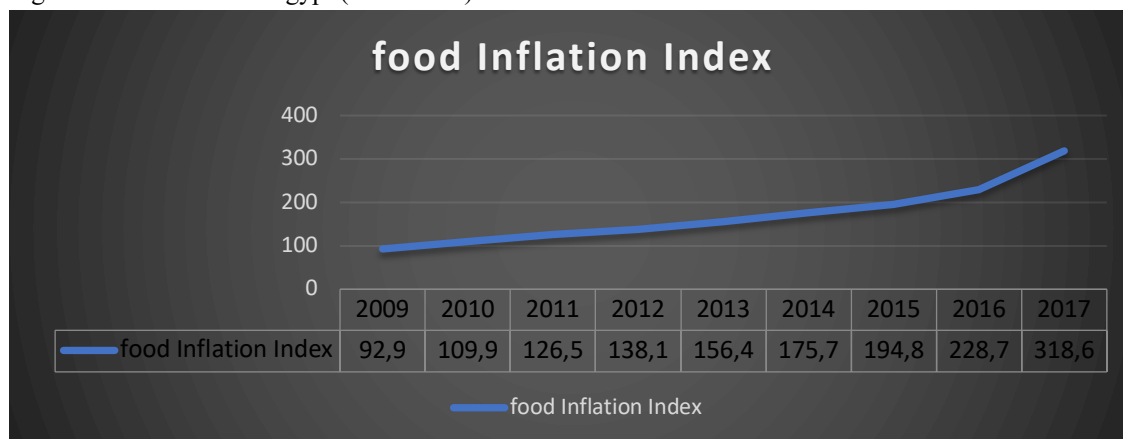
Table 7: food production in Egypt (1990-2017)

periods	Wheat			Maize			Rice		
	TQ 000 tons	Yield Ton/ha	GR	TQ 000 tons	Yield Ton/ha	GR	TQ 000 tons	Yield Ton/ ha	GR
1990-1999	5238	5.46	2.50	5313	6.48	3.34	4472	8.04	3.14
2000-2009	7376	6.45	0.10	6656	7.85	0.39	6239	9.65	0.77
2010-2017	8751	6.45	0.90	7774	7.63	-0.04	5472	9.43	-0.76

Source: CAPMAS, statistical yearbook

The land productivity rate of growth has decreased during (2000-2017). Yields of wheat, maize and rice at the national level grew by less than one percent yearly during (2000- 2017). The decrease in productivity of land can be due to the land fertility and water resources degradation and the decrease in government expenditure on Research and development of Agricultural sector (Hamdy Sayed & Dawn Thilmany, 2019: 4457)

5.2 Food Access and climate change in Egypt

Figure 2: Food Index in Egypt (2009-2017)

food Inflation Index

	2009	2010	2011	2012	2013	2014	2015	2016	2017
food Inflation Index	92,9	109,9	126,5	138,1	156,4	175,7	194,8	228,7	318,6

Source: CAMPAS

We found that prices of food in Egypt witnessed a remarkable increase. The developing countries involving Egypt have a problem of increasing prices of food. The Egyptian family's food expenditure increases from 34% of its income in 2015 to more than 37% in 2017/2018. For the change in the value of average family's spending on food prices during the period (2015- 2018), there is a rise by 34% at current prices while it lower by 16% at constant prices that shows that the rise is because of a rise in prices only. Climate change will lead to more pressure on already increasing prices of food. It is predicted that prices of food rise by 16% to 68% in 2030.

5.3 food utilization and climate change in Egypt

Lowering production of crops, which may cause from a climate change, may lead to a malnutrition rise. According to a demographic and health survey in 2014, only a small number of children in Egypt are consuming food which is in accordance with the recommendations of national and international health organization. The children percentage that is stunted ranges from a low of 15% in frontier governorates to a high of 30% in the urban regions of Upper Egypt. The prevalence of undernourishment as % of population lowered from 5.5 in 2000 to 4.4 in 2014 and then rose to 4.5 in 2017 (world bank database).

5.4 food stability and climate change in Egypt

Egypt is a country that has a deficit of food that leads to sensitivity of the system of food to fluctuations of world prices of commodity and foreign reserves' variability (WFP world food programme, 2018: 4)

Table (8): self sufficiency in the main food commodities in Egypt

Main food commodities	Production(1000 tons)	Requirements (1000 tons)	Self sufficiency
wheat	7388	13591	54.4
Rice	4553	3273	139.1
Maize	6300	11900	53.2

Source: Sustainable Agricultural strategy towards 2030.

Egypt depends on an import of 40% of its food that indicates inability of Egypt to meet the increased demand and highly relies on imports. The table above shows that Egypt is incapable of achieving self sufficiency of food. The increasing population without raising production of crops is a major problem as it indicates that the share of person of water and food will lower.

6. Climate Finance in Egypt

There is no sole definition of climate finance. However, the nearest definition is got by the United Nations framework convention on climate change which "finance its goals is lowering emissions and improving sinks of greenhouse gases and target to reduce vulnerability and maintaining and increasing the resilience of ecological systems and human to negative impacts of climate change" (UNFCCC, 2014).

6.1 Adaptation cost in Egypt

Two methods have been used to predict costs of adaptation in Egypt. **First**: the first method includes developing estimate of adaptation particularly for Egypt. The Egypt Environmental affairs agency published a study (National Environmental Economic and development) (NEEDS) for a climate change and predicted costs of adaptation for the sectors of agriculture and coastal. Its findings were an average yearly cost of 100$ to 270$ million (Ministry of state for Environmental affairs, 2013: 120-121).

Table (9): Estimated adaptation costs in Egypt- NEEDS study

Items	Finance needed	
	2020	**2050**
Observation & control of climate change	90	210
Land and agriculture production	311	948
Irrigation	2055	2150
Socioeconomic studies	16	28
Capacity building, enlightenment and training	17	51
Coasts and seashore regions	330	620
Total	**2819**	**4007**

Source: EEAA(2010), National Environmental, Economic and development study (NEEDS) for climate change, Egypt

Second: the second method is a top down method which depends on overall yearly adaptation costs estimates in all developing countries or regions. This method depended on two new published overall yearly adaptation costs estimates in all developing countries (UNFCCC 2007 and World Bank 2010). A very simple method for using these two studies to predict costs of adaptation in Egypt is to depend on an assumption that the predicted yearly adaptation costs by 2030 are spread equally among population in developing countries. There are around 6 billion persons in the developed countries. By depending on an assumption of receiving 8 million persons in Egypt the same percentage of finance of adaptation as all other persons, so yearly costs of adaptation in Egypt may be 400$ million to 1.2 $ billion.

Table (10): estimated adaptation costs in Egypt-2030 ($ million per year)

study	Agriculture & Irrigation	Total adaptation
NEEDS	2680	3215
UNFCCC 2007	74	400-960
World Bank 2010	N/A	1065-1200
Nelson et al 2009	57-65	N/A

We reached that the three predicted costs (UNFCCC, World Bank and Nelson &etal) are well under the predicted costs through the country relied on survey of NEEDS.

6.2 climate finance in Egypt

Egypt is a receiver of international climate finance from main donors whether are bilateral and multilateral. According to data of OECD, main funders were Japan 786$ million, EIB (European Investment Bank) 316$ million, World Bank 302 $ million, France 110$ million, GCF (Green climate fund) 84$ million, EBRD (European Bank for Reconstruction & Development) 81$ million and IFC (International finance corporation) 58$ million in 2016 (European Institute of the Mediterranean 2018: 33).

7. Estimate the Impacts of climate change on food security

To assess the impacts of climate change on food security in Egypt we use ARDL model (Autoregressive distributed lag) model. We estimate the impacts of climate change (temperature & CO2 emission per capita) on food availability (measured by food production Index), Food Access (measured by food inflation) and food utilization (measured by prevalence of undernourishments as % of population). Then investigate the impacts of biodiversity (measured by Red list Index) on the relationship between climate change and food security. Also forecast the expected value of food production index, food inflation and prevalence of under nourishment of population in 2030 and 2050

7.1 Descriptive Statistics for variables

Table 11: Descriptive Statistics

Variable	Mean	Std. Deviation	Minimum	Median	Maximum
Food production Index	86.696	24.989	43.180	86.696	124.980
co2emissionpercapita	1.889	0.397	1.284	1.889	2.483
Red list Index	0.939	0.019	0.906	0.939	0.973
Prevalence of under nourishment of pop	4.789	0.296	4.400	4.789	5.500
Food inflation food access	165.931	51.020	105.000	165.931	360.433
Temperature	23.055	0.506	21.778	23.055	24.728

The mean of the time series Temperature is23.055 while Median is 23.055 , Minimum is 21.778, Maximum is 24.728, Std. Deviation is 0.506. while for co2 emission per capita The mean is 1.889 while Median is 1.889, Minimum is 1.284, Maximum is 2.483, Std. Deviation is 0.397 The mean of the time series Red list Index is 0.939 while Median is 0.939, Minimum is 0.906, Maximum is 0.973, Std. Deviation is 0.019 The mean of the time series Food production Index is 86.696 while Median is 86.696, Minimum is 43.180, Maximum is 124.980, and Std. Deviation is 24.989 while for food inflation the mean is 165.931 while Median is 165.931, Minimum is 105.000, Maximum is 360.433, Std. Deviation is 51.020. The mean of the time series Prevalence of under nourishment of pop is 4.789 while Median is 4.789, Minimum is 4.400, Maximum is 5.500, Std. Deviation is 0.296

7.2 ARDL model estimation

First we will check stability using Augmented Ducky Fuller

Table 12: unit root test

Variable	level ADF	1different ADF	2different ADF
Temperature	-3.620[*]	-	-
prevalence of under nourishment of pop	-	-3.855[*]	-

food production Index	-	-5.500[*]	-
co2emissionpercapita	-	-6.003[*]	-
Food inflation food access	-3.498[*]	-	-
Red list Index	-	-4.961[*]	-

From the table above, There is stability for Temperature, food inflation variables in level 0 as the value of prob. is less than $\alpha=0.05$. Also there is stability in time series of food production , Red list index and prevalence of under nourishment of pop , co2 emissions in level 1 , the value of prob. is less than $\alpha=0.05$. We conclude that all series are stationary at most one difference so we will use ARDL model to detect the effect of independent variables on dependent variable.

Estimated model 1

Table 13: ARDL models

	Food production Index		Prevalence of under nourishment of pop		Food inflation food access	
	B	Prob.	B	Prob.	B	Prob.
co2emissionpercapita	-0.601	0.9542	-0.06393	0.3313	1.7543	0.0039
Temperature	-0.126	0.0009	0.000519	0.3231	0.015273	0.005

Food production Index=-0.60141(co2emissionpercapita) -0.12669(temperature)

The independent variable co2emissionpercapita had a non-significant effect on the dependent variable Food production Index where is the value of prob.=0.954 is more than $\alpha=0.05$

The independent variable temperature had a significant effect on the dependent variable Food production Index where is the value of prob.=0.0009 is less than $\alpha=0.05$, when the temperature increase by one unit the Food production Index decreases by 0.12669

Prevalence of under nourishment of pop=-0.06393(co2emissionpercapita)+ 0.000519(temperature)

The independent variable co2emissionpercapita had a non-significant effect on the dependent variable Prevalence of under nourishment of pop where is the value of prob.=0.3313 is more than $\alpha=0.05$

The independent variable temperature had a non-significant effect on the dependent variable Prevalence of under nourishment of pop where is the value of prob.=0.3231 is more than $\alpha=0.05$

Food inflation food access=1.7543(co2emissionpercapita)+ 0.015273(temperature)

The independent variable co2emissionpercapita had a significant effect on the dependent variable Food inflation where is the value of prob.=0.0039 is less than $\alpha=0.05$, when the co2 emissions increase by one unit the Food inflation increase by 1.7543

The independent variable temperature had a significant effect on the dependent variable Food inflation where is the value of prob.=0.005 is less than $\alpha=0.05$, when the temperature increase by one unit the Food inflation increase by 0.015273

Estimating model (2)

Table 14: ARDL model

	Food production Index		Prevalence of under nourishment of pop		Food inflation food access	
	β	Prob.	B	Prob.	β	Prob.
co2emissionpercapita	-0.64221	0.952	-0.0089	0.9189	1.63509	0.0053
Temperature	-0.12888	0.0012	0.000747	0.2008	0.016148	0.003
Red list Index	-23.454	0.7959	1.83638	0.347	9.90288	0.1461

From the previous table, we can see that:-

Food production Index=-0.64221(co2emissionpercapita) -0.12888(temperature) -23.454(Red list Index)

The independent variable co2emissionpercapita had a non-significant effect on the dependent variable Food production Index where is the value of prob.=0.952 is more than α=0.05

The independent variable temperature had a significant effect on the dependent variable Food production Index where is the value of prob.=0.0012 is less than α=0.05 , when the temperature increase by one unit the Food production Index decreases by 0.12888

The independent variable Red list Index had a non-significant effect on the dependent variable Food production Index where is the value of prob.=0.7959 is more than α=0.05

Prevalence of under nourishment of pop=-0.0089 (co2emissionpercapita)+ 0.000747 (temperature)+ 1.83638(Red list Index)

The independent variable co2emissionpercapita had a non-significant effect on the dependent variable Prevalence of under nourishment of pop where is the value of prob.=0.9189 is more than α=0.05

The independent variable temperature had a non-significant effect on the dependent variable Prevalence of under nourishment of pop where is the value of prob.=0.2008 is more than α=0.05

The independent variable Red list Index had a non-significant effect on the dependent variable Prevalence of under nourishment of pop where is the value of prob.=0.347 is more than α=0.05

Food inflation =1.63509 (co2emissionpercapita)+ 0.016148 (temperature)+ 9.90288(Red list Index)

The independent variable co2emissionpercapita had a significant effect on the dependent variable Food inflation where is the value of prob.= 0.0053 is less than α=0.05 , when the co2 emissions increase by one unit the Food inflation increase by 1.63509

The independent variable temperature had a significant effect on the dependent variable Food inflation where is the value of prob.=0.003 is less than α=0.05 , when the temperature increase by one unit the Food inflation increase by 0.016148

The independent variable Red list Index had a non-significant effect on the dependent variable Food inflation where is the value of prob.=0.1461 is more than α=0.05

7.3 Forecasting the impact of temperature on food production and food Inflation

Table 15: the Impacts of climate change (temperature) on food production and food inflation in 2030 and 2050

	Population		temperature	Food production	Food prices
	No of population	Yearly change			
2030	120,831,557	1.58%	1-1.5	-4 % - -15%	7% - 29%
2050	159,956,808	1.25%	1.7-2.5	-10% - -35%	15% -56%

The table above estimates the potential impacts of climate change (measured by temperature) on food security (food Availability and food Access) in 2030 and 2050. Food production is estimated to decrease by 4 to 15% by 2030 and decrease by 10 to 35% by 2060. While food prices is estimated to increase by 7% to 29% by 2030 and increase by 15% to 56% by 2050.

Conclusion

Food insecurity is an important challenge facing the Egyptian economy. This paper analyses the impacts of climate change on food security in Egypt. Climate change presents a high risk to food security in Egypt from food production to food Access and food utilization. To estimate the impacts of climate change on food security in Egypt we use ARDL model (Auto regressive distributed lag) model

The study found that temperature had a significant effect on food production and food Access. Increase in temperature will decrease food production and increase food prices. Also, the study found that Red list index had no significant impact on food production and food inflation in Egypt. This may be due to that indicator is not the best indicator to measure biodiversity. Results indicate that Egypt without sufficient adaptation will suffer from negative impacts on food production and food access that will lead to large food insecurity. This study recommended developing a comprehensive adaptation system to decrease the negative impacts of climate change on food security.

Study limitations: the main limitation in this study that due to the limited availability of data the study has not studied the four dimensions of food security. Also, Red list Index is not the best indicator to measure biodiversity but there is a shortage of suitable indicators to measure biodiversity.

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Brand Extension Management: Analysis of Industry Trends

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Abstract
Incumbent traditional brands have an initial advantage over new entrants to a market. With traditional brands, marketers have spent many dollars and many years to establish brand awareness and build equity. Building and managing strong brands is considered to be one of the key drivers of success in the hospitality industry. A brand extension strategy is followed when a company uses an established brand name to introduce a new product. This practice has been widely used by a variety of firms to introduce new products. This study views the brand extension from the hotel industry by conducting qualitative research and contributes to research and theory on brand extensions by developing a model in the hotel industry.

Keywords: Brand Extension, Hospitality, Hotel marketing

1. Introduction

1.1 Introduce the Problem

Building and managing strong brands is considered to be one of the key drivers of success in the hotel industry. This trend towards strong brands is also developing at local as well as global level for better market recognition. Leveraging the brand equity of a successful brand promises to make introduction of a new entry less costly by trading on an established name. The costs of introducing a brand into a consumer market can be considerable, ranging above $50 million (Pitta & Katsanis, 1995). With the huge costs and risks involved in launching new brands, Brand extension became popular as the way to achieve growth in a cost-controlled environment.

Brand extension is defined as 'the use of established brand names to enter new product categories or classes' (Keller & Aaker, 1992). A brand extension is when a firm uses an established brand name to introduce a new product. When a new brand is combined with an existing brand, the brand extension can also be called a sub-brand. An existing brand that gives birth to a brand extension is referred to as the parent brand.

1.2 Brand Extension in the Hospitality Industry

Brand extensions were introduced as a branding strategy in the consumer products industry. Marketers have long recognized that strong brand names that deliver higher sales and profits have the potential to pass their qualities

on to other products. The value of a brand is not only determined by its current status, but also by its potential in the future and in new currently untapped markets (Eusebio et al., 2006; Srivastava & Shocker, 1991). This potential can be realized by making use of brand extensions as a growth strategy (Broniarczyk & Alba, 1994). The two most common approaches to leveraging brand equity are line extensions and category extensions. Line extension is the use of an established brand for a new offering in the same product category. Category extension is the stretching of the established brand to a different product category (Aaker & Keller, 1990).

One of the earliest examples of line extension in the hospitality industry occurred in the 1970s, when Radisson diversified its brand into product tiers, including Radisson Inns, Resorts, and Plaza Hotels. Later Holiday Inn introduced Holiday Inn Express and Holiday Inn SunSpree Resorts in 1991. The upscale Holiday Inn Crowne Plaza was introduced in 1983; and Holiday Inn Select followed in 1994. Holiday Inn Express is targeted at the in-and-out business person or traveler who is willing to forgo some amenities for a lower price. Holiday Inn Select is similar to the Express but is aimed at the business traveler staying for a longer period of time who desires a few more amenities, such as data port connections and conference rooms. The traditional Holiday Inn is targeted at the middle-class market and provides higher-cost features such as a restaurant, lounge, conference rooms, and a swimming pool. The Holiday Inn Crowne Plaza is targeted at the more upscale or serious business traveler and features luxurious furnishings and restaurants, health spas, business services, conference rooms, and other amenities. Many hotels followed this strategy and these are just some examples of brand extension strategies in the hospitality industry. Today, most major hotel companies have at least one brand extension, and this implies that hotels consider brand extension strategies to be effective.

Another example of brand extensions, category extension, in the hospitality industry is that some upscale hotels have extended across a range of products. Westin was the first hotel company to use category extension for its products. They developed their unique *Heavenly Bed* with its own brand name under the slogan 'its layer after layer of cozy down bedding. It's an oasis for a weary traveler. It's heaven on earth. And it's at Westin.' Now, Westin's *Heavenly Bed* is being sold not only through a room catalogue on the Internet but also in the At Home departments of 48 Nordstrom stores nationwide, and is available by special order at others. Each component and a bed frame also can be purchased separately at stores. The bed has a distinctive brand standard, and is a good brand to build upon. The *Heavenly Bed* was a trailblazer in hotel marketing and prompted other chains to follow similar approaches. It was the first big success in the growing hotel retailing business. After Westin's success, other upscale hotels started to imitate that brand extension. Other Starwood brands launched branded pillows and beds. Sheraton Hotels introduced a mattress and bed under the brand name, *Sweet Sleeper* mattress, bed; W Hotels started to sell W brand pillows, sheets, and bedding products as well. After the huge success of the *Heavenly Bed*, Westin Hotels developed another product named the *Heavenly Shower*. Westin's *Heavenly Bath* came just two years after the introduction of the Heavenly Bed. This new bathroom improvement was the result of a survey by Westin, which was conducted by Guideline Research and Consulting Corporation of New York City. One thousand men and women were interviewed on their bathing habits and bathroom likes and dislikes. After a year of research and development, which included testing more than 150 showerheads, Westin decided on the Speakman shower with a dual showerhead. The custom-designed showerhead features several spray options, from a light mist to massaging needles. Westin has already begun installing *Heavenly Baths* around the country.

Westin's *Heavenly Bed* ushered in a seemingly exciting new trend in the hospitality industry. However, the president of Ritz-Carlton Hotel Co., Horst Schulze, insisted that instead of innovating, the major brands were simply copying each other. He lamented, 'imagine an industry that has existed for thousands of years and suddenly the marketing for the brand is a bed' (Hotels, 2005). Nevertheless, Ritz-Carlton Hotels has now introduced a range of retail products for sale at its online gift shop (http://www.ritzcarltonshops.com). At http://www.omnitoyou.com, Omni Hotels is selling a range of branded products including '*Omni Ideal Bed*, *Omni Presidential Bed*, *Luxury Omni Robes*, *Luxury Bath Towels*, *Luxury Bath Products*, *Luxury Bed Linens*, and others. Through Peninsula Merchandising Limited, The Hong Kong and Shanghai Hotels, Limited has been successfully merchandising a variety of products with the Peninsula Hotel brand name and logo. There are now Peninsula Boutiques at Hong Kong International Airport, and at the Peninsula Hotels in Hong Kong, Tokyo, and Beijing, selling products including chocolates, teas, coffees, and cookies. The Peabody Hotel Group through The

Peabody Galleria (http://www.thepeabody-hotelsathome.com/) allows consumers to buy a variety of merchandise carrying the company's well-know duck motif. In Scotland, the Gleneagles Hotel has put its famous brand name on a variety of golf-related gift items.

A brand extension strategy is aimed at encouraging customers to patronize a brand family on various occasions (Jiang et al., 2002). Figure 1 provides specific examples in the two varieties of brand extensions; line and category extensions.

Figure 1. Examples of Brand Extensions in the Hospitality Industry

Brand Extension	Category Extension	Holiday Inn Crowne Plaza
		Holiday Inn Select
		Holiday Inn Express
	Line Extension	Westin Hotels & Resorts
		Westin Heavenly Bed
		Westin Heavenly Shower

(Adapted from Keller, 2003)

1.3 Purpose of the Study

Brand extension strategies have had a fairly long and successful history in the hospitality industry. There is considerable evidence that this is an ongoing trend and more research on this phenomenon study from different perspectives is needed. Previous research has provided mixed evidence about the general effect of an extension on the parent brand only from consumers' perspectives and has not directly studied from the industry. Therefore, there is current need to examine the issues and trends in a scientific framework from the industry perspective. To fill this gap in the literature, this study seeks to explore the following questions.

- How industry managers view the brand extension?
- What are the main drivers behind the brand extension?
- What would be the benefits/ risks of brand extensions from the industry view?
- Who are key players involved in the process in hotels?

2. Method

To produce data relevant to operational techniques and marketing trends, data will be collected through qualitative, telephone interviews. There are three specific advantages to this methodology: 1) it increased the amount of data collected by overcoming poor response rates of questionnaires; 2) it can be facilitated comparability by ensuring that all questions will be examined; and 3) it provides a framework in which an understanding of topics could be developed in lieu of measurement (Barriball & White, 1994; Brown, 2005).

The design of these questions can be unstructured, where no specific set of explorative topics are developed, or fully structured, where limited deviation of conversation is provided (Kayat, 2002). To ensure that participants are asked the same set of questions within a flexible framework, a semi-structured interview methodology is employed (Dearnley, 2005). This allows the researcher to examine a pre-determined set of themes in-depth (structure) with the flexibility of topic exploration (unstructured) (Babbie, 2004). Table 3.1 provides an overview of the questions.

Table 1. Interview Questions

Is your hotel selling your branded logo products?
(a) If yes, what kinds of products?
(b) If no, why is your hotel not selling your own brand product?
Are you familiar with Westin's "Heavenly Bed"?
What is yor general attitude regarding brand extension?
Do you think that the strategy of brand extension is helpful for hotels (or your hotel)?
    (a) If yes, why do you think so?
    (b) If no, why not?
What are the key decision criteria for brand extension decisions?
What benefits do you see in using brand extension strategy?
What data are used in brand extension forecasting?
What could be the risk of using brand extension strategy?
In your opinion, what would be the key factors in a brand extension strategy?
Why do you think other hotels like Hyatt or Ritz Carlton are imitating Westin's strategy?
Does your hotel have any plan to develop its own logo products in the near future?
What is your current position at your hotel?
How long have you been in your position?
How long have you been in the hospitality industry?

While there are no defined rules as to sample size for qualitative research (Baum, 2000), sample size of previous studies ranged from 10 and 100, with approximately 50 being a popular sample size (Rubinstein, 1994). More important for qualitative research than the sample size is the derailed description of the data (Carey, 1995). There is a need to find evidence of data saturation or redundancy, when limited new significant information is uncovered through additional interviews (Phillimore & Goodson, 2004). Given these factors, and targeted subject selection, it is decided that 35 of the marketing manager would be an appropriate sub-population.

To recruit the sample, an initial mailing will be distributed on official university letterhead to every marketing & sales manager from the directory of HSMAI (Hospitality Sales and Marketing Association International). The letter indicates the scope and purpose of the study and that the researcher would contact them if they would give the response to the researcher. The researcher will follow up on the response through telephone communication and set up the interview schedule. A total of 35 managers will be interviewed. All scheduled interviews will take place during the late fall and early winter of 2018.

Content analysis will be selected as the methodological framework for several reasons. This technique enables analysis of 'open-ended' data, such as interviews, to be structured for the purpose of diagnostics (Babbie, 2004). This method, even in its most informal state, is often applied in exploratory research and can be useful in determining directions for further investigation (Li & Dewar, 2003).

Analysis was completed using the program Atlas/ti. Atlas/ti is a computer based program for users to manage, organize and support research using qualitative data (Muhr, 2005). A hand-coding process was used first, prior to the computer analysis. The hand-coding is a necessary component of preparing the interviews for analysis in Atlas. The coding process was simple and natural. The unit of measurement was first defined. Berg (2001) identifies "theme" as a useful unit to count, defining it as a simple string of words, or a sentence. Themes and/or words are coded initially into one the major themes. Current computer programs are not sophisticated enough to identify emergent codes without being directed from a list of pre-generated options. Identified codes are entered into Atlas/ti in a list of all codes developed in the process of manually examining the transcripts. The software developer, Muhr (2005) describes the process of coding and entering data for analysis by Atlas/ti. First, all of the data (the interview transcriptions) gathered is entered and associated with the program in what is referred to as a hermeneutic unit (HU). This creates a single file of all the data, allowing practical and easy access to all the sources in one corpus. Text passages are then selected and assigned code words or phrases previously

determined and entered into the program by the researcher. These passages tie together lines of text, referred to by the software program as quotes, to certain codes from the established list. Upon completion of initial coding, the program is then able to look at patterns across all interviews, and generate an assessment of codes fully or partially shared by multiple respondents. With Atlas/ti, the researcher can access specific features that assist in making connections between various coded concepts, especially in terms of unique and distinct forms of useful diagrams and other visual output (Berg, 2001). From this analysis, the researcher can build what the software refers to as semantic, propositional, or terminological networks representing the relationships between the content of the varying interviews (Muhr, 2005). These results can then be further analyzed in detail by the program's generation of what it identifies as super codes, or coding that is prevalent and prominent in all data sources. The researcher can guide the analysis process by tacking memos, or basic notes of interest to multiple quotes from different respondents.

Output from the program can be generated via a compiled report that sorts and groups all codes, super codes, memos, and networks into one amalgamated file (Muhr, 2005). Additionally, Atlas also assists in producing graphic representations of the existence, relationship, frequency, and strength of themes within or across interviews.

3. Results

Twenty five open-ended interviews were conducted (n=25). There will be a review of the open coding categories used within each coding family. This is followed by a detailed review of respondent interviews, as well as comparisons of results across cases. The nature of each hotel and the individual respondents will be summarized in a descriptive fashion. Each interview will be summarized with respect to the perception and attitude of the manager toward the brand extension strategy within that organization, as well other relevant or noteworthy issues pertaining to the manager's attitude and strategic key factors. Wherever possible and appropriate, direct quotes from the interviews are cited. This is for the purposes of adding as much depth and description to the analysis of the emergent themes within each interview.

3.1 Coding

The open coding process concentrated on the portions of the interview that addressed the perception toward the brand extension. As coding progressed, three logical groupings, or categories, of codes emerged: attributes and characteristics of brand extension in general; benefits of, and risks to the extension; and key factors and key decision criteria (See Figure 2). A detailed listing of codes will be presented in the following sections.

Figure2. Major Brand Extension Categories.
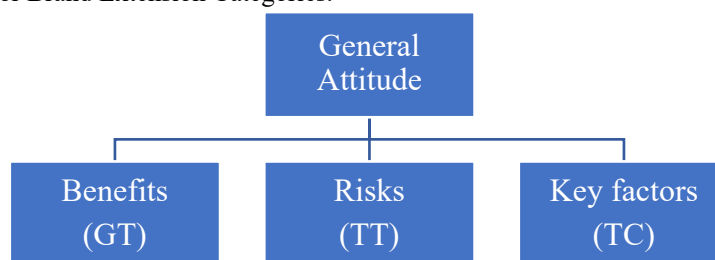
3.2 General Attitudes

Within Atlas/ti, the General Attitude is represented by a prefix code of GA and six codes were identified for this category: strategy, benefit; opportunity, marketing, synergy; and saving (See Table 2). The codes strategy and marketing indicate which extension methods have been in place and which extension methods are used for the strategy of the hotels. These themes help to paint a picture of the strategies used by the hotels with respect to the marketing. The opportunity code pertains to instances where the chance of the extension strategy was identified. It can be helpful in ultimately attempting to compare programs across cases. Certain passages were identified

with the Benefit code. In all of the interviews, there was some amount of discussion about the benefit of the brand extension strategy within the hotel. These entries were of great assistance in presenting the company's position and attitude towards extension. While the codes within the General Attitude do not address specific content of brand extension, they are nonetheless helpful in painting a more robust picture of the goals and value of brand extension within each case.

Table 2. General Attitude (GA) Codes

Code Names
Strategy
Benefit
Opportunity
Marketing
Synergy
Saving

3.3 Extension Benefits

Throughout the coding process, numerous types of benefits of the brand extension were identified. These emergent codes were identified as belonging to the coding category of extension benefits, which was identified within Atlas/ti with the prefix EB. There were a total of 12 codes identified within the EB family.

Table 3. Extension Benefits (EB) Codes

Code Names	
Awareness	Opportunity
Brand image	Projects
Certification	Profits
Class	Saving
Coaching	Synergy
Marketing	Test
Money	Win

4. Discussion

Brand extension strategy is a key strategy in the hospitality industry. The marketing manager is the individual responsible for the communication and implementation of corporate policies and projects. This study explored the industry manager's attitudes towards brand extension strategy of the hotel. It also reviewed and discussed the characteristics and benefits of the brand extension given to the hotel industry, as well as the content of that strategy. The information that was generated from the analysis of the twenty five interviews conducted indicated the perceived attitude to the brand extension strategy in the hotel industry. The majority of the respondents possessed a strong and clearly defined perception towards brand extension. They all have positive perceptions regarding the brand extension strategy and they thought that is necessary.

This study revealed a number of principles concerning the proper way to introduce brand extensions. Brand extension strategies must be carefully considered by systematically steps. Brand extension benefits content varied widely. Several predominant factors were defined to include: extension benefits, extension risks, key decision factors, marketing tools, and forecasting data. Brand awareness was the most frequently discussed item during the interview. It is noted that it is critical to fully understand the depth and breadth of awareness of the parent brand and its strength, favorability, and uniqueness. Moreover, before the extension decisions are contemplated, it is important that the desired knowledge structures be fully articulated. The results of the study also shows that profiling actual and desired knowledge structures helps to identify possible brand extensions as well as to guide decisions concerning their likely success. In regard to the key decision factors, the consumer knowledge and consumer trends were the most prevalent factor when concerning brand extension strategies. Possible category extension product candidates can be generated through managerial brainstorming sessions as

well as consumer research. Although consumers are generally better able to react to an extension concept that to suggest one, it still may be instructive to ask consumers what products the brand should consider offering if it were to introduce a new product.

In forecasting the success of a proposed brand extension in the hotel industry, it is necessary to access the likelihood that the extension would realize the advantages and avoid the disadvantages of brand extensions through consumer research. Consumer expectations, patterns, and preference are key factors for forecasting the success extension strategies. As with any new product, analysis of consumer, corporate, and competitive factors can be useful. To narrow down the list of possible extensions, consumer research is needed. Consumers may be probed directly. Consumers may even be asked what products they believe are currently attached to the brand. To better understand consumers' patterns and attitudes toward a proposed extension, consumer research should be employed using open-ended associations as well as rating scales based on perception statements. Marketers must not only take a consumer perspective in evaluating a proposed brand extension but must also take a broader competitive perspective. 'What are the competitive advantages to the extension as perceived by consumers and possible reactions initiated by competitors as a result?' would be the important factors when considering brand extension strategies.

More research can be done in this realm. A more detailed assessment of how often, how long, and how effective particular programs are would be the next logical step after this exploratory study. As the extended brand industry continues to grow and thrive, the need for brand extension strategy will follow. Any hotel interested in successful growth must focus on how the brand extension strategy can be best developed and maintained.

Several limitations existed in the execution of this study that could provide insight for additional research. The geographic region under investigation was very homogenous in size and scope. While this provided an excellent controlled environment to develop an understanding of the industry prospective, further diversification of the sample is recommended. Another limitation is the generalizability of sample in the study. This research drew from a sample from HSMAI and only 25 responses. Therefore, it cannot be assumed that the respondents were a representative sample of the population of all hotel industry. Another limitation of this study is that only 70% of respondents mentioned that their hotels are using brand extension strategies for the different products. 30% of respondents mentioned that their hotels had not started brand extension strategies yet. Since the purpose of this study is to see the perspective from the industry managers, the interviews from those 30% of respondent were not removed. However, that lack of experience could be another limitation of this study. Along these lines, the overall scope of this research was limited in that only a cursory review of hotel industry was taken. By decreasing the scope and focusing on individual aspects, a deeper understanding of specific issues could be established. Further this examination would be the inclusion of a qualitative component to analyze developed constructs and test relationships among them.

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Facing the Digital Revolution Era with Development of Real Asset Investment Products for Sharia Bank Customers

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Abstract
The existence of financial application technology at this time can facilitate consumers of financial service users to find alternative investments and financing beside the capital market and banking for investment in real assets and financial assets. They began to use investment and financing from financial applications such as iGrow, Investree, Ammana, etc. The iGrow application makes it easy for investors who want to invest in the agricultural and livestock sectors. Or Investree application that makes it easy for investors to invest in financial assets without going through the capital market. This study aims to see the potential for developing banking products for customers who want to invest in real assets such as agriculture, livestock, trade and food services. The contract which is considered appropriate and similar to the investment practice of real assets is the mudharabah muqayyadah contract or a special investment. Conjoint analysis is used to determine which mudharabah muqayyadah products are desired by customers. The results of this research in general are: Investment sector in food services and trade. The type of return can be either fixed or variable. Term / period of 1 year. Payment of graduale or terms. The level of security is really secure.

Keywords: Islamic Banking, Product Development of Banking, Real Asset Investment, Mudharabah

I. Introduction

Revenue sharing transactions have long been practised by the Indonesian people. Research by Yaumidin (2008) from the Indonesian Institute of Sciences (LIPI) showed various types of revenue sharing transactions. This revenue sharing in the agricultural sector has traditionally been passed down through generations, for example the "maro" system or half (1/2), "mertelu" or one third (1/3) in food crops. In the livestock sector there is a transaction where a person can raise cattle obtained from other people accompanied by a certain deal about financing with the distribution of the revenue in the form of a "gaduh" or "baboon" (Yaumidin, 2008). There is also a revenue sharing system in capture fisheries.

The concept of profit sharing can also be found in franchises for restaurants, that is on the distribution of royalty fees which are the percentage of sales, or in the form of profit. But because the franchise not only adopts profit sharing, but also the licensing transaction, the need to buy equipment or raw materials from the franchisor. Then the franchise is not identical to profit sharing.

The recognition of the concept of profit sharing in the community is an opportunity for Islamic banks to develop profit sharing based products. Because people who have money (capital) to invest, not all of them have the time and access to find partners in running the business they want. Islamic banks can benefit from this condition by becoming an intermediary (liaison) between investors and business man, by becoming a fee broker or Islamic bank can become an investor partner for investment in real assets. Because the main principle of Islamic banking business activities is profit sharing such as mudarabah and musharakah.

However, Islamic banks in Indonesia has a problem in product development due to lack of legal instruments and supporting legislation (Sitompul, 2002). This led to the main characteristic of Islamic banking in Indonesia, that is, profit sharing is disguised. Islamic banks are forced to adjust their products in accordance with the provisions applicable to conventional banking. The type of conventional banking in Indonesia is commercial banking which is the financing term is debt-based financing (Sharia Banking Directorate, 2012). So it is difficult if the sharia bank customer wants to invest in real assets using profit sharing which are equity-based financing because commercial banking is debt-based financing.

Before fintech in Indonesia emerged in 2017, people who wanted investment in the agriculture, livestock, and trade sectors had to search guerrillas for their own investment and business locations. With the help of the internet, they are looking for a web site that contains information about investing in real assets. But the disadvantage of this method is the large number of web sites but only offers a limited selection of investment products and locations. For example a web site that only contains one type of superior teak tree (Jati Unggul Nusantara) investment product with a specific location. In addition, there are also risks and security issues regarding the reliability of the information presented on the internet. Many entrepreneurs offer investment in real assets through the internet, but there are no parties to verify as market supervisors to ensure that investors and entrepreneurs are not harmed.

Since the issuance of several fintechs that offer investment in real assets makes investment in real assets that were originally exclusive become inclusive. This happens because investors are easier to access investments in real assets as they use fintech applications. Previously, investors had to find one by one business information that needed real asset investment. Now with only one application, the choice of investment products is increasing and can be easily compared.

Based on information from OJK (Financial Service Authority), Fintech registered with OJK as of April 2019 registered and licensed are 106 companies. The majority are money lending and borrowing services. Of these, there are several fintechs that offer investment in real assets such as: 1. "iGrow" that offers investment in the agriculture and livestock sectors. 2. "TaniFund" who offer investments in the agricultural sector. 3. "Amartha" offers investment in the small medium enterprise (SME) sector. 4. "Akseleran", "Santara" that offer equity crowdfunding investments. 5. "Ammana" which offers sharia-based investment concepts. A number of these fintechs offer direct investment schemes to entrepreneurs who need funds to develop their businesses.

The provision of direct investment such as those offered by some of these fintechs, is currently not provided by Islamic banks in Indonesia. As a consequence of Islamic banking as commercial banking, funds are collected from the community and channeled without the community knowing specifically where the funds are flowing. Direct financing products also are considered inefficient by Islamic banks because many investments today require large amounts of investment funds, so that tens or even hundreds of thousands of investors or shahib al-mal are needed to jointly fund one particular project. In this scheme banks receive funds from shahib al-mal in the form of third party funds as a source of funds (Karim, 2017). These funds are in the form of savings or mudharabah deposit deposits with varying durations and with varying returns. Furthermore, third party funds are

channeled by the bank into earning assets. The profit from this financing distribution will be divided between the bank and the third party fund owner.

Although it is difficult whether Islamic banks are able to provide investment products directly to Islamic banking customers? This study aims to see the potential for developing banking products for customers who want to invest in real assets such as agriculture, livestock, trade and food services. The contract which is considered appropriate and similar to the investment practice of real assets is the mudharabah muqayyadah contract or a special investment. Conjoint analysis is used to determine which mudharabah muqayyadah products are desired by customers.

II. Literature Review

According to the Law of the Republic of Indonesia Number 21 of 2008 concerning Islamic banking, in particular Article 1 paragraph (25) defines financing as the provision of funds or the equivalent bill in the form of:
   a. Profit sharing transactions in the form of mudarabah and musharakah.
   b. Leasing transactions in the form of ijarah or lease purchase in the form of ijarah muntahiya bittamlik.
   c. Sale and purchase transactions in the form of murabahah , salam, and istisna receivables.
   d. Borrowing and borrowing transactions in the form of qard receivables
   e. Leasing transaction services in the form of ijarah for multi-service transactions based on agreement or agreement between Islamic banks and other parties that require the funded party or fund facility to return the funds after a certain period of time in return for ujrah, without compensation or profit sharing.

Definition of profit sharing is a financing that uses a mixing contract whereby the contract mixes assets into one unit and then both parties bear the risk of the business activities carried out and divide the profits / revenues according to the agreement (Djamil, 2012). Usually this mixing contract is used for investment activities so it does not provide certainty of return (return) from the beginning. The rate of return / return can be positive, negative, or zero.

Receivables/Acceptables is a financing that uses an exchange contract where this contract is a transfer of ownership from one person to another in the form of goods and benefits. Contract of cooperation / mixing is the unification of ownership or expertise of the party who understands. According to Djamil (2012), the contract of cooperation (syirkah) is generally used to work on business activities that are investments in nature. However, to run a contract of cooperation / mixing is often needed as an exchange contract.

The following are the products of the contract of profit sharing applied by Islamic banks:

a. Musyarakah

Musyarakah is financed based on a cooperation agreement between two parties or more in a particular business in which each party contributes funds provided that the benefits and risks will be borne jointly in accordance with the agreement. This musyarakah or syirkah can be used in project financing and venture capital. In project financing, investors and entrepreneurs both provide funds to finance a particular project. After the project is finished, the entrepreneur returns the funds together for the results agreed with the investor. In venture capital, investments are made for a certain period of time, and after that investors divest, both briefly and gradually.

b. Mudharabah

Mudharabah is a business collaboration between two parties where the first party (the owner of the fund / shahibul maal) provides all capital, while the other party becomes the manager (mudharib). Business profits are divided according to the agreement outlined in the contract, while losses are borne proportionally to the amount of capital, namely by the owner of the capital. Losses arising from fraud or negligence of the manager, the manager must be responsible for the loss.

i. Mudharabah Mutlaqah (general investment)

Mudharabah Mutlaqah is a form of cooperation between capital owners and business actors whose scope is very broad and not limited by the specifications of business type, time and business area. Applications in banking are applied in savings and deposit products, so there are two types of fundraising, namely: mudharabah savings and mudharabah deposits.

ii. Mudharabah Muqayyadah (Special Investment)

Mudharabah Muqayyadah is the opposite of mudharabah mutlaqah, in which the business actor is limited to the type of business, time, or place of business. Mudharabah muqayyadah principle can be applied in the form of special financing on balance sheet and special off balance sheet financing. Special financing on balance sheets is a restricted investment where the fund owner can set certain conditions that must be obeyed by the bank. For example, it is used for certain businesses, with certain contracts, or certain customers. While special off balance sheet financing is a direct fund for mudharabah distribution to business operators. Fund owners can set general terms / conditions in this product.

Overview of Islamic Banking Financing

The Indonesian Bankers Association or IBI (2015) divides the financing system based on sharia principles according to the juridical point of view as follows:

a. Profit sharing based on mudarabah and musharakah principles.
b. Financing of sale and purchase based on the principles of murabahah, istisna, and as-salam.
c. Lease financing is based on the principle of ijarah (pure rent) and ijarah al-muntahiya bit-tamlik (lease buy or lease with option rights).

The description of financing from the distribution of Sharia Bank funds (Sharia Commercial Banks / BUS and Sharia Business Units / UUS) for five consecutive years are as follows:

Table 1: Financing based on type in Rupiah Currency of Shariah-compliant Contract of Islamic Banking

Billion (IDR)					
Indicator	2015	2016	2017	2018	2019
1. Profit Sharing Financing	**70,146**	**93,713**	**118,651**	**145,507**	**171,270**
a. Mudharabah	14,815	15,292	17,090	15,866	13,779
b. Musyarakah	55,331	78,421	101,561	129,641	157,491
c. Other Profit Sharing Financing	-	-	-	-	-
2. Receivables/Acceptables	**120,324**	**145,145**	**157,814**	**164,088**	**173,323**
a. Murabahah	115,605	139,536	150,276	154,805	160,654
b. Qardh	3,948	4,731	6,349	7,674	10,572
c. Istishna'	770	878	1,189	1,609	2,097
3. Ijarah including Leasing receivables	**8,972**	**9,150**	**9,230**	**10,597**	**10,589**
a. Syndication Financing	153	-	-	-	-
b. Financing through Channeling	8	6	-	165	72
c. Financing through Executing	-	-	29	35	18
d. Other Ijarah	8,812	9,144	9,201	10,407	10,498
4. Salam	-	-	-	-	-

Total Financing	199,442	248,007	285,695	320,193	355,182

Source: Statistics of Islamic Banking 2020, OJK

The most widely provided financing by Islamic banks is financing with receivable financing reaching more than 50% of total financing. Whereas the profit sharing-based agreements such as mudarabah and musharakah, only reached less than 42% of the total financing. The receivables financing has many similarities with credit-based financing because they are debt-based.

According to Sitompul (2002) in Indonesia economy, there is a separation between banks and capital markets. Conventional banks cannot channel funds directly from customers to entrepreneurs. Whereas in the capital market, customers can choose which entrepreneurs will be given capital. This is because according to the banking law, conventional banks are prohibited from investing in capital except for banks or companies in other financial fields. Islamic banks are also prohibited from direct capital participation other than banks and financial institutions. According to Law No. 21 Th 2008 article 24 paragraph (1) b and c. "Sharia Commercial Banks are prohibited b. conduct activities to buy and sell shares directly in the capital market; c. conduct capital participation, except as referred to in Article 20 paragraph (1) letter b and letter c; " Equity participation under article 20 paragraph (1) b and c may only be for: carrying out equity participation activities in Sharia Commercial Banks or financial institutions conducting business activities based on Sharia Principles; carry out temporary capital participation activities to overcome the consequences of financing failure based on Sharia Principles, provided that they have to withdraw their investments. Whereas philosophically, Islamic banks are permitted to conduct direct capital participation activities or direct investment using a mixing contract. Because Islamic banks are basically not only commercial banks but also as investment banks where the contract of mixing is generally used for investment (Greuning & Iqbal, 2008).

The profit sharing financing product applied in Islamic banking so far is indirect financing which has a group investment work system. This system involves many investors and many investment managers (mudharib) with banks as intermediaries. It is probable that investors do not know mudharib so that there is no direct and personal relationship (Karim & Siddiqi, 2002). This is different from profit sharing business practices that research by LIPI where the profit sharing mode applied is a direct profit sharing scheme between two parties. Investors know the investment manager so that investors can establish communication and find out directly about the business being financed.

Research on Product Development of Investment

This research on the development of investment products for real assets using mudharabah muqayyadah in Islamic banking refers to (Winzar & Johnson, 1999). This research from Winzar and Johnson divides investment attributes into 6 parts, namely:

Term (length to maturity).	1,3,5 or 7 years
Interest Rate	lO,12,14 or 16%
When Interest Paid	Monthly, Quarterly, Semi Annual, Deferred
Interest Rate Type	Fixed, Variable
Security	Totally Secure, Reasonably Secure
Liquidity	Liquid, Not Liquid

III. **Research Methodology**

This study uses conjoint analysis to determine customer preferences for a new product. Basically, the purpose of conjoint analysis is to find out how one's perception of an object consists of one or many parts (Hair, Black, Babin, & Anderson, 2010). The main result of conjoint analysis is a form (design) of a product or service, or a particular object desired by most respondents. Conjoint analysis is a multivariate analysis that is used to find out consumer preferences. One of the advantages of this conjoined analysis is that it can know the preferences

although only one respondent . In addition, conjoint analysis is different from other multivariate analysis, the conjoint process does not require assumptions such as normality, homoscedasticity and others.

Conjoint analysis belongs to the Multivariate Dependence Method, with the model:
$$Y_1 = X_1 + X_2 + \ldots + X_n$$

Explanation:

X_1 = INVESTMENT SECTOR: is the choice of investment in the sector / sector of Agriculture, livestock, Trade, Food Services

X_2 = PROFIT SHARING TYPES : are types of returns that can be fixed each period or variable.

X_3 = TERM: is the period of time you want to invest. The period of time includes: 1 year, 3 years, 5 years.

X_4 = PROFIT SHARING PAYMENT SCHEDULE: is when investors want payment of the returns made. Payments for investment capital can be made in stages (gradual) or at the time of returning investment capital.

X_5 = SECURITY: is the level of investment security that is the investor's preference. Reasonably Secure does not require a guarantee. While Really Secure requires a guarantee.

Y_1 : dependent variable (Y_1) is the overall preference of a respondent to a number of factors and levels in a product. This dependent variable also includes the level of interest factor of a respondent to product attributes. For example, he considers the Choice Factors in the Industrial Sector to be the most important when assessing investment choices, and the type of profit sharing is less important.

Object of research

This study takes a sample of the population of Islamic bank customers who want to have investment products in real assets with four investment sectors: agriculture, livestock, trade, and food services. The reason for choosing mudharabah muqayyadah products in this sector is because LIPI's (2008) research sample is mostly in these four sectors. Expected respondents are someone who already has sufficient income to invest and intends to make profit-based investments. By doing snowball sampling, respondents were obtained from other respondents' references who knew that there might be acquaintances who were able and interested in making investments based on their needs.

The area to be covered

Based on the Sharia Banking Statistics data concerning the Total Third Party Funds or Dana Pihak Ketiga (DPK) based on the Province, DKI Jakarta province has the largest amount of DPK, which is more than Rp.88,882 billion. This study will take a sample of respondents from the Jakarta and surrounding areas (Bogor, Depok, Tangerang, Bekasi).

Conjoint Analysis

In general, the conjoint analysis process is as follows:

1. Formulate Problems

Researchers recognize / identify mudharabah muqayyadah product attributes with their respective levels / levels used to form a stimulus. From a theoretical perspective, the attributes chosen must be very important in influencing customer preferences and choices. From the managerial side of Islamic banks, their attributes and levels must be measurable, actionable.

2. Form a Stimulus

The stimulus formation procedure used is the full profile method. This study uses fractional factorial design to summarize all the combination attributes of investment product levels. This design is used to reduce the number of stimulus profiles evaluated in the full profile approach. Based on the literature study from LIPI and Lester W. Johnson research, it was concluded that the attributes of *mudharabah muqayyadah* products that will be offered are shown by the model.

3. Determine the Form of Data Input

In conjoint analysis, the dependent variable is usually the preference or intention to buy. Respondents give ratings expressed in preferences or intentions (mean) to buy. In evaluating the mudharabah muqayyadah product profile, respondents were asked to give a rating. This rating is obtained using a 5-point Likert scale (1 = very disliked, 5 = very like).

        1 = Strongly Dislikes the stimuli of the product
        2 = Don't like the product stimuli
        3 = Enough to like the product stimuli
        4 = Like the product stimuli
        5 = Very like the product stimuli

From filling in these numbers, conjoint analysis will be done to determine the type of product the respondent wants.

4. Select the Conjoint Analysis Procedure

Data will be analyzed at the individual level (each respondent) and at the aggregate level. At the individual level, data from each respondent is analyzed separately. For aggregate analysis, first estimate the individual level worth or utility function. Then the respondents are grouped based on their part-worth similarities. Aggregate analysis is then carried out for each cluster / group.

5. Interpretation of Results

To interpret the results of the analysis, it is necessary to plot the part-worth function. The value of the part-worth function for each attribute is presented in table form. Analysis is carried out on every factor assessed by the respondent. Then look for the importance factor of all available factors.

6. Evaluation of Reliability and Validity

The test-retest reliability can be evaluated by getting a few replicated judgments. In other words, at the later stage, in the interview, respondents were asked to evaluate the selected stimulus again. Two values of this stimulus were then correlated to assess the test-retest reliability. Correlation tests are seen from the correlation output with the Pearson or Kendall method.

Results

Of the 30 questionnaires obtained, 14 were responses from e-mail and the remaining 16 from direct distribution. The lack of response may be due to only a few respondents who know mudharabah products and the questions asked appear complicated because mudharabah products are related to investment. Only 22 respondents were willing to use mudharabah muqayyadah products.

Table 2: *Mudharabah Muqayyadah* Product Preferences in General Value Utilities

		Utility Estimate	Std. Error
INVESTMENT SECTOR	Agriculture	-.246	.094
	Livestock	-.262	.094
	Trade	.238	.094
	Food Services	.270	.094
PROFIT SHARING TYPES	Fixed	.012	.056
	Variable	-.012	.056
TERM	1	.411	.075
	3	-.073	.086
	5	-.339	.095
PROFIT SHARING PAYMENT SCHEDULE:	Gradual	.047	.067
	At the time of returning investment	-.047	.067

	capital		
SECURITY	Really Secure	.121	.053
	Reasonably Secure	-.121	.053
(Constant)		3.096	.061

1. INVESTMENT SECTOR. Because the utility for Food Services and Trade is positive, respondents generally like the Investment Sector in Food Services and Trade. And the most preferred is the Investment Sector in Food Services with a utility value of 0.270. For the Livestock Sector has the lowest value, namely: - 0.262, the livestock sector is less preferred by respondents.
2. PROFIT SHARING TYPES. Because the utility for the yield type remains worth + 0.12, the type of fixed returns is preferred to the types of variable returns that are -0.12
3. TERM (time period). Because the utility for the term / period of 1 year has a positive value of 0.411, the respondent generally likes the term / period for 1 year. And the lowest value is - 0.339 is the term / period of 5 years.
4. PROFIT SHARING PAYMENT SCHEDULE. Because the utility for payment in graduale is positive 0.47, in general, respondents prefer payments in graduale rather than payback at the time of return on capital whose utility value is - 0.47.
5. SECURITY (security level). Because the utility for a level of security that is really secure is positive value of 0.121 then in general respondents like the level of security that is really secure. This means that respondents like mudharabah muqayyadah products that have tangible guarantees such as collateral in the form of movable objects (such as vehicles, machinery, etc.) or immovable objects (such as land and buildings above) or immovable objects (such as securities, receivables trade).

Level of importance (Factor Importance)

Factors or attributes that are considered important by the respondent can be seen from the following table:

Tabel 3: Importance Values

INVESTMENT SECTOR	44.078
PROFIT SHARING TYPES	4.699
TERM	28.294
PROFIT SHARING PAYMENT SCHEDULE	8.492
SECURITY	14.437
Averaged Importance Score	

In general, respondents consider that the INVESTMENT SECTOR of mudharabah muqayyadah is the most important factor in assessing or maybe investing (44.078%). Then the second factor which is considered by the respondent is the TERM / mudharabah muqayyadah transaction period with a weight of 28,294%. The third factor that is considered important is the SECURITY of the mudharabah muqayyadah product with a percentage of 14,437%. Other factors such as the " PROFIT SHARING TYPES ", " PROFIT SHARING PAYMENT SCHEDULE " are considered less important than other factors because the price is less than 10%.

2. Measurement of Predictive Accuracy and Significance Test

In the Correlation Output (to measure Predictive Accuracy), the correlation number with the Pearson or Kendall method shows a high number (above 0.9, 0.948). And the correlation is significant (below 0.05, ie 0.00). This shows that the respondents' opinions can be accepted to describe the desires of Islamic bank customers who want to use mudharabah muqayyadah products. However, because the sample is only taken in an urban location, it can be assumed that the population represented by the sample is the customer population in urban areas.

Table 4: Correlations[a]

	Value	Sig.
Pearson's R	.948	.000
Kendall's tau	.891	.000
Kendall's tau for Holdouts	.600	.071
a. Correlations between observed and estimated preferences		

Conclusion

This research on mudharabah muqayyadah product development in Islamic banking has the following conclusions:

1. Mudharabah muqayyadah products desired by customers

Mudharabah muqayyadah products desired by customers in general are:
- Investment sector in food services (utility value = 0, 270) and trade (utility value = 0.238). Note that food services and trade sell halal goods.
- Profit sharing type is variable.
- Term / period of 1 year.
- Profit sharing payment schedule is graduale or terms.
- Security levels that are really secure. This means that customers prefer mudharabah muqayyadah products that have tangible guarantees such as collateral in the form of movable objects (such as vehicles, machinery and so on) or immovable objects (such as land and buildings above) or immovable objects (such as securities, account receivable).

2. Optimum combination of mudharabah muqayyadah products

Judging from the importance, the mudharabah muqayyadah product must prioritize the "investment sector" (44%) and "time period" (28%). "Level of security" (14%). Other factors such as "profit sharing payment schedule ", " profit sharing type ", can be adjusted to the ability of Islamic banks. The optimum mudharabah muqayyadah product is a product in the food service sector and trade sector with a period of 1 year and has tangible guarantee.

3. Potential segments of mudharabah muqayyadah products

The investment sector can be used as a basis for potential customer grouping for mudharabah muqayyadah products. The weight of the "investment sector" interest is highest compared to other attributes so that it is suitable to be used as a differentiator between segments / groups. The product groups include: Agriculture, Animal Husbandry, Food Services and Trade. The formation of this potential segment group is also useful to increase the funds allocated for mudharabah muqayyadah products so that it is easier to apply to Islamic banking

Suggestions

The portion of financing for profit sharing, especially mudharabah muqayyadah in Islamic banking is still small compared to financing of others in Islamic banks. The opportunity for mudharabah muqayyadah product development is still wide open. This research shows that there is an interest in the *mudharabah muqayyadah* product. Islamic banking needs to capture this opportunity and develop technical aspects of implementation related to *mudharabah muqayyadah* products.

The research on *mudharabah muqayyadah* product development is still general. That is, this study only covers the outline desired by Islamic bank customers. Islamic banks need to clarify the *mudharabah muqayyadah*

financing offered to attract more customers. Even Islamic banks need to introduce entrepreneurs directly or mudarib to Islamic bank customers. According to Fathurrahman (2012) this mudharabah muqayyadah financing is a special financing off balance sheet that distributes mudharabah funds directly to the executor of the business. The bank only acts as an intermediary (arranger) that brings together the funds owner and the business implementer. Fund owners can set general conditions for this product.

Several fintech applications are able to accommodate the wants of islamic bank customers for direct investment for real assets. Such as iGrow, TaniFund, Amartha, Ammana, Akseleran, Santara. Fintech does not require a big amount of capital to invest in real assets. Example, if someone wants to invest in corn agriculture at iGrow, he just has to spend a minimum Rp 5.575.000,- per package (iGrow, 2018). While *mudharabah muqayyadah* in islamic banking example at Bukopin Syariah require more than 100 million rupiah (Bank Syariah Bukopin, 2014).

Suggestions for Further Research

Research development of *mudharabah muqayyadah* products on islamic banks cannot be considered as representing the Islamic banking customer population. The sample is taken by snowball sampling: respondents introduce other respondents who might be interested in *mudharabah muqayyadah* products. Taking snowball sampling cannot be considered as representing the population. But if Islamic banking wants to form a particular segment group, this research can be used as a comparison.

The method used is full profile. That is the method of obtaining evaluations from respondents by presenting profiles expressed in all level attributes. This full-profile method can only include products whose attributes do not exceed 8 attributes. So that products that have more complex attributes / characteristics may not be appropriate using full-profile. Other product presentation methods such as choice-based conjoint, adaptive conjoint can be used for products with more complex attributes.

This research was taken in 2014, thats three years before fintech arose in Indonesia. The full-profile method only uses writing as defining products. And seems less attractive than what fintech offers by using graphs and pictures. If islamic banking wants to develop products of real asset investment, they have to use the same strategy as fintech does by using graphs and pictures to make the offering attractive.

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Stock Market-Growth Relationship in an Emerging Economy: Empirical Finding from ARDL-Based Bounds and Causality Approaches

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Abstract

This paper tends to establish the short and long run dynamics between stock market and GDP growth in Nigeria utilizing yearly data spanning between 1989 and 2017. The paper deployed the ARDL, FMOLS, DOLS, Toda Yamamoto causality and the variance decomposition techniques to verify these dynamics. The ARDL Bounds test reveals evidence of cointegration in the long run among the variables. The ARDL estimate reveals market capitalization of listed companies affects economic growth positively in the short and long run. Also, stocks market turnover ratio positively impacts economic growth while stock market total value positively affects GDP in the short run. The result of the Toda Yamamoto causality revealed one-way causality from Stocks market turnover ratio to economic growth and from Stock market total value traded to economic growth. The variance decomposition revealed the strength of causality among the variables for a relatively longer period. Based on these findings, recommendations were put forward.

Keywords: Stock Market, Economic Growth, ARDL, Toda Yamamoto, Variance Decomposition

1. INTRODUCTION

The stock market offers prospective investors with equity and direct type finance for financial reasons. This role allows it to work in the process of economic growth as a crucial long-term lubricant. Moreover, stock market performance is often regarded as an important or good barometer to measure the financial power and growth of a nation. Therefore, an economy that has an effective stock market can often use its essential market index to measure changes in the overall production and economic activity of the economy. An estimated wealth of $15

trillion was lost by the financial markets in one year and two months as a result of the Great Recession from 2007 to 2009, thus, making policymakers to focus on the role and relationship of the financial sector with economic growth (Crotty, 2009). Demirgüç-Kunt and Levine (1996) analyzed the relationship between equity market and economic growth in the 1990s, showed a positive correlation between liquidity generation to accelerate the level of savings and investment. Broadly speaking, the financial market is vital for the economic growth of developing or emerging markets, therefore, its importance cannot be overlooked. Most countries government tends to lay more emphasis on the stock market performance because it serves as a factor that triggers growth in most developed economies (Ewah et al. 2009). Financial market liberation drives development on Nigeria's financial market (Ariyo & Adelegan, 2005), attention was not given to its impact on economic indicators. Furthermore, in 2005, the capital market aids the twenty-five Banks to meet up with the least capital prerequisite of 25 billion nairas imposed on them by the Central Bank of Nigeria (CBN) during the consolidation of the banking sector. In Africa, Nigeria's Stock Market is among the top three biggest, however, in 2008, it undergoes deterioration, and this downturn has a negative effect on the growth of Nigeria's Stock Market, while negatively affecting Nigeria's economic growth (Iheanyi & Sotonye, 2017).

The downturn in government expenditure, monetary regime tightening, and possible changes in regulation specifically blended and occasionally messages that are conflicting with respect to the lending margin by banks to operators in the market from the authorities cause the deterioration in the capital market (Azubike, 2017). Assurance in the financial market by investors, coupled with possibly broader indications for stock markets of Nigeria, was crippled by all these problems. According to Anulika (2017) the increase in instability about the market valuation accelerated eye-catching local and international investors exit the stock market. Instead of the proclamation of regulations and activities to calm the problem at hand, it only aggravated it; this also worsens the confidence investors have on the capital market.

In spite of the eye-catching assumption that democracy triggers economic activities that lead to economic and stock market growth, in Nigeria, it is small when compared to the size of the economy (Echekoba et al. 2013). Many researchers such as; Demirgüç-Kunt & Levine, (1996), and Agarwal & Mohtadi, (2004) pinpoint that developed countries had looked into the various directions via mobilizing resources that will affect growth and development in the economy as money and financial market. However, this is not the situation in developing countries like Nigeria, where more attention is allocated to the money market than the capital market (Nyong, 1997). Over the years, the interactions between the capital market and economic growth have produced mixed results from many scholars. Many researchers[1] believe that capital market-economic growth relationship is positive, few researchers[2] opt for no significant relationship, and a minority of the researchers[3] is of the opinion that capital market-economic growth relationship is negative. In any case, under the right political condition, stock market-economic growth relationship is always positive. The problem of macroeconomic instability, stock market gain education to the public on its influence on the country's economic growth and development, the fundamental of acute practices of market operator's minimization, these contribute to an overall understanding of the stock market's benefits in the economy

The motif of this research is to analyze the influence of stock market capitalization, turnover ratio, total value traded on Nigeria's economy. In filling the gap in this literature, our study employed the Autoregressive Distributed Lag (ARDL) cointegration test to ascertain the relationship among the variable used in the long run, and also capture the long and short coefficients. Using the Toda Yamamoto causality test to investigate direction of causality, and the variance decomposition reveal strength of causality among the variables for a relatively longer period.

The study's significance borne out of the uniqueness of our study which is that no previous study has combined in using the econometric techniques utilized in this study for the of Nigeria based on our own knowledge and the constructive review of literature carried out in different countries. We discover that from our study on Nigeria, the

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[1] Nyong, (1997); Obadan, (1998); Ewah and Bassey, (2009); Ndikumana, (2001); Friedman and Schwartz, (1963); Alam and Hasan (2003); Brasoveanu et al. (2008)
[2] Ewah et al (2009); (Ram, 1999); Guo & Jiang, (2013); Rigobon and Sack (2006).
[3] Anulika, (2017); Dakhlaoui and Aloui (2011); Naceur & Ghazouani, (2007).

existence of a long run equilibrium link between economic growth and the exogenous variables used; (b) the economic growth is triggered by market capitalization of listed companies both in the short and long run; (c) the Toda Yamamoto evidence of a one-way causality from Stocks market turnover ratio to GDP growth, and from Stock market total value traded to GDP growth; and (d) the variance decomposition revealed the strength of causality among the variables for a relatively longer period.

The remaining part of this study will be structured as follows: Literature review is divided into the empirical and theoretical review of the research. Data and methodology segment describes the data and also employed the methodology used in this study, the empirical result segment provides the empirical analysis outcomes and the concluding segment gives a conclusion on the study.

2. LITERATURE REVIEW

This study was carried out on a wide range of research on the side of developed and developing countries; to analyze, a vast empirical and theoretical literature based on the relationship between the stock market and economic growth. To understand this market and growth relationship, we looked at it from the perspective of developed and developing markets. Atje and Jovanovic (1993), were one of the earliest scholars that dug into the stock market and growth relationship. The researchers used cross-sectional data on forty countries covering the period of time from 1980 to 1988 and utilizing the OLS regression technique. The study shows the stock market and growth relationship is positive. To make a clear distinction between the capital market and economic growth, we classified the views of scholars. The first dimension of studies that established a positive relationship between the stock market and economic growth.

Several studies align with this positive capital market and growth relationship (Arestis et al. 2001; Oskooe 2010; Padhan 2007; Enisan and Olufisayo 2009; Autonios 2010; Aigbovo and Andrew 2015; Adamu and Sanni 2005; Naik 2012; Maria and Tomaliwan, 2013). The second segment of studies is those that identify a negative relationship between the stock market and economic growth. Few studies comply with this negative relationship (Mishra et al. 2016; and Nyong, 1997). The final dimension is studies that found insignificant Stock Market-Growth relationship. Few studies comply with this insignificant relationship (Ewah et al. 2009; Seetanah et al. 2012).

Table 1: Summary of Literatures

Author(s)	Country(S)	Variable(s) Utilized	Econometric Technique	Findings
Atje & Jovanovic (1993)	Forty Countries	Y, SM	OLS	SM →Y
Arestis et al. (2001).	Developed Countries	Y, SM, TO, ST	OLS	TO→ Y ST→ Y SM → Y
Oskooe (2010)	Iran	Y, SC, SO, ST	OLS	TO→ Y ST→ Y SM → Y
Padhan (2007)	India	Y, SM, TO, ST	TYDL Granger Causality Test	ST ⟷ Y SM⟷ Y
Deb and Mukherjee (2008)	Tanzania	Y, SM, ST	Bounds Coint, VAR Granger Causality Test	SM⟷ Y
Adamu and Sanni (2005)	Nigeria	Y, SM, ST, TO	OLS, Granger Causality Test	SM → Y
Hailemariam & Guotai, (2014).	17 emerging markets and 10 developed markets	Y, SM, ST, TO	OLS	TO→ Y ST→ Y SM → Y

Anulika, (2017)	Nigeria	Y, SM, ST, TO	Bounds Coint Granger causality test	Y → SM Y → TO
Autonios (2010)	67 developing countries	Y, SM, ST, TO	VECM Granger causality test, Johansen coint.	Y → SC Y → ST Y → SO
Hofileña & Tomaliwan, (2014)	Philippine	Y, SM	Bounds Coint, VECM	Y→ SM
Naik (2012)	economies of emerging market	Y, SM	GMM	SM→ Y
Pan and Mishra (2016)	33 highly aid-dependent African countries	Y, SM, TO, ST	Bounds Coint.	Negative Relationship
Seetanah et al. (2010)	27 developing countries	Y, SM, TO, ST	VAR	SC→ Y
Hossain and Kamal (2010)	Bangladesh	Y, SM, TO, ST	Bounds Coint, Granger causality	SM → Y TO → Y
Seetanah, et al. (2012)	10 least developed countries	Y, SC, T0,ST	VAR	No Relationship
Aigbovo and Andrew (2015)	Nigeria	Y, SC, SO, ST	Bounds Coint. VECM, Granger causality	TO→ Y ST→ Y SM → Y
Nyong (1997)	Nigeria	Y, SC, SO, ST	Bounds Coint	Negative Relationship
Ewah et al. (2009)	Kenya	Y, SC, SO, ST	OLS	No Relationship
Nguyen et al. (2014)	Canada and Australia	Y, SC, SO, ST	Bounds Coint., Granger causality	TO→ Y ST→ Y SM → Y

Where: Y: GDP→ indicates a positive relationship; ↔ indicates bidirectional causality; → indicates uni-directional causality Stock market total value traded(ST), Stocks market turnover ratio (TO), Stock Market capitalization (SM)

Source: Authors Compilation

3. DATA AND METHODOLOGY

3.1. Data Description

This study utilized yearly data spanning between 1989 and 2017 gathered from central bank of Nigeria (CBN) and World Bank (WB) data base. The tables below illustrate basic description of data utilized.

Table 2: Descriptive Statistics

	Y	ST	TO	SM
Source	WB	CBN	CBN	CBN
Mean	3.229261	1.397103	7.764759	15.21483
Median	3.154395	0.869000	7.583000	11.71000
Maximum	3.408764	8.647000	29.40200	35.83000
Minimum	3.094380	0.017000	0.429000	3.840000
Std. Dev.	0.126482	1.988487	6.596997	9.912182
Skewness	0.231508	2.494676	1.497003	0.990684

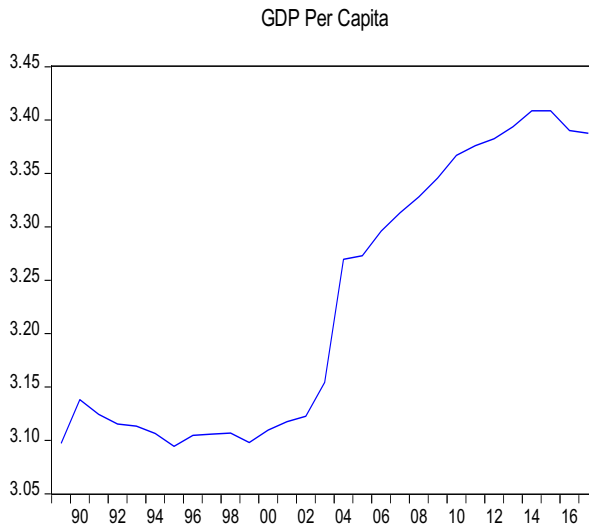| Kurtosis	1.265023	8.518568	5.747814	2.900853
Jarque-Bera	3.896308	66.87911	19.95508	4.755578
Probability	0.142537	0.000000	0.000046	0.092755
Observations	29	29	29	29

Source: Authors Compilation
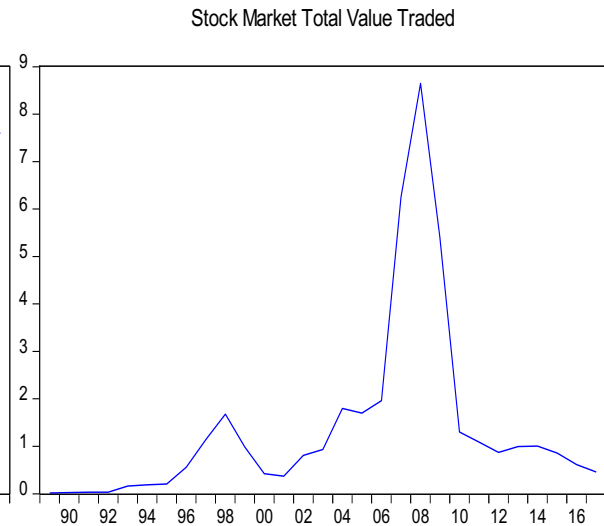

Figure 1: Economic Growth

Figure 2: Stock market total value traded
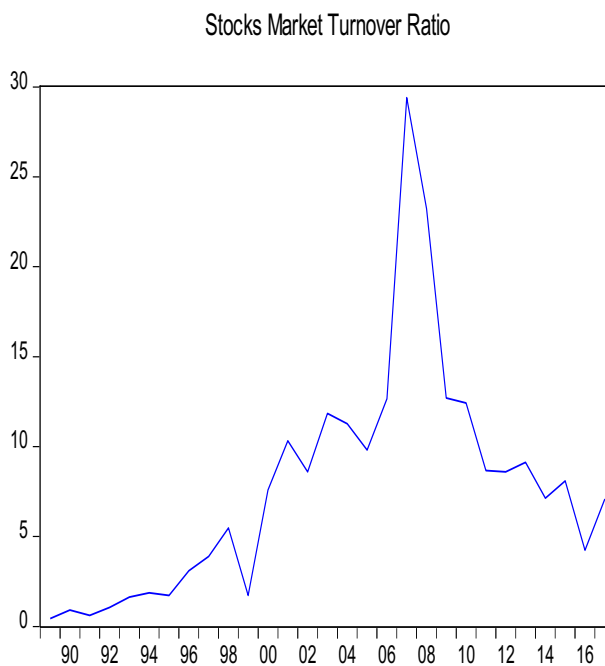
Figure 3: Stocks market turnover ratio
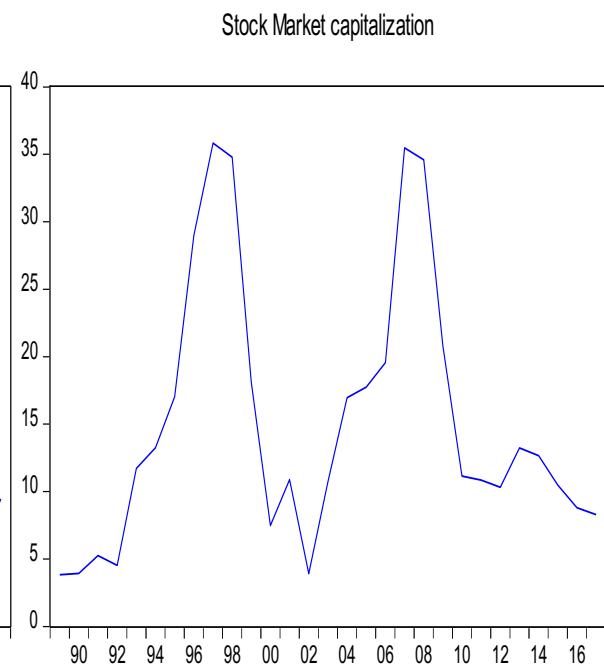
\ **Figure 4:** Stock Market capitalization

3.2. Model

In line with the works of Aigbovo and Andrew (2015) and Azubike (2017), in which SC, ST and SO are been denoted as stock market indicators, leading to the construction of the first model

$$Y = f(SC, ST, SO) \tag{1}$$

$$Y_t = \beta_0 + \beta_1 InSC_t + \beta_2 ST_t + \beta_3 InSO_t \tag{2}$$

Incorporating the error term, the econometric model is as follow:

$$InY_t = \beta_0 + \beta_1 InSC_t + \beta_2 ST_t + \beta_3 InSO_t + \varepsilon_t \tag{3}$$

Where: Y represents GDP per Capita (constant $ 2010), **SC** represent Market capitalization of listed companies (% of GDP), **ST** represents Stock market total value traded to GDP, **SO** represent Stocks market turnover ratio, ε_t represents error term, $\beta_0, \beta_1, \beta_2,$ and β_3, are the parameters and while In indicates natural logarithms and t is for time. For the research time series covering the time period between 1989 and 2017 was employed.

3.3. Cointegration Methodology

Before establishing the cointegration among the variable used, it is important that all these variables are stationary. It concluded that variables which are non-stationary tend to generate spurious regression analysis. In implementing ARDL procedures, none of the variables must be integrated at an order of I(2) (Granger & Newbold, 1974). Testing for long-run relationship existence using the ARDL bound test technique will be the next step. Pesaran and Shin (1995), and Pesaran et al. (1999, 2001) developed the ARDL bound test technique. Unlike other cointegration test (Engle-Granger, 1987; Johansen, 1988; Johansen-Juselius, 1990; Johansen, 1991) in which their application is based on only variables that are stationary at same level, while the ARDL bounds test is applicable at mix integration order either at I(0) or I(1), and it will also produce the long and short-run coefficient in a single framework. It adopts various lag-lengths to the variables employed. The results from the bounds test under the ARDL approach follows an F-distribution. Narayan and Narayan (2005) built up the critical values for bounds test following an F-distribution, which accommodates small samples. The ARDL model is established by equation 4 below as follows;

$$\Delta InY_t = \theta_0 + \sum_{i=1}^{t} \theta_1 \Delta InY_{t-i} + \sum_{i=1}^{t} \theta_2 \Delta InSC_{t-i} + \sum_{i=1}^{t} \theta_3 \Delta InST_{t-i} + \sum_{i=1}^{t} \theta_4 \Delta InSO_{t-i} + \beta_1 InY_{t-1}$$
$$+ \beta_2 InSC_{t-1} + \beta_3 InST_{t-1} + \beta_4 InSO_{t-1} + \varepsilon_t \qquad (4)$$

The null hypothesis guarding the ARDL model is (Ho = $\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$) against the alternate hypothesis (Ho $\neq$ $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$). The null hypothesis will not be accepted in a situation when the F-statistics surpasses the upper bound critical values, confirming that there is a long-run relationship between the variables. We do not reject the null hypothesis in the event when the F-statistics is lower than the lower bound critical value, affirming that there is no long-run relationship between the variables used. When the value of the F-statistics lies within the upper and lower bound critical value, the analysis turns out to be inconclusive.

In capturing the short run divergence from the model's long-run equilibrium, the Error Correction Model (ECM) was employed. By employing the error correction mechanism, the short-run imbalance was corrected. When the ECM is incoporated into the framework, the model will reflect equation 5;:

$$\Delta InY_t = \theta_0 + \sum_{i=1}^{t} \theta_1 \Delta InY_{t-i} + \sum_{i=1}^{t} \theta_2 \Delta InSC_{t-i} + \sum_{i=1}^{t} \theta_3 \Delta InST_{t-i} + \sum_{i=1}^{t} \theta_4 \Delta InSO_{t-i} + \omega ECT_{t-i} + \varepsilon_t$$
$$(5)$$

3.4. Robustness Check

Fully modified ordinary least squares (FMOLS) introduced by Phillips and Hansen (1990), and dynamic ordinary least squares (DOLS) models introduced by Phillips and Loretan (1991), Saikkonen (1991), and Stock and Watson (1993) are also employed. The Dynamic OLS and Fully Modified OLS were used to check the robustness of the long-term relationship between the variables. Co-integrating regressions have become one of the standard tools for analyzing integrated variables since Engle and Granger (1987). Although the ordinary least squares estimator (OLS) is preferable because it investigates if there is presence of serial correlation or not, it does contain a second order bias. The bias OLS estimation is resolved by these techniques. An uncomplicated method of creating an asymptotically efficient estimator that deletes the cointegrating system response is proposed by Saikkonen (1992) and Stock & Watson (1993) respectively. The DOLS method requires an increase in co-integrating regression with lags, and the equation of the co-integrating error term associated with past stochastic regressor innovations is the result of some ΔX_t.

3.5. Granger Causality

The advantage the Toda Yamamoto Granger causality test by Toda & Yamamoto (1995) has over ARDL approach is that it can detect direction of causality while ARDL can only detect long and short run interactions among variables. When variables are integrated at different orders, it makes inference valid. The fundamental reason behind this technique is to exaggerated the right correct order of VAR, p, with additional lags, where d signifies the maximum integration order of the variables. Therefore, the estimated VAR is formulated as follows:

$$B_t = \alpha_o + \sum_{i=1}^{m} \alpha_i B_{t-1} + \sum_{i=m+1}^{m+dmax} \alpha_i B_{t-1} + \sum_{i=1}^{m} \beta_1 A_{t-1} + \sum_{i=m+1}^{m+dmax} \beta_1 A_{t-1} + e_t \qquad (6)$$

$$A_t = \alpha_o + \sum_{i=1}^{m} \alpha_i A_{t-1} + \sum_{i=m+1}^{m+dmax} \alpha_i A_{t-1} + \sum_{i=1}^{m} \beta_i B_{t-1} + \sum_{i=m+1}^{m+dmax} \beta_i B_{t-1} + \mu_t \qquad (7)$$

The two time series variables are B, and A respectively, the framework parameters are denoted by α's and β's. The maximum order integration is represented by dmax , the model error term are illustrated by μ_t and ε_t. AIC, SC, FPE, and HQ are the metrics for lags election.

4.   EMPIRICAL RESULTS

4.1. Unit Root Result

The Augmented Dickey-Fuller (ADF), the Phillips–Perron (PP), DFGLS and Zivot-Andrew (ZA) tests was employed in this paper to verify the stationarity properties of the variable used. Variables are said to be stationary when it is mean and variance over time is constant (Gujarati & Porter, 2004).

Table 3: Unit root test results with intercept and Trend

Variables	Y	SC	SO	ST
ADF	I(1)*	I(1)*	I(1)*	I(0)*
PP	I(1)*	I(1)*	I(0)*	I(1)*
DF-GLS	I(1)*	I(1)**	I(0)	I(1)*
ZA	I(1)* <2003>	I(1)* <1997>	I(1)* <2008>	I(0)* <2007>

Note: ∗, ∗∗ and ∗∗∗ portray 1%, 5% and 10% significant level respectively

From table 2 above, it is evident that the variables used are stationary at mixed integration order (either I(0) or I(1)).

The Eq. (3) was estimated through the procedure of OLS to perform the bound tests. To reduce the degree of freedom in estimating the parameters in Eq. (3), the maximum lag-lengths was set to 2. Table 3 reveals that the computed F-statistics is greater than the critical bounds values, hence the null hypothesis will be rejected at a 1% significance level. Thus, this establishes a long-run relationship is strongly demonstrated among the variables used. Hence, a long-run interaction between the dependent variable and independent variables is clearly illustrated.

4.2. Cointegration Result

Table 3: ARDL bound test for co-integration

Model estimation	**Y = *f*(SM, ST, TO)**	
Lag structure	2, 2, 2, 1	
F-statistics	23.05*	
Level of Significant	Critical bounds levels	
	I(0)	I(1)
10%	2.12	3.23
5%	2.45	3.61
1%	3.15	4.43

Note: 1%c level of significant stands for *

Since the ARDL bounds model establishes co-integration among the variables. Furthermore, the short and long run run interactıon is estimated utilizing the ARDL as depicted in table 4.

4.3. ARDL Long and Short Run Result

Table 4: ARDL Long and Short-run estimate

Panel A: Long run estimation		
Variable	**Coefficient**	**T (Prob)**
Y(-1)	0.682496	(6.598)*
SM	0.036497	(2.188)**
ST	0.018941	(0.940)
TO	-0.177456	(-1.767)***
C	0.866270	10.562
Panel B: Short run estimation		
ΔSM	0.036497	(2.862)**
ΔST	0.018941	(1.617)*
ΔTO	-0.015439	(-1.623)
ECM(-1)*	-0.122190	(-10.465)*
R^2	0.99	
Adj R^2	0.99	
F-stat(Prob)	(401.32)*	

Note: 1%, 5% and 10% level of significant mirrors *, ** & *** correspondingly

The estimated elasticity of GDP per capita with respect to the market capitalization of listed companies is 0.036 at a 5% level of significance in the long run. For every 1% increase in market capitalization of listed companies, GDP per capita would rise by 0.036%. Long-run elasticity estimates of GDP per capita in relation to stocks market turnover ratio is 0.177 at 10% significance level, showing that for each 1% increase in stocks market turnover ratio, GDP per capita rises by 0.78%.

In the short run, at a 1% significance level, Stock market total value traded to GDP has a positive effect on GDP per capita. It implies that for each increase in Stock market total value traded to GDP by 1%, GDP per capita will increase by 0.018. At 5% level of significance, GDP per capita elasticity with respect to market capitalization of listed companies is 0.036, indicating an increase in market capitalization of listed companies by 1% will lead to GDP per capita rising by 0.036%. The coefficient of ECT is -0.12, having the expected sign and also significant at 1% level, after the previous year's imbalance, approximately 12% speed adjustment converges to the long-run equilibrium.

Table 5: Diagnostic tests for ARDL model

Tests	F-Stat (P-Value)
J–B normality test (Prob-value)	0.85 (0.65)
Breusch–Godfrey LM test (A)	0.61 (0.83)
Breusch-Pagan Heteroscedasticity test (B)	1.58 (0.18)
Ramsey RESET (U)	0.13 (0.71)

Table 6 reveals the several diagnostic tests of the estimated ARDL model for Eq(4), which indicates the model's residuals are distributed normally, not serially correlated and heteroscedasticity, and not misspecification. In terms of structural changes in Nigeria's economy, one or more structural breaks in these variables can be possible. Brown et al. (1975) proposed the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) test so as to examine the stability of the short and long-run coefficients. The CUSUM and CUSUMSQ plots fall within the critical bounds of 5% significance are presented in Figures 1 and 2 respectively. The implication is that the estimated parameters over the periods are stable. Thus, a meaningful conclusion can be drawn from our model.
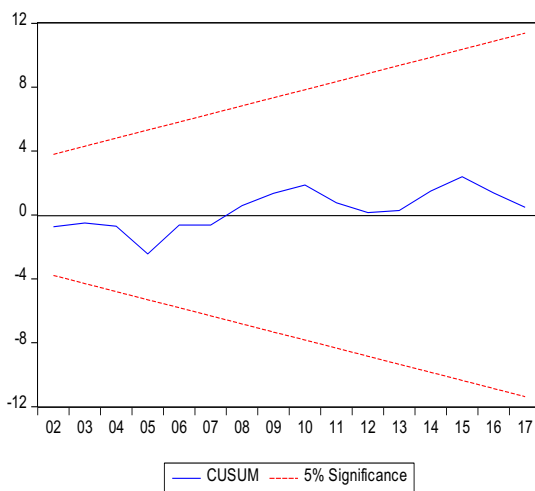
Fig 1: CUSUM
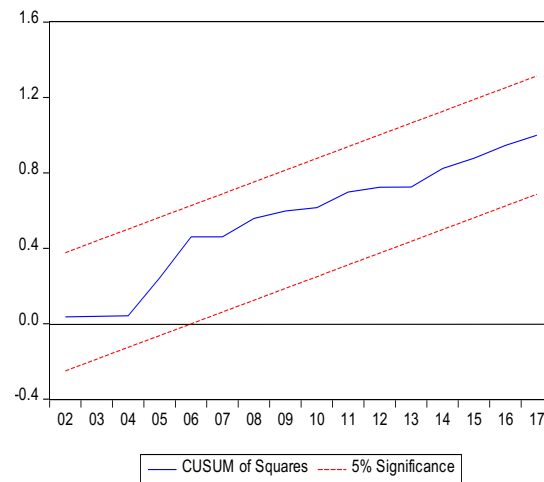
Fig 2: CUSUMSQ

Table 6: Robustness Check

Variable	FMOLS model		DOLS model	
	Coefficient	T-stat	Coefficient	T-stat
Y(-)	0.7375	(9.214)*	0.682	(3.131)**
SM	0.0357	(3.088)*	0.0364	(2.211)**
ST	0.0152	(1.105)	0.018	(1.298)
TO	-0.0136	(-1.992)***	-0.015	-(1.833)***
C	0.836	9.8178	0.866	7.106
R²	0.996		0.996	
*, **, *** depicts the 1%, 5% and 10% level of significant correspondingly				

Table 5 above demonstrates the long-run coefficients of FMOLS and DOLS models. FMOLS and DOLS were estimated using our ARDL estimation to verify the robustness. The outcome of the FMOLS supports the outcome of the long-run ARDL estimate, which shows SC and SO is related to Y in the long-run at 1% significant level but the DOLS models show a different outcome. In support of the long-run ARDL estimate, the SC was related while SO was not.

4.4. Toda Yamamoto Causality Test

Findings from the table below illustrates the result of the Toda Yamamoto. There is evidence of a one-way causality from stocks market turnover ratio and stock market total value traded to GDP per capita.

Table 7: Toda Yamamoto causality Test

	Causality Direction	Lag	Mvalt
Toda Yamamoto Causality	Y → SM	3	3.024
	SM→ Y	3	3.151
	Y → TO	3	0.506
	TO → Y	3	20.861*
	Y → ST	3	0.385
	ST → Y	3	14.228*

Note: → direction of causality. The optimal lag is selected using AIC. *, ** and *** denote statistically significant at 1%, 5% and 10% levels, correspondinly

4.5. Variance Decomposition

The relative power of the causality between the two time series ahead of the time frame specified cannot be detected by the Granger causality test. This weakness is corrected by the variance decomposition to verify the causality ahead of the time specified.

Table 7: Variance Decomposition

Variance Decomposition of Y				
Period	S.E.	Y	ST	TO	SM
1	0.017825	100.0000	0.000000	0.000000	0.000000
2	0.022124	91.41626	0.563528	0.338225	7.681986
3	0.022965	88.51044	0.539264	3.026160	7.924133
4	0.025531	71.85878	6.451614	13.99029	7.699316
5	0.028717	57.50200	8.190113	19.01669	15.29120
6	0.031155	48.85414	7.056895	24.31841	19.77056
7	0.034461	39.99733	10.14850	31.92341	17.93076
8	0.037951	33.54133	13.90914	37.76210	14.78742
9	0.041562	30.20922	14.02895	42.02375	13.73807
10	0.046732	27.51818	14.22669	43.27579	14.97934
11	0.051873	26.58350	14.30973	42.64215	16.46461
12	0.056448	27.33798	13.83909	41.45907	17.36385

Variance Decomposition of ST				
Period	S.E.	Y	ST	TO	SM
1	1.085835	1.157304	98.84270	0.000000	0.000000
2	2.211031	0.838894	96.67672	2.310038	0.174344
3	2.484827	1.776328	94.26074	3.073959	0.888976
4	2.511141	2.837324	92.29632	3.477633	1.388725
5	2.530361	3.339909	91.34395	3.785285	1.530852
6	2.537947	3.474547	90.93413	3.833584	1.757741
7	2.547046	3.568693	90.28607	3.847970	2.297265
8	2.560878	3.568308	90.05015	3.942629	2.438918
9	2.570313	3.575330	89.97691	4.016125	2.431636
10	2.577877	3.675307	89.49326	4.074499	2.756934
11	2.591451	3.825221	88.57554	4.129346	3.469897

| 12 | 2.601477 | 3.994563 | 87.89447 | 4.131327 | 3.979644 |

Variance Decomposition of TO

Period	S.E.	Y	ST	TO	SM
1	5.215565	0.514719	94.14563	5.339652	0.000000
2	6.473602	1.284796	93.11970	5.149242	0.446257
3	6.601444	3.074435	90.30865	6.179778	0.437141
4	6.721419	3.646343	87.77233	7.839958	0.741367
5	6.755608	4.011711	86.88681	8.323192	0.778289
6	6.807740	4.814150	85.73136	8.649004	0.805489
7	6.909665	5.281678	84.37428	9.277923	1.066115
8	6.985040	5.677232	83.46299	9.484040	1.375742
9	7.046651	6.386157	82.09541	9.582899	1.935534
10	7.127760	6.915867	80.65742	9.678436	2.748282
11	7.174660	7.341952	79.79133	9.637227	3.229487
12	7.202533	7.786115	79.17909	9.575973	3.458819

Variance Decomposition of SM

Period	S.E.	Y	ST	TO	SM
1	6.360914	0.261803	47.54190	2.105870	50.09042
2	9.882405	0.643953	56.28535	2.509357	40.56134
3	11.02883	4.939937	47.05136	2.564832	45.44387
4	11.34989	7.468381	44.42965	2.779459	45.32251
5	11.40583	8.141458	44.00438	2.752265	45.10190
6	11.70499	7.788694	41.92791	2.852847	47.43055
7	11.99190	7.463055	40.40135	2.783237	49.35236
8	12.19403	7.533922	40.18826	2.730796	49.54702
9	12.21116	7.662180	40.09589	2.761233	49.48070
10	12.24438	7.644813	39.91916	2.746277	49.68975
11	12.31621	7.555908	39.58167	2.714338	50.14808
12	12.38119	7.502987	39.59473	2.699739	50.20254

To ascertain the actual effects of the Stock market total value traded(ST), Stocks market turnover ratio (TO), Stock Market capitalization (SM), and GDP Per Capita (Y) for a relatively longer period, this study allowed variance decomposition for 12 consecutive periods. Utilizing the variance decomposition for 12 continuous periods, this study investigates the causal effect among SC, TO, SM, and Y for a long timeframe. The innovation in Y in the first period is explained by itself alone. However, has we go into the twelfth period, it can only explain 27% of it variation while ST, TO, and SM can explain 13.83%, 41.45% and 17.36% of it variation. Also for ST, 98% of innovation in ST in the first period is explained by itself alone. However, has we go into the twelfth period, it can still explain a large percentage (87%) of it innovation while other variables such as Y, TO, SM only account for a smaller percentage of 3%, 4%, and 3% respectively. In respect to TO it can explain it can only explain 94% of it variation in the first period and as the years dwindles into the twelfth year, it can only account for 79% of its variable and Y, ST and SM accounts for 7%, 9% and 3% respectively. Finally, concerning SM, in the first period, it can account for 50% of it variation in the first period while ST also account for 39%. In the last period which is the twelfth period, it can only account for 50% of itself and ST account for 395 followed by Y with 7% and TO with 2%.

5.   CONCLUSION

This study investigates the dynamics between GDP growth and Stock market total value traded (ST), Stocks market turnover ratio (TO), Stock Market capitalization (SM) in Nigeria utilizing yearly data between 1989 and 2017. The study employed the ARDL techniques to examine the long and short run interaction between GDP growth and the other variables. Furthermore, the Toda Yamamoto causality test was utilized to verify the causality direction, and the variance decomposition techniques which is utilized to ascertain the actual effects of the ST,

TO, SM, and GDP growth for a relatively longer period. Findings from the ARDL long run estimate shows; (i) there is positive interaction between SM and GDP growth which aligns with the findings of Arestis et al. (2001), Oskooe (2010), Padhan (2007), Hofileña & Tomaliwan, (2014), and Anulika, (2017); (ii) the interaction between GDP growth and Stock market total value which complies with findings of Oskooe (2010), Aigbovo and Andrew (2015), and Nguyen et al. (2014); and (iii) no significant interaction was found between Stocks market turnover ratio (and GDP growth this outcome complies with the findings of Seetanah, et al. (2012), and Ewah et al. (2009). The Toda Yamamoto causality test shows; (i) evidence of a one-way causality from Stocks market turnover ratio to GDP growth, and from Stock market total value traded to GDP growth. Finally, the outcome of the Variance decomposition revealed; (i) The innovation in Y in the first period is explained by itself alone. However, has we go into the twelfth period, it can only explain 27% of it variation while ST, TO, and SM can explain 13.83%, 41.45% and 17.36% of it variation; (ii) However, has we go into the twelfth period, it can still explain a large percentage (87%) of it innovation while other variables such as Y, TO, SM only account for a smaller percentage of 3%, 4%, and 3% respectively; (iii) In respect to TO it can explain it can only explain 94% of it variation in the first period and as the years dwindles into the twelfth year, it can only account for 79% of its variable and Y, ST and SM accounts for 7%, 9% and 3% respectively. Finally, concerning SM, in the first period, it can account for 50% of it variation in the first period while ST also account for 39%. In the last period which is the twelfth period, it can only account for 50% of itself and ST account for 395 followed by Y with 7% and TO with 2%.

Of course if global financial crisis affects the result negatively, Nigeria cannot find solution. Though, in the case of internal political crisis, Nigerian government can find solutions to prevent insurgencies like Boko Haram. Because the cost of the economy is very high, it takes time to create confidence for the investors of the Nigeria stock Market. The stock market is an important factor that will affect economic growth of Nigeria as an emerging economy. It is not possible to prevent external risks but the politicians should focus on creating more stable political and economic environment in the country. Developing more liberal economic policies which will encourage both foreign and domestic investors into channeling their resources into the capital market. Many studies found out similar results in general but most of them fail to utilized variance decomposition techniques which is used to ascertain the actual strength of causality between variables for a relatively longer period.

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Investor Behaviour Heterogeneity in the Options Market: Chartists vs. Fundamentalists in the French Market

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Abstract
Behavioural finance confirmed the existence of two types of agents, fundamentalists and chartists, in the financial market. Fundamentalists follow the traditional efficiency market theory based on adaptive learning rule, whereas chartists follow the price tendency and past price movements. This paper examines the heterogeneity between fundamentalists and chartists. To this aim, we propose to introduce a sentiment variable in the classic model of Black and Scholes (1973) and to extract in a novel way the implied volatility variable. After that, we estimate the Markov switching model on this variable to test heterogeneity in the French market. The estimated daily data from 2009 to 2018 for 30 companies daily of CAC40 in a sectoral analysis confirm the evidence of heterogeneity between chartists and fundamentalists.

Keywords: Behavioural Heterogeneity, Behavioural Finance, Fundamentalists and Chartists, Options Market, Black and Scholes, Implied Volatility, Two-State Markov Switching Model

1. Introduction

Because of anomalies observed in the market, many works have criticised the traditional literature of finance based on the efficiency of financial markets and the rationality of investors. These criticisms gave rise to the development of the behavioural finance theory. The behavioural finance approach attempts to explain inefficiencies detected in financial markets according to the cognitive processes and the importance of investors' psychology in making decisions in the financial markets. However, due to the limits of the traditional approach, many works criticised investor homogeneity hypothesis and developed models based on the concept of investor behaviour heterogeneity. According to the literature, markets are divided into two types of investors with different behaviours (fundamentalists and chartists), and heterogeneity was confirmed in many works. Shiller (1984) proposed the estimation of a heterogeneous model. He presented a model with heterogeneous agents: rational and irrational. He estimated a proportion of rational investors between 1900 and 1983 and found that this proportion fluctuated

considerably between 0% and 50%. Westerhoff and Reitz (2003) estimated a heterogeneous agent model with fundamentalists and chartists using exchange rate data and found significant fluctuations in the case of fundamentalists. Brock and Hommes (1997, 1998) proposed a heterogeneous agent model, which was subsequently improved by Boswijk et al. (2007) and estimated the model with annual data ranging from 1871 to 2003 for the American stock price. They confirmed the evidence of two different types of behaviours and then they accepted the heterogeneity among investors: fundamentalists and chartists. Guirat (2011) studied investor behaviour heterogeneity in the French stock market. She considered 27 firms operating in the French market during the period January 1989–October 2007 for daily, monthly and quarterly data. Results found by this author are different than the above-mentioned studies, where she highlighted that heterogeneity among investors varies from one investment horizon to another where investors with the same horizon of investment would adopt homogeneous strategies. She concluded that the chartist strategy was adopted in the case of daily and monthly investment horizons whereas fundamentalist strategy was adopted for the quarterly investment horizon.

In this paper, we are interested to study the same subject area evoked by Guirat (2011) but with a different methodology. Our objective in this research is to detect anomalies in the market caused by investor behaviour heterogeneity in the stock market. Our point of view starts with the famous model of Black and Scholes (1973) which was applied to the valuation of European options contracts according to this model. This model seems to be inefficient when incorporating the sentiment variable as a measure of implied volatility. For this reason, and in order to overcome the limits and criticisms regarding the performance of the Black and Scholes model, we consider the Markov switching model to estimate the implied volatility with an evolutionary selection of heterogeneous strategies. For doing this, we follow the strategy adopted by an investor that may depend on the degree of volatility in order to identify the heterogeneity of investor sentiment: chartists and fundamentalists. By applying the two-state Markov switching model to 30 companies operating in the French stock market for daily data options ranging from 18/06/2009 to 05/09/2018, we conclude that both types of investors govern the French market, chartists and fundamentalists and that Markov switching estimations improve heterogeneity of the investors.

The present paper is organised as follows. Section 2 presents the literature review of behavioural finance and the heterogeneity existing between fundamentalists and chartists. Section 3 describes the empirical methodology, data and empirical results. Finally, section 4 concludes the paper.

2. Behavioural finance and heterogeneity among fundamentalists and chartists

In a seminar work, Bondt and Thaler (1985) published a paper entitled "Does the stock market overreact" where they criticised the efficiency market hypothesis. From that date and even before it with reference to Kahneman and Tversky (1979), new literature developed for analysing the functioning of stock markets known as behavioural finance.

Due to the progress of neuroscience finance, a logical understanding of the main mechanisms conducting the decision of investors was presented. The originality of novel approaches is based on human psychological behaviour coming from their transdisciplinary nature. Finance is considered then a discipline that has been analysed using sociological, genetic, neurological, physical, psychoanalysis or even psychological concepts, often called behavioural finance (Kahneman and Tversky, 1979).

Many works and researchers highlighted that emotions and other subjective elements played an important role in making investment decisions. The interest accorded to the behaviour of the investors gave rise to the discipline of behavioural finance. Behavioural finance is a field that is of interest to the introduction of psychology to finance. In this research field, we focus mainly on the behaviour of investors when making decisions.

Phenomena found in this theory are purely psychological and relate behavioural finance to behavioural economics in general. It was largely used in periods of crises and it is interested in the imbalances caused by investor behaviour. Contrary to the classical financial theory based on the rationality of economic agents, behavioural finance seems to be an anecdotal approach as it offers a more pragmatic vision of the behaviour of investors, notably based on psychology.

Many critics have been given to the hypothesis of market efficiency. One of the answers to the violation of this hypothesis gives rise to the development of behavioural finance (Kahneman and Tversky, 1979; Barberis et al., 1998). Behavioural finance criticises the notion of rationality and introduces elements of social psychology to economic decision making. Divergence from the rationality hypothesis implies the introduction of the notion of heterogeneity into the behaviour of investors, i.e. there are endless ways to behave irrationally in the market. In general, literature provides three essential reasons for heterogeneous behaviour.

Indeed, the heterogeneity of expectations may exist due to the existence of different types of agents with different behaviours. De Long et al. (1990), for example, proposed a model that illustrates the coexistence of different types of investors and that rational investors looked for opportunities. Frankel and Froot (1986, 1990) developed the idea that two types of participants in the market dominate the foreign exchange market: fundamentalists and chartists. They differ in the manner of using information. For the fundamentalists, they considered the exchange rate as an economic model, while chartists used historical data corresponding to the exchange rate to form their expectations.

Several studies examined the impact of heterogeneous beliefs on option prices. In a theoretical framework, Shefrin (2001) showed that the heterogeneity of beliefs influences option prices (i.e. which leads to prices different than those of Black and Scholes), and can explain the fluctuations observed in implied volatilities. Through an example of two investors, they showed how these investors have different beliefs and can obtain different option prices. Meanwhile, the option price equilibrium is a weighted average of the two option prices. Several documents focusing on heterogeneity highlighted that traders having more pessimistic (optimistic) opinions may be attracted by call options (e.g. Benninga and Mayshar, 2000; Buraschi and Jiltsov, 2006).

More precisely, studies that focus on heterogeneity among options traders have insisted on the heterogeneous beliefs that they hold regarding the fundamentals for determining the price of the option. For example, Benninga and Mayshar (2000) showed that heterogeneity in risk aversion can observed smile volatility observed could explain the fluctuations observed in the implied volatility. Several agent heterogeneity models make distinctions between fundamentalist and chartist agents.

Fundamentalists base their expectations of future prices and their investment strategies on market fundamentals and on economic factors such as dividends, profits, GDP growth, unemployment, etc. They have the tendency to invest in assets characterised by an undervaluation and whose prices are below the fundamental reference value and sell the overvalued assets, whose prices exceed the fundamental market value. On the contrary, chartists or technical analysts ignore market fundamentals and base their expectations of future asset prices and their arbitrage strategies based on the historical data price.

In reality, chartists are considered naive investors or those who are forced to sell when asset prices fall. In this regard, De Grauwe and Dewachter (1993) showed that periods of high volatility are associated with the predominance of fundamentalists while periods of low volatility are associated with the predominance of chartists. Agents can change strategies over time where chartists can become fundamentalists and vice versa.

3. Empirical analysis

3.1 Description of the data

In this paper, we aim to study fundamentalists and chartists in the French stock market. We collected the following data from 30 companies operating in the CAC40 stock index: the price of the underlying asset (S), the strike price of the option (K), the current date, time to expiration, the price of the call option (Price), the transaction volume, the implied volatility at 3 months and the interest rate (R). Further, our database is made up of a series of continuous options of the companies considered here using Thomson Reuters calculations for the entire period of our study. The use of the stock option is based on the fact that individuals cannot follow the same behaviour according to the

companies constituting the same index and also that the behaviour of investors would probably depend on characteristics linked to the psychology of the latter.

In order to determine heterogeneity in the French market and testing the sentiment of investors, we use a proxy variable. This variable allows us to evaluate the importance of investors' behaviour on European price options and to deduce the behavioural typology that characterises the strategies of fundamentalists and chartists. This variable is calculated using the Black Scholes (1973) model. First, we explain how we extract this variable, and after that, we apply the Markov switching model to analyse the heterogeneity among fundamentalists and chartists in the French market. We use a modified version of the Black and Scholes model by introducing a sentiment variable[1]. According to the traditional hypothesis of Black and Scholes (1973)[2], from which we assume the market is efficient, investors are assumed to be risk-neutral and the sentiment was not included in the model. As investors are irrational and markets are inefficient, sentiments can modify the impact of price option volatility on the market. For this reason, we propose the introduction of investors' sentiment in the Black and Scholes (1973) model. We use the Newton algorithm to calculate implied volatility and then the option price, taking into account this implied volatility.[3]

We use the following variables to calculate implied volatility:
C = price of a call option
P = price of a put option
S = price of the underlying asset
X = strike price of the option
r = interest rate
t = time to expiration
s = volatility of the underlying asset
Companies and sectors selected in our study are summarised in Table 1.

Table1. Sample of the study

Sector	Company
Financial	BNP PARIBAS, Crédit Agricole, Société Générale, Axa.
Automotive	Renault, Peugeot, Valeo.
Commercial	Danone, Carrefour, L'Oréal, LVMH, Pernod, Unibail.
IT services	CAP Gemini, Atos
Advertising	Publicis, Vivendi.
Construction	Lafarge, Saint Gobin, Vinci.
Oil and gas	Total, Air liquid.
Electric and equipment	Schneider, Micro-electronics company.
Water	Suez, Veolia.
Medical	Essilor, Sanofi.
Aerospace	Airbus.
Pneumatic	Michelin.

3.2 Descriptive statistics

[1] We assume that the implied volatility is decomposed into rational and irrational implied volatility in presence of market sentiment in the Black and Scholes model.
[2] Black-Scholes model (1973) is a pricing model used to determine the fair price for a call option or a put option based on the following variables: type of option, strike price, underlying stock price, volatility, time, strike price and risk-free rate. This model was employed to the case of European call option.
[3] The introduction of the sentiment variable in the option valuation formula, led to theoretical prices closer to the market price.

Table 2 presents the descriptive statistics for the variables considered in the Black and Scholes model and defined in the previous section. We are considering in this table the mean statistics for the 30 companies based on the sectorial statistics. According to these statistics, it was noticed that the mean, median, minimum and maximum in the financial sector are the larger in the sample.

Table 2: Descriptive statistics

	K	LIFE_DAYS	R	PRICE	S	SIGMA
Mean	47.112	79.719	1.995	0.416	46.821	0.285
Median	46.751	73.667	1.808	0.321	45.500	0.272
Maximum	77.731	430.000	7.238	1.856	77.500	0.650
Minimum	23.461	14.917	0.189	-0.284	23.533	0.140
Std. Dev.	12.773	43.634	1.035	0.571	12.781	0.073
Skewness	0.173	2.767	1.666	0.700	0.218	0.973
Kurtosis	2.511	69.274	11.633	2.588	2.531	4.559
Jarque-Bera	156.547	2145565.186	56912.052	262.890	167.599	1062.808
Probability	1.75E-6	0.000	0.000	0.000	5.11E-5	0.000

As shown in Table 2, the mean value of the price is equal to .416 and ranges between a maximum value of 1.856 and a minimum value of -.284. The more important conclusion for these statistics is the Jarque-Bera statistic, indicating that all of the series deviate from the normal distribution. Most of the variables follow a leptokurtic distribution and tails are fatter.

According to the descriptive statistics, we can see that, in the French market, options vary considerably in price, in terms of maturity and volatility for the period 18/06/2009 to 05/09/2018.

3.3 Empirical results

The aim of this paper was to study the heterogeneity behavioural concept that may exist in the French stock market. We assumed that fundamentalists and chartists do not have the same behaviour. For doing this empirically, we find that it is legitimate to use the Markov Switching model[4]. We apply this model to study whether there are different beliefs between fundamentalists and chartists in the French market. The variable that can give a good answer to this hypothesis is the implied volatility of the call option. This variable detects the behaviour of investors among the sentiment of chartists and fundamentalists.

Therefore, we considered an autoregressive two-regime Markov switching model of order p, noted MS(2)-AR(p), which is presented as follows:

$$X_t - \mu(S_t) = \varphi_1[X_{t-1} - \mu(S_{t-1})] + \varphi_2[X_{t-2} - \mu(S_{t-2})] + \cdots + \varphi_p[X_{t-p} - \mu(S_{t-p})] + \varepsilon_t$$

Where, $\varepsilon_t \rightsquigarrow i.i.d(0, \sigma_{S_t}^2)$ and $\mu(S_t) = \begin{cases} \mu_1 & for\ fundamentalist \\ \mu_2 & for\ chartist \end{cases}$

The transition from one state to another is governed by a first-order Markov chain with transition probabilities, expressed as follows: $p_{ij} = P(S_t = j \backslash S_{t-1} = i), i, j = 1, 2$

Where p_{ij} is the probability of moving from State i at time t-1 to State j at time t.

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[4] Markov switching models have experienced strong development in empirical literature since the discovery of these models by Hamilton (1989). These models allow greater flexibility to accommodate for different behaviors in the time series data. We consider in this paper the two states Markov switching models as we have divided investors in two types: fundamentals and chartists.

For the Markov switching model, we specify an MSIH(2)-AR(0)[5] process for which we assume the same variance for each regime and no autoregressive lags to avoid the deterioration of the reproduction of the stylised facts of the cycles[6]. Table 3 gives an estimate of the Markov switching models for the companies.

Table3: Markov switching estimation results

	μ_1	μ_2	σ_1	σ_2	p_{11}	p_{22}	Duration State1	Duration State2	Linearity test
Financial	.272 [a]	.721 [a]	.348	.872	.99	.974	106	39	134.45[a]
Automotive	2.945 [a]	5.534 [a]	.801	1.57	.99	.98	103	50	86.79[a]
Commercial	1.584 [a]	2.848 [a]	.459	.603	.966	.966	29	29	79.57[a]
IT services	2.472 [a]	8.16 [a]	.813	5.37	.99	.978	102	45	102.45[a]
Advertising	1.076 [a]	2.143 [a]	.302	.763	.981	.976	53	42	91.14[a]
Construction	1.424 [a]	2.471 [a]	.386	.587	.988	.954	83	22	101.34[a]
Oil and gas	2.538 [a]	5.339 [a]	.983	1.71	.98	.976	50	42	89.7[a]
Electric and equipment	2.864 [a]	6.786 [a]	.974	2.25	.994	.983	167	59	112.88[a]
Water	.522 [a]	1.188 [a]	.175	.662	.991	.972	112	36	125.94[a]
Medical	1.829 [a]	3.596 [a]	.603	.801	.986	.98	71	50	97.17[a]
Aerospace	1.51 [a]	3.95 [a]	.557	1.41	.99	.987	98	77	102.68[a]
Pneumatic	.02 [a]	.801 [a]	.11	.597	.967	.92	31	13	71.25[a]

[a] denotes the null hypothesis is rejected at five percent significance level.

From this table, we can note, first, that the linear model null hypothesis is rejected in favour of the state Markov switching model. This non-linearity is caused by the existence of asymmetries characterising time series. These asymmetries reflect the differences in the market between fundamentalists and chartists, as each type has its own strategy. Second, estimated coefficients of intercepts, probabilities and standard errors show significant differences between chartists and fundamentalists, and the results are in line with the expected signs. The estimated coefficients are positives and significant. In general, for all sectors, persistence is greater for fundamentalists than chartists, except for the commercial sector. On average, the duration in State 1 (fundamentalists) is larger than the duration in State 2 (chartists) and Regime 2 is more volatile than Regime 1 for all sectors. We can notice the evidence of significant heterogeneity between chartists and fundamentalists. The results show a large difference in duration in State 1 and State 2 in the banking and insurance sectors, where we observed a high persistence in Regime 1. In fact, during a crisis, investors in the financial sector suddenly switch between strategies, which is also the case for major vital sectors. We can observe in the market a phenomenon of strategy imitation, probably due to a lack of information. In conclusion, the results of the Markov switching model show heterogeneity of behaviour and subsequently we reject the null hypothesis of the homogeneity of beliefs.

Conclusion

The present paper aimed at studying investor behaviour heterogeneity in the French market. We proposed a modified European options model for evaluation. We introduced to the B-S model (1973) a sentiment investor variable and we extract implied volatility to test the heterogeneity between fundamentalists and chartists in the market. We considered the implied volatility as a good proxy measure to the sentiment behaviour of investors. For the empirical analysis, we employ the two-state Markov switching intercept heteroscedasticity model to evaluate the French market of options and then verify heterogeneity between fundamentalist and chartist investors about the sentiment behaviour. Through the daily data from 30 companies listed in the CAC 40, ranging from 18/06/2009 to 05/09/2018, we found a few differences among sectors.

Our results show that both types of investors govern the French market: chartists and fundamentalists. Estimations by employing Markov-switching estimations demonstrated the heterogeneity of the investors. Therefore, we reject the null hypothesis of the homogeneity of beliefs.

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[5] Markow switching two-step intercept heteroscedasticity model.
[6] See Ferrara, L. (2003).

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Determinants of Import Demand in Cote d'Ivoire: The Role of Expenditure Components

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Abstract

This study examines the relationship between aggregate imports and the individual components of expenditure in Cote d'Ivoire over the period from 1980 to 2017. The autoregressive distributed lag model is used to test and estimate the long and short-run import elasticities with respect to the expenditure components. The study finds evidence of a long-run relationship between aggregate imports, the expenditure components, domestic and import prices. The long-run import demand in Cote d'Ivoire is affected positively by domestic price, negatively by foreign price and positively by all expenditure components except exports which effect is insignificant. Furthermore, there are significant differences in the long and short-run elasticities of imports with respect to the different components of final expenditure. Final consumption expenditure and investment expenditure are among the major determinants of aggregate import demand in the long run. In the short run, all expenditure components are positively related to import growth, with consumption expenditure having the highest effect on import growth. The findings of the study indicate that the use of aggregate expenditure variable in the import demand function leads to aggregation bias because different components of final expenditure have different import contents. We also show that the relative price formulation is inappropriate in estimating import demand function for Cote d'Ivoire.

Keywords: Import Demand, Expenditure Components, ARDL, Cote d'Ivoire

JEL Classifications: C22, F10, F41

1. INTRODUCTION

International trade is widely acknowledged as an engine for economic development. It promotes domestic efficiency, international specialization and competitiveness, leading to economic growth. In this context, empirical investigation of import demand function has gained much literature in international economics over the past three decades. For policy purposes such as the balance of payment problems, it is important to know the driving factors of import demand and predict whether the balance of payment is deteriorating or not.

Most empirical studies have estimated import demand functions within the traditional framework by relating the volume of imports to domestic real income and relative import price (e.g., Mwega, 1993; Sinha, 1997; Bahmani-

Oskooee and Niroomand, 1998; Tang and Nair, 2002; Tang, 2003; Dutta and Ahmed, 2004; Tsionas and Christopoulos, 2004; Chang *et al*., 2005; Babatunde and Egwaikhide, 2010; Modeste, 2011 ; Nwogwugwu *et al*., 2015 ; Mugableh, 2017). However, a major limitation of these studies is that they have used a single demand variable (e.g., GDP) as an explanatory variable in import demand function. The use of a single expenditure variable may lead to aggregation bias because different components of final expenditure may have different import contents (Giovannetti, 1989). Moreover, an import model that embodies disaggregate demand variables among the regressors shows better fit and forecast than a model with a single demand variable.

A number of studies have used disaggregated components of expenditure together with the relative price variable to estimate aggregate import demand functions. For instance, Abbott and Seddighi (1996) estimate the import demand function for United Kingdom and found significant differences between elasticities of import demand with respect to consumption expenditure, investment expenditure and exports. Import demand is more sensitive to changes in consumption expenditure as compared to changes in export and investment expenditure. In the case of Malaysia, Mohammed and Tang (2000) report that the macroeconomic components of final demand expenditure namely public and private consumption expenditure, investment expenditure and exports, are all important in determining demand for imports in both the long-run and the short run. Min *et al*. (2002) reveal that import demand in Korea is positively affected by consumption and export expenditure, whereas it is negatively affected by relative prices and investment expenditure. Tang (2003) finds export expenditure to have the biggest impact on import demand in China followed by investment, final consumption and relative price. Narayan and Narayan (2005) analyze the import demand behavior for Fiji during the period from 1970 to 2000. They introduce relevant variables such as relative prices, total consumption, investment expenditure and export expenditure. Their results indicate that import demand is inelastic and statistically significant with respect all the explanatory variables in both the long-run and the short-run. Fosu (2008) analyses the behaviour of Ghana's imports during the period 1970-2002. Using disaggregated expenditure components of total national income, he finds inelastic import demand for all the expenditure components and relative price. In the long-run, investment and exports were the major determinant of movements in imports in Ghana. In the short run household and government consumption expenditures are the major determinants of import demand. Import demand is not very sensitive to price changes. In the case of Turkey, Guncavdi and Ulengin (2008) establish that private consumption and export expenditure are the most determinants of imports in the long run while consumption and investment expenditures are dominant factors in the short run. Government expenditure is found to have no significant impact on import demand in Turkey. In a time series analysis of demand function for Cote d'Ivoire over the period 1970 to 2007, N'Guessan and Yue (2010) confirm the leading role of investment and exports expenditures as the main determinants of imports in Cote d'Ivoire in the long run. In the short run, consumption expenditures are the major driver of import demand. The variable of relative price has no significant effect on import demand both in long and short run. Chani *et al.* (2011) examine the import demand function for Pakistan. They find that import demand is affected positively and significantly by all expenditure components. On the contrary, the relative prices have negative but insignificant relationship with import demand. Ziramba (2012) investigate the relationship between South African aggregate imports and expenditure components and the relative price of imports for the period 1970 – 2009. He finds that different components of final demand expenditure have different impacts on aggregate import demand in both the short and long-run run. Muhammad and Zafar (2016) estimate the long run and short run of import demand function of Pakistan during the period 1973-2013. They find that import demand has both long- and short-run relationship with final consumption expenditure, investment expenditure, government consumption expenditure, exports, foreign direct investment, and exchange rate. Chantha *et al*. (2018) examine the case of Cambodia and find that relative prices and exchange rates have negative effects on import demand both in long and short run, while exports have positive effect on import demand. Foreign direct investment and final consumption expenditure have insignificant impact on import demand.

The objective of this study is to examine the import demand function and estimate the effect of individual components of expenditure on imports in Cote d'Ivoire over the period from 1980 to 2017. We disaggregate total expenditure into final consumption expenditure, investment and exports. At the methodological level, we use three alternative methods for estimating long run relationships, i.e. ARDL, FOLS and DOLS. These methods account for possible endogeneity of explanatory variables and have better small sample properties. We use these methods for gauging the sensitivity of the results to different estimation techniques. Furthermore, contrary to N'Guessan

and Yue (2010) and other empirical studies which use relative price, we introduce import and domestic prices as two explanatory variables and test the assumption of price homogeneity. We contend that relative price formulation should not be imposed *a priori* but needs to be tested empirically. If the price homogeneity assumption does not hold, estimates from standard import demand function using relative price may be misleading. Our empirical results provide evidence against the price homogeneity assumption.

The balance of the paper is organized as the following way. Section 2 describes the econometric framework of the empirical study. Section 3 consists of the discussion of the empirical results. Section 4 provides concluding remarks and policy implications of the study.

2. ECONOMETRIC FRAMEWORK

2.1 Model Specification

Our aim in this study is to investigate the determinants of aggregate imports in Cote d'Ivoire with a focus on expenditure components. The traditional and popular import demand function is specified as follows:

$$\ln M_t = \gamma_0 + \gamma_1 \ln Y_t + \gamma_2 \ln PD_t + \gamma_3 \ln PM_t + \mu_t \qquad (1)$$

where $\ln M_t$ is the natural logarithm of real imports of goods and services, $\ln Y_t$ is the natural logarithm of real income, $\ln PD_t$ is the natural logarithm of the price of domestically produced goods and services, $\ln PM_t$ is the natural logarithm of the price of imported goods and services, and μ_t is an error term which is normally distributed with mean zero and constant variance.

Giovannetti (1989) has proved that the use of a single aggregate expenditure variable in the aggregate import demand function may result in aggregation bias because different components of final expenditure may have different import contents. Following Giovannetti (1989), Abbott and Seddighi (1996), Min *et al.* (2002) and Narayan and Narayan (2005), the real domestic income variable (Y_t) is decomposed into three broad components: consumption expenditure, investment expenditure and export expenditure. Thus, the empirical import demand function to be estimated in the present study is specified as follows:

$$\ln M_t = \beta_0 + \beta_1 \ln CE_t + \beta_2 \ln K_t + \beta_3 \ln X_t + \beta_4 \ln PD_t + \beta_5 \ln PM_t + \mu_t \qquad (2)$$

where CE_t is the real value of final consumption expenditure, K_t is the real value of gross capital formation and X_t is the real value of exports of goods and services. We expect β_1, β_2, β_3, and β_4 to be positive, while β_5 is expected to be negative.

In our empirical model, we have used two separate price variables instead of the relative import price, to capture the effects of prices on imports. Most existing empirical studies follow the standard theory of demand that assumes that import demand function is homogeneous of degree zero in prices and income (Deaton and Muellbauer, 1980). This implies that if one multiplies all prices and money income by a positive number, the volume of imports will remain unchanged. This assumption allows the import demand function to be expressed as a function of real income and relative price of imports defined as the ratio of import price to domestic price. The use of relative price attenuates any collinearity that may exist between domestic and import prices. However, it implies that the effects of import price and domestic price are equal in magnitude but opposite in sign, that is: $\beta_4 + \beta_5 = 0$. If this restriction does not hold, estimation from relative price formulation can lead to misleading results (Murray and Ginman, 1976; Urbain, 1993). Contrary to previous studies including Ziramba and Bbuku (2003), Narayan and Narayan (2005), Chimobi and Ogbonna (2008), N'Guessan and Yue (2010), Bathalomew (2010), Chani *et al*. (2011), Yin and Hamori (2011), Marbuah (2013), and Ibrahim and Ahmed (2017), we do not postulate *a priori* this restriction and argue that price homogeneity hypothesis should be tested.

2.2 Data Description

This study uses variables comprising real final consumption expenditure (CE), real gross capital formation (K), real exports of goods and services (X), real imports of goods and services (M), domestic price (PD) and import

price (PM). The data cover the period from 1980 to 2017 and were obtained from the 2019 World Development Indicators of World Bank. Import unit value index (2000=100) was used as a proxy for import price, GDP deflator (2000=100) was used as a proxy for domestic price index. We use the import unit value index and the export unit value index to convert nominal data on imports and exports in constant local currency. Real data on consumption and capital formation were obtained using the GDP deflator. Furthermore, all data are expressed in natural logarithmic form. This functional form provides elasticity coefficients directly. Studies including Doroodian *et al.* (1994), Sinha (1997) and Raijal *et al.* (2000) have shown that the log linear transformation provides more reliable estimates compared to linear transformation.

Table 1. Descriptive Statistics and Correlation Matrix

Variables	lnM	lnCE	lnK	lnX	lnPD	lnPM
Panel A: Summary statistics						
Mean	28.392	29.409	27.556	28.134	4.459	4.622
Median	28.486	29.415	27.462	28.345	4.579	4.605
Maximum	29.081	30.012	28.499	28.793	5.127	5.369
Minimum	27.205	29.043	26.671	26.982	3.637	3.871
Std. dev.	0.410	0.222	0.481	0.530	0.493	0.463
Skewness	-0.618	0.700	0.281	-0.534	-0.211	0.038
Kurtosis	3.253	3.450	2.607	1.820	1.538	1.786
Jarque-Bera	2.527*	3.427*	0.745*	4.015*	3.665*	2.341*
Probability	0.282	0.180	0.688	0.134	0.159	0.310
Panel B: Correlation matrix						
lnM	1.000*					
lnCE	0.719*	1.000*				
lnK	0.584*	0.534*	1.000*			
lnX	0.833*	0.672*	0.300**	1.000*		
lnPD	0.846*	0.847*	0.424*	0.889*	1.000*	
lnPM	0.575*	0.814*	0.392*	0.671*	0.892*	1.000*

Note: M, CE, K, X, PD, and PM denote real imports, real final consumption, real gross capital formation, real exports, domestic price and import price, respectively. * (**) indicates statistical significance at the 5% (10%) level.

Table 1 shows the descriptive statistics of the logarithmic transformation of the variables. The average real imports over the sample period was about 28.392 with a maximum of 29.081 and a minimum of 27.205. The import price index averaged 4.622 with a maximum of 5.369 and a minimum of 3.871. The probability values from the Jarque-Bera statistic suggest that all the variables are normally distributed. The correlation matrix indicates positive relationships among the variables.

Table 2. Structure of imports by commodity types (as share of total imports)

	2008	2010	2012	2014	2016	2017	2002-2017
Consumer goods	39.20	39.03	39.97	39.72	48.23	50.75	42.82
Intermediate goods	48.92	35.63	41.60	38.48	29.35	25.26	36.54
Capital goods	11.88	25.34	18.43	21.80	22.42	23.99	20.64
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Source: General Administration of Customs, Cote d'Ivoire.

Table 2 presents the composition of imports by commodity types. It clearly shows that Cote d'Ivoire's import basket is dominated by consumer goods followed by intermediate goods and capital goods. Over the period 2002-2017, on average, 42.8 percent of Cote d'Ivoire's imports are consumer goods, 36.5 percent are intermediate goods, and 20.6 percent are capital goods. These figures clearly show the heavy reliance of the Ivorian economy on imported goods to meet the domestic demand of households and private sector.

2.3 Econometric Methodology

Most of the time series data faces the problem of nonstationarity due to the presence of unit root or time trend. In such situation regression results may be misleading (Granger and Newbold, 1974). Hence our empirical analysis involves three steps as described below. As a first step, we test for the order of integration of the series by using the PP unit root test of Phillips and Perron (1988) and the KPSS test of Kwiatkowski et al. (1992). In a second step, we test whether there is a long run relationship among the variables. For this purpose, we employ the Autoregressive Distributed Lag (ARDL) bounds testing approach to cointegration developed by Pesaran et al. (2001). This approach performs well in small samples without concerning whether the regressors are stationary at level (i.e. I(0)) or stationary in first difference (i.e. I(1)). Hence, it eliminates the uncertainty associated with pre-testing the order of integration of the series in small samples.

To carry out the ARDL bounds test to cointegration, Eq.(2) is reformulated as a conditional error correction model as follows:

$$\Delta \ln M_t = \theta_0 + \theta_1 \ln M_{t-1} + \theta_2 Z_{t-1} + \sum_{i=1}^{p} \gamma_{1i} \Delta \ln M_{t-i} + \sum_{i=0}^{q} \gamma_{2i} \Delta Z_{t-i} + e_t \qquad (3)$$

where Δ is the difference operator and $Z_t = (\ln CE_t, \ln K_t, \ln X_t, \ln PD_t, \ln PM_t)$. The presence of long run relationship is tested by restricting coefficients of lagged level variables equal to zero. That is, the null hypothesis of no long-run relationship is $H_0: \theta_1 = \theta_2 = 0$. This hypothesis is tested through an F-test. Under the null hypothesis, however, the distribution of this F-statistic is non-standard, irrespective of whether the variables are integrated of order zero or one. Pesaran et al. (2001) have tabulated two sets of critical values that account for integrating properties of the variables. If the calculated F-statistic is higher (lower) than the upper (lower) critical value, then the null hypothesis of no cointegration can (cannot) be rejected.

The ARDL bounds testing procedure is sensitive to the selection of the lag structure (p, q). In this study, maximum lag length on each variable was set to five and the optimal lag structure was selected using the AIC criterion. The model has been tested by the diagnostic tests that are serial correlation, normality test and heteroskedasticity test. The stability of the model has also been tested using the Brown et al. (1975) cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ). Once a long-run relationship is identified amongst the variables, the estimated long-run coefficients are obtained as the negative value of the coefficients for the lagged explanatory variables divided by the coefficient for the lagged dependent variable. The short-run coefficients are simply the estimated coefficients of the first differenced variables in the unrestricted error correction model.

3. EMPIRICAL RESULTS

We begin our empirical analysis by examining the stationarity of the variables. As indicated above, we apply the PP and KPSS tests. The results of unit root tests reported in Table 3 suggest that all the variables are non-stationary in their level but become stationary after taking the first difference. Thus, we can conclude that the variables under study are integrated of order one. Based on this result, the next step of our empirical investigation is to test for the existence of long-run relationships among the variables.

Table 3. Results of Unit Root Tests

	Level		First difference	
Series	PP	KPSS	PP	KPSS
lnM	-2.768	0.074	-7.635*	0.059
lnCE	-0.665	0.112	-4.454*	0.082
lnK	-2.803	0.143	-9.191*	0.074
lnX	-2.112	0.141	-4.821*	0.070
lnPD	-1.875	0.086	-4.175*	0.084
lnPM	-3.375	0.061	-7.511*	0.100

Note: M, CE, K, X, PD, and PM denote real imports, real final consumption, real gross capital formation, real exports, domestic price and import price, respectively. The unit root tests have been performed under

the model with constant and trend. 5% critical values for PP and KPSS tests are -3.536 and 0.146,
respectively. * indicates the rejection of the null hypothesis at 5% level of significance.

To investigate the existence of long-run relationships between the variables, the bounds test is employed under the ARDL approach framework. The results are displayed in Table 4. The calculated F-statistics are compared with the critical values provided by Pesaran *et al*. (2001). The results show that a long-run relationship exists among the variables when import variable is used as dependent variable. In this case, the computed F-statistic value is greater than the upper bound critical value at 5% level of significance. The results also suggest a llong-runrelationship when exports variable is the dependent variable. Diagnostic tests such as serial correlation test, heteroskedasticity test, normal distribution test, and the stability test are used to ensure the reliability of the estimated models. The tests indicate that there are no serial correlation, no heteroskedasticity and normal distribution. The stability test also clearly demonstrates that the models are stable. We can, therefore, conclude that there is at least onlong-runun relationship between the variables.

Table 4. Results of the ARDL Cointegration Test

Model	F-stat.	Diagnostic tests		
		Normality	Heteroskedasticity	Correlation
M=f(CE, K, X, PD, PM)	7.692*	0.730 [0.649]	23.044 [0.682]	0.586 [0.478]
CE=f(M, K, X, PD, PM)	3.207	0.636 [0.727]	32.079 [0.271]	1.047 [0.353]
K=f(M, CE, X, PD, PM)	3.125	1.315 [0.518]	29.246 [0.452]	0.046 [0.830]
X=f(M, CE, K, PD, PM)	7.271*	3.599 [0.165]	29.994 [0.465]	0.486 [0.485]
PD=f(M, CE, K, X, PM)	2.755	0.599 [0.862]	25.039 [0.723]	0.160 [0.688]
	Critical values (T=38)			
	Lower bounds I(0)		Upper bounds I(1)	
1%	2.82		4.21	
5%	2.14		3.34	
10%	1.81		2.93	

Note: M, CE, K, X, PD and PM denote real imports, real final consumption expenditure, real capital formation, real exports, domestic price and import price, respectively. Lag length on each variable was selected using the AIC criterion with maximum lag set to 5. Critical values are those of the model with no intercept and trend. Figures in [.] are *p_values*. . * indicates the rejection of the null hypothesis of no cointegration at 5% level of significance.

As cointegration exists among the variables, we further estimate the long-run elasticities of import demand with respect to each independent variable. We estimate the long-run relationship using the ARDL approach of Pesaran *et al.* (2001), the Fully Modified OLS (FMOLS) estimator proposed by Phillips and Hansen (1990), and the Dynamic OLS (DOLS) estimator suggested by Stock and Watson (1993). These three estimation techniques account for the possible endogeneity among the variables and have desirable properties in small samples. The results from these methods enable us to compare the long-run elasticities of import demand derived using alternative estimation methods. The results are summarized in Table 5. They show that the long-run coefficients on consumption expenditure, investment expenditure, domestic price and import price have their expected sign and have statistically significant impact on import demand in Cote d'Ivoire. The effects of expenditure components are different on aggregate import demand. The import demand is highly sensitive to domestic price followed by import price, consumption expenditure and investment expenditure in the long run. The consumption and investment expenditure components are positively related to import demand regardless of estimation methods. This indicates that an increase in consumption and investment expenditure components will lead to higher import demand as indicated by Keynesian absorption theory. This finding is consistent with the fact that a large proportion of Cote d'Ivoire's imports are consumer and capital goods. The positive and significant import demand elasticity with respect to domestic price implies than at increase in domestic prices leads to higher imports of goods and services. On the contrary, the coefficient on import price is expectedly negatively signed and significant. This implies that an increase in foreign prices will decrease imports and consequently reduce the import bill. For example, an increase in import price by 1% will reduce import demand by 1.84% and the import bill by 0.84%.

Furthermore, the results show that the coefficient on expenditure on exports is not in accordance with economic theory which suggests a positive relationship between exports and imports. However, the coefficient on exports is

not significant in two models. Overall, the elasticity estimates in Table 5 indicate that consumption expenditure, investment expenditure, domestic and import prices are the main determinants of Cote d'Ivoire's aggregate imports in the long run. In particular, consumption expenditure appears to dominate the influence of other components of final expenditure in the long run. Our results are not consistent with findings by N'Guessan and Yue (2010) who found that, in the long run, investment and export expenditures are the main determinants of Cote d'Ivoire's imports and that import demand is not sensitive to price changes. The difference in magnitude of the elasticities of import demand with respect to different expenditure components provides evidence in support to using different components of final expenditure separately in import demand function.

Table 5. Results of Estimated Long Run Import Demand Function

| Regressor | Dependent variable: LnM | | | | | |
| | ARDL | | FMOLS | | DOLS | |
	Coef.	t-stat.	Coef.	t-stat.	Coef.	t-stat.
lnCE	0.975*	2.385	0.519*	4.107	1.347*	2.632
lnK	0.521*	3.442	0.296*	4.228	0.717*	9.037
lnX	-0.611	-1.519	0.161	1.453	-1.284*	-2.217
lnPD	2.503*	2.640	0.752*	3.898	4.560*	2.999
lnPM	-1.844*	-2.546	-0.639*	-4.016	-3.313*	-3.001
Price homogeneity test						
H_0: $\beta_4+\beta_5=0$	-2.850* [0.029]		1.346 [0.187]		2.964** [0.059]	

Note: The model estimated is: $lnM_t=\beta_0+ \beta_1 lnCE_t + \beta_2 lnK_t + \beta_3 lnX_t + \beta_4 lnPD_t + \beta_5 lnPM_t +\mu_t$, where M, CE, K, X, PD and PM denote real imports, real final consumption expenditure, real capital formation, real exports, domestic price and import price, respectively. The restriction $\beta_4+\beta_5=0$ implies homogeneity price. Figures in [.] are *p_values*. The asterisk * and ** denote statistical significance at the 5% and 10% levels, respectively.

To check whether the price homogeneity of import demand is appropriate, we test the linear restriction on price variables *i.e.* $\beta_4+\beta_5=0$. The results from the ARDL and DOLS models show that the hypothesis of price homogeneity should be rejected, implying that the relative price formulation of import demand is not appropriate in the case of Cote d'Ivoire. This result provides significant evidence for using domestic and import prices separately in import demand equation instead of relative price. The results clearly show that import demand is more sensitive to changes in domestic price than to import price.

Once cointegration among the variables is proved, we can estimate the short run dynamic model for import demand through an error correction model. Table 6 displays the short run elasticities of the import demand with respect to its determinants using the ARDL approach. According to the results, all expenditure components (consumption, investment and exports expenditures) have significant positive effects on import demand in the short run. The magnitude of impact of these expenditure components on the import demand is however different. Consumption expenditure has the highest elasticity of import demand and it is followed by exports and investment expenditures. The results also show that domestic price has a positive impact on imports while import price is negatively related to imports in the short run. The effects of domestic and import prices are consistent with *a priori* expectations. The coefficient on the lagged error correction term is statistically significant with the expected negative sign, confirming the existence of a long-run relationship among the variables.

Table 6. Short Run Import Demand Function using the ARDL Model

| Regressor | Dependent variable: ΔlnM | | |
	Coef.	t-stat.	Prob.
ΔlnCE	0.654*	2.357	0.026
ΔlnK	0.134*	3.487	0.001
ΔlnX	0.181**	1.714	0.098
ΔlnPD	1.100*	5.334	0.000
ΔlnPM	-1.007*	-11.605	0.000
ECT(-1)	-0.620*	-9.198	0.000

Note: M, CE, K, X, PD and PM denote real imports, real final consumption, real capital formation, real exports, domestic price and import price, respectively. The asterisks * denotes statistical significance at the 5% level.

4. CONCLUSION

The study has examined the aggregate import demand function for Cote d'Ivoire. The Autoregressive Distributed Lag (ARDL) modelling technique was used to examine the relationship between aggregate imports and disaggregated components of final demand for the period 1980 to 2017. We disaggregated components of final demand into three components that are final consumption expenditure, investment expenditure and expenditure on exports. The bounds test results show that there islong-runrun relationship between aggregate import demand and its determinants. We then estimate the long run elasticities of import demand with respect to its determinants. The robustness of the results was further checked using the Fully Modified Ordinary Least Squares (FMOLS) and the Dynamic Ordinary Least Squares (DOLS) techniques.

The results of the study reveal that significant determinants of Cote d'Ivoire's aggregate imports in the long run are final consumption expenditure, investment expenditure, domestic and import prices. Domestic and import prices have the largest long run effects on the demand for imports. Moreover, there are significant differences between the long run elasticities of imports with respect to different components of aggregate expenditure. Final consumption and investment expenditures were found to be the major determinants of import demand in the long run. This is not surprising given that consumer and capital goods have the largest share to imports in Cote d'Ivoire. The import elasticity of demand with respect to exports is negative and insignificant. In the short run, all expenditure components are positively related to import growth, with consumption expenditure having the highest effect on import growth. Results of the short run import demand also show that consumption expenditure, investment expenditure, exports expenditure, domestic and import prices are all significant determinants of import demand. All variables except import price show a positive effect on imports in the short run.

Our results show the importance of using disaggregated expenditure components given that they have different impacts on import demand. In addition, the results of this study reject the price homogeneity assumption and show that import demand is more sensitive to domestic price than to import price. This finding provides strong evidence of using domestic and import prices separately in estimating import demand function instead of relative price. Therefore, the relative price formulation is inappropriate in estimating import demand function for Cote d'Ivoire.

These empirical results have significant policy implications on the economic policies designed to improve trade performance and the balance of payment. Firstly, given the large influence of final consumption expenditure on import demand, fiscal policies designed to influence the pattern of consumption expenditure in Cote d'Ivoire are essential to reduce imports and hence improve external balance. Government should thus create the enabling environment to increase domestic productive capacity in order to reduce imports especially on consumer goods such as rice, which can be produced locally. By increasing domestic productive capacity, the export base will be broadened, which will increase exports and hence improve the trade balance. Secondly, the estimated domestic price elasticity suggests that an increase in domestic inflation will result in an increase in imports. This suggests that efforts should be done to control for inflation by keeping it at a low level.

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Impact of Knowledge Management on Organizational Performance: A Case of U.S. Retail Firms

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Abstract

This paper investigates the influence of knowledge management on organizational performance in the case of U.S. retail firms. The paper is based on secondary data analysis, which was collected through a critical review of the literature. The analysis has shown that knowledge management has a significant impact on the performance of organizations in the case of U.S. retail firms. The study found that, when the management of a firm gives importance to the effective management of knowledge, it ultimately helps to improve the performance of that firm. Knowledge management in an effective way is considered important for ensuring long-term prosperity. Knowledge has become the most effective factor for various knowledge-based embedded elements. This is also referred to as exposed tacit due to mobile employees, and therefore its dissemination and development are considered to be significant in order to achieve sustainable competitiveness.

Keywords: Knowledge, Knowledge Management, Competitive Advantage, Organizational Performance, Tacit Knowledge, Explicit Knowledge

1. INTRODUCTION

Nowadays, nearly all companies operate within the knowledge economy. Moreover, these businesses must pursue knowledge-intensive practices to achieve sustainable competitiveness. The organization's prosperity is seen more on the basis of their ability to manage the given knowledge effectively. Knowledge is considered a valuable factor for any type of organization. Knowledge management, however, cannot be effectively and efficiently implemented. Santoro et al. (2018) stated that knowledge is corporate power, and also knowledge is identified as a major asset for a business. It becomes very challenging for an organization to respond effectively to the ever-changing market demands without effectively managing knowledge. Hence, the idea of knowledge management has to be transformed into a major need for any organization, regardless of the size of the organization. However, the approach to knowledge management can be quite different.

According to Dingsøyr (2019), knowledge is basically identified as the major driver of competition, and its influence is underscored by changes in the economy. The knowledge of a company cannot be easily replaced by other organizations. Dalmarco et al. (2017), every organization is working in the midst of economic transition during this competitive edge period, based on the information from a new era based on knowledge development.

Today, the key drivers for organizational performance are differences in the knowledge base and all other abilities of a firm to develop and use knowledge. The academic discussion about this procedure has got to be changed mainly around the idea of management of knowledge. Knowledge management basically shows different processes and practices that are performed within a company, with the objective to unleash the intellectual potential by making an improvement in the effectiveness and efficiency of knowledge resources of an organization. According to Batista et al. (2017), knowledge management is considered a significant element for a company, and it is also identified as very important for organizational success. Based on the enhanced significance of knowledge management for some type of contemporary organizations, the analysis of knowledge management becomes notable. It is important to analyze how knowledge management works best for a firm. Therefore, much research has been conducted to underscore the importance to analyze knowledge management in an organization, for example, Nowacki and Bachnik (2016), the research analyzes the significance of knowledge management for organizational performance. However, there has been no study conducted previously for examining the impact of knowledge management on organizational performance in the United States (U.S.) retail firms. Hence, the current study has been conducted for examining the influence of knowledge management on organizational performance in the case of U.S. retail firms.

2. KNOWLEDGE

Knowledge is basically identified as integration of value, norms, expert insight, contextual information and, information that are used for new information and experiences. The application and emergence of knowledge are done in 'knowers' minds. Employees and management basically show knowledge in the form of processes, norms, practices, and documents. North and Kumta (2018) have stated that developing knowledge in an efficient way is significant. Moreover, there are two kinds of knowledge that have an impact on decision quality. These are explicit knowledge and tacit knowledge. However, it is significant that all organizations have both kinds of knowledge. Velasquez and Lara (2017) have stated that knowledge is basically a power of firm and it acts as the major asset of an organization while considering survival in this competitive environment. It becomes very challenging for an organization to make a good response to the change the requirements of market without effective knowledge tacit of knowledge management has become a major need for any organization, regardless of its size. However, on the other hand, the approach of knowledge management can be quite different.

3. KNOWLEDGE MANAGEMENT

Knowledge management is basically a procedure that is used to develop value with the help of the intangible assets of a company. The knowledge is managed based on the basic competencies and abilities developed by companies and people with the passage of time. For survival in the current competitive environment, employees should target to have more knowledge. Because of the many changes seen in businesses today, organizations should strive to increase their knowledge. In the present global economy, organizations should target on making use of knowledge systems in the most effective and efficient way. The growth of new knowledge is seen based on the present structure and also on a company's capabilities. Organizational management should always be geared to the efficient and effective management of knowledge, a firm's management should take proper account of its significance. Thus, Obeidat et al. (2017) aimed to interpret the significance of knowledge management.

There is no such peculiar literature done on the practices of knowledge management, Knowledge management is a complex research avenue, without any vocabulary developed, it is linked with various practices aimed at unleashing enterprise's intellectual potential. Like it is mentioned before, it is important for an organization to improve both the efficiency and effectiveness of the management of a company's knowledge resources. Liebowitz (2019) says that organizational enablers, critical success factors, and organizational facilitators are the major enabler factors for managing knowledge. It does not, however ,means that these approaches always prove to be

helpful in managing effective knowledge, because of the possibility that the company's facilitators may not result in the proper use of knowledge resources. This is mostly seen in cases where knowledge is not managed effectively and are not considered suitable for the organization. Tangible resources are identified as the source of an important competitive edge in a company. However, Ferraris et al. (2017) stated that a company can only make use of tangible resources in order to get a competitive advantage in the case when its integration is done with particular knowledge and there is more complexity in imitating the given resources. The basic competitive advantage is developed in a firm through the ability of an organization to apply present and new knowledge in an effective way. It is done with the aim to make new processes and products. Therefore, knowledge management can be seen as being linked to the leverage and knowledge identification, with the objective to foster the innovation process. However, knowledge and knowledge management are considered more closely linked to a firm's major work procedures.

According to Cupial et al. (2017), effectively managing knowledge resources is seen as very important for all types of companies to survive in a competitive environment. Knowledge essentially addresses the major source of a company's competitive advantage. The growth of the resource approach is basically a company's knowledge-based theory, for which knowledge is considered to be fundamentally an important input for successful development. Khosravi and Nilashi (2018), have, however, said that it is not significant that effective knowledge management always gives a competitive edge, without targeting other important company approaches. Therefore, a company can't gain a competitive advantage without an effective leadership approach, only through effective knowledge management. Ceptureanu et al. (2017) have also identified that knowledge is the most important development approach in a company. Managers should, therefore, target on the development, attainment, movement, retention, and integration of knowledge in an effective way. It is also recommended that companies aim more strategically to position themselves according to resource-based and other knowledge-based aspects, based on valuable, unique, and inimitable resources. However, it is also important for the company's management to focus on the major services or products offered to consumers, rather than only on resources. The table (1) below can help the organization to achieve a sustainable competitive edge.

| Key Issues	Key Aspects
Management	Strong Support Commitment Effective Leadership
Employees	Engagement Training Team Work
Technological	Infrastructure Latest Technology
Organizational	Culture

Table 1. Key Issues and Elements of KM
Source: Developed by Author

In addition, LUI et al. (2019) said that the major knowledge management infrastructure is identified as a major prerequisite to reinforce the knowledge management process within an organization. It shows the long-term knowledge base and other information management within a firm. The knowledge management infrastructure basically deals with the processes of knowledge development in an organization, whereby, the stimulation of processes used to generate and create knowledge is carried out. The knowledge management infrastructure is identified as the organizational environment, through which knowledge is retrieved, acquired, protected, and stored with the aim of making it easier to use. Two major factors are involved in knowledge management infrastructure: social infrastructure and technical infrastructure. The technical infrastructure consists of IT tools, hardware, and infrastructures. On the other hand, however, social infrastructure involves organizational structure, human resources, and culture of the organization.

4. KNOWLEDGE MANAGEMENT AND ORGANIZATIONAL PERFORMANCE

Most companies are suffering from the challenges of measuring knowledge management effectiveness and the contribution it makes to organizational performance. Therefore, Santucci et al. (2018) aimed at facilitating organizational management in terms of interpreting that for whether or not knowledge management influences organizational performance. The knowledge within a firm is identified as the major factor that is embedded in all performance levels. knowledge resources are identified as major strategic resources in most companies. The importance of knowledge management to all firms is quite obvious. furthermore, it is also clear that how it makes a contribution to the service and product offering. Knowledge management basically helps organizations plan, create, organize, and motivate employees utilizing knowledge resources effectively. The most important by-products of knowledge management are essentially the integration of processes, technology, and people, according to which organizations should aim to transform tacit knowledge into some form of explicit knowledge. This makes it easier for other people to reuse knowledge and thus improves the entire business process. This is similar to Nonaka's knowledge management model (as shown in Figure 1).

Figure 1: The Nonaka – Takeuchi Model knowledge management model
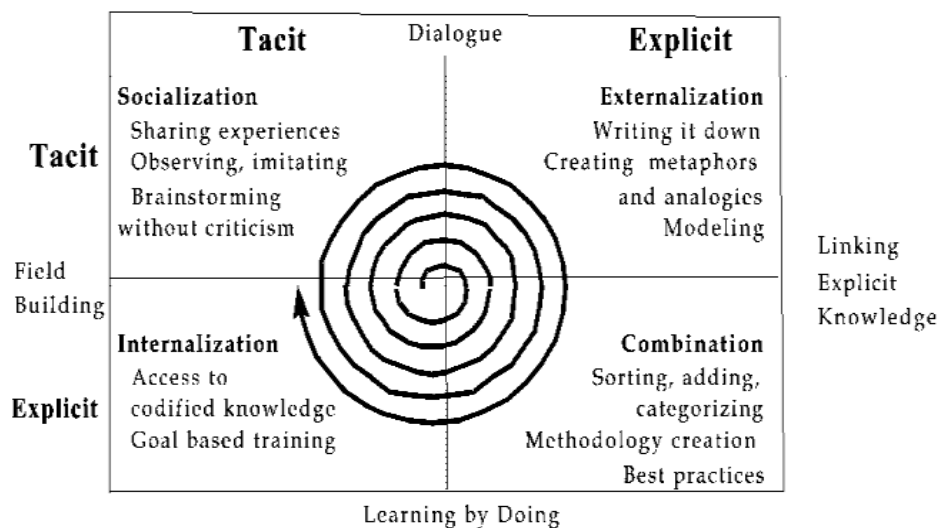
Source: (North and Kumta, 2018)

Desai and Rai (2016) investigated the impact of knowledge resources on a company's competitive age. Based on the results provided by Alaarj et al. (2017), it has been identified that knowledge resources present in a company provide a significant resource for gaining a competitive edge. Research by O'Connor and Basri (2018) has found that knowledge resources are useful in innovation because brilliant performance is seen as a result. Elfar et al. (2017) research aimed at analyzing the significant resources of knowledge in order to gain a competitive advantage. Knowledge management is considered to be very important to an organization and plays an important role in the development of a positive atmosphere within an organization, hence boost the return on investments. In addition, Shpakova et al. (2017) research have identified that knowledge management is basically an indicator of both creative and comprehensive methods to eliminate restrictions. It also ensures the constraints that can ensure change is developed and implemented. Effective knowledge management within a company is seen as very important, as it proves helpful in meeting the requirements for determining the organization's operational and strategic objectives. Kane's (2017) research at interpreting the significance of knowledge management for a company, but the research did not analyze the direct impact of knowledge management on organizational performance. Cabrilo and Leung's (2019) research was therefore aimed at analyzing the influence of knowledge management on organizational performance. According to Shpakova et al. (2018), companies should give greater importance to key knowledge management practices that involve knowledge creation, conversation, sharing, and contribution. In addition, the basic methods used for the storage, selection, processing, use, and access to knowledge should also be targeted with the aim of achieving excellence in performance. Knowledge sharing is now becoming very important for better exploitation of knowledge assets. It is not always important that

knowledge assets are the source of competitive advantage; however, these assets can be used efficiently and effectively to achieve maximum benefit. Lopes et al. (2017) research aimed to interpret the organization's significance of knowledge assets. Gutiérrez et al. (2016) said if employees are linked together as a result of knowledge management, then employee skills are continuously developed and employees begin to depict more efficiently and effectively. As a result, the company's valuable memory is developed to support faster problem-solving. It helps to produce services and products with better knowledge embedded in order to provide the necessary competitive advantage and to drive an organization's overall techniques. Sumbal et al. (2017) said that knowledge management involves continuous employee learning to improve their understanding level. Effective knowledge management is helpful in sharing knowledge with other stakeholders that can help improve new relationships. As a result of effective knowledge management, skills of employees get enhanced by the use of existing resources, Consumer loyalty can be ensured. It also helps to build a better image of an organization in front of the public.

5. CONCLUSION AND FUTURE RECOMMENDATIONS

Knowledge management has been and remains to be a key competitive differentiator when it comes to driving organizational performance. The power of people and machines together provides the greatest opportunity for the creation of knowledge in human history. However, modern ways of working, new technologies such as the AI-enabled platforms, change in the composition of the workforce make traditional-management views obsolete. Many organizations need to redefine ways to promote knowledge creation in order to maximize human potential in the workplace. In order to keep up with ever-changing technology, and to ensure that a company is successful in addressing unforeseen challenges, the company's need to combine the technology infrastructure, processes, incentives and culture that would motivate people to integrate and use knowledge management. The prosperity of a company is based on its ability to manage knowledge in an effective manner. The government sector or organizations should also increase their capacity by focusing on knowledge management. Knowledge management is considered to be significant for the retail sector and all organizations and should therefore be explored in more detail. The literature review stresses that Knowledge management is considered significant in order to increase the performance of an organization in the United States(U.S.) retail firms, hence its relevance.

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The Dynamic of 2011 – 2016 East Java's Regional Spatial Growth, An Exploratory Spatial Data Analysis

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Abstract
East Java is one of the Indonesian provinces with above national average of GDP growth. It experiences spatial growth disparity within the province. The implemented regional spatial plan assigns eight development regions, with their corresponding growth centers to reduce the disparities. The objective of this study is to explore the dynamic of the interregional spatial growth within this province, according to the designated spatial plan. The Exploratory Spatial Data Analysis (ESDA) is implemented on 2011 up to 2016 data of the region's economic growth. The result indicates the still existence of the spatial growth disparity. Most of the growth centers are in their second round of the backwash – effect stage.

Keywords: Growth Disparity, Spatial Growth, Spread – Backwash Effect, ESDA

1. Introduction

1.1. Background of the Study

Economic development is a necessary process to improve regional welfare and standard of living. Todaro and Smith (2009) define economic development as a process that involves various aspects, such as economic structure, social change, poverty, inequality, and unemployment in the context of economic growth. Among other measures, economic growth is a measure that is commonly used to indicate the nature of economic development.

Within a country however, regions have commonly experienced unequal rate of economic growth. In most countries, national economic growth has been dominantly supported by the growth of some designated growth centers. These growth centers have relatively higher economic growth compared to their surrounded regions. The persistent economic growth disparities have been a growing concern in many countries in the past decades, including Indonesia.

The concept of spatial inequality has been evolved from the neoclassical trade and growth theory, the location theory, the external scale economies until the central place theory (Dawkins, 2003). The relation between geography and economic activities was the initial focus of many researches. The focus has been shifted to the mechanism of spatial imbalance of growth and its convergence process (Neary, 2001). The growing concerns on spatial disparities have been supported by the advance in theory (e.g. new economic geography) and in the development of spatial data analysis and GIS. For equity concerns, a more even distribution of economic growth across regions is desirable. Researches which describe the spatial pattern or analyze the mechanism of the spatial growth provide useful ground to prescribe policies promoting the desirable equal distribution of the growth.

Indonesia is one of the most spatially diverse nations in terms of natural resource endowments, population and economic activity distribution, ecology, and ethnicity. The country's regional development pattern has invited more interest for analytical as well as political purposes. While the country has shifted its centralistic government system to a highly decentralized one, the regional income per capita disparity is still the main issue. Any studies to address the reasons for this persistent disparity (Resosudarmo and Vidyattama, 2006; Hill, Resosudarmo and Vidyattama, 2009) have not achieved proper results.

This study particularly focuses about the economic growth in East Java, one of the provinces in Indonesia. It consists of 38 regencies/municipalities. Compare to other provinces, this province still relatively shows more evenly distributed development benefits (Dick, Fox and Mackie, 1993), but this condition does not guarantee the absence of economic growth disparity among the regencies/municipalities. During 2011 – 2016, East Java has experienced between 5.42% until 6.16% of GDP growth. Those numbers are always above the average of national growth (BPS, 2019). Within the province, in 2011, the 38 regencies/municipalities experienced economic growth on average 6.1%, with the highest growth of 10.39% and the lowest growth of 2.49% for Sampang and Bojonegoro respectively. The spatial distribution of the 2011 GDP growth for all Each Java's regencies/municipalities is depicted in Figure 1. The distribution indicates a non-stability variance of growth across the province. The regions in the northwest and southwest have the highest growth with small variation, while the rest of the regions have lower growth, with a big variation. In addition to the spatial non – stability of the growth variance, during 2011 – 2016 this province also experiences an increased disparity of the economic growth across the regencies/municipalities. It is shown in the Figure 2 which depicts an upward trend of coefficient variation of GDP growth (%) for all the 38 regencies/municipalities during those years.
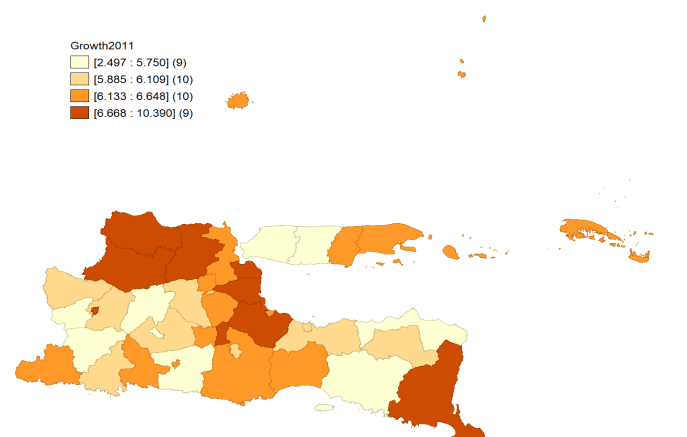

Figure 1 Spatial distribution of 2011 Growth Each Regency/Municipality in East Java
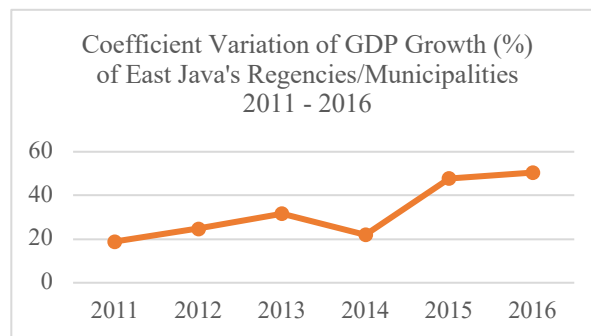
Figure 2 The trend of Coefficient Variation of GDP Growth (%) of the 38 East Java's regencies/municipalities during 2011 – 2016

In order to distribute the economic productivity more evenly across the region, the provincial government regularly updates the Regional Spatial Planning, in which the regions of the province are clustered into several development regions according to their similar geographical and the current socio-economic conditions. For each development region, one well developed central region (mostly municipality) is assigned to play its role as an engine of development for the rest of the regions in the same cluster. In this case, some growth centers are designated, and the backwash – spread mechanism is expected to reduce the economic growth disparities across regions. The most up to date spatial plan for East Java is presented in East Java's Local Regulation Number 5, 2012, about the Province Regional Spatial Planning 2011 – 2031. The spatial plan designates 8 units of the development region (*Satuan Wilayah Pengembangan*, SWP), which are shown in Figure 3. SWP 1 is the location of the capital of the province – Surabaya. The names of each SWP and their corresponding central location are depicted in Table 1. By comparing the map in Figure 1 and Figure 3, during 2011, it is obvious that there is still a discrepancy of growth among regencies/municipalities, even though they are located at the same SWP.
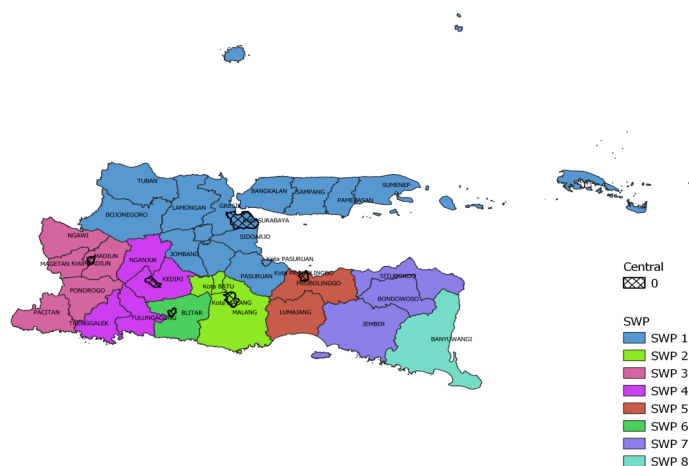
Figure 3 The division of Eight Development Region Units (SWP) for East Java's Regencies/Municipalities

Table 1 The Name of Each SWP and its central

Name of SWP	1	2	3	4	5	6	7	8
	Germakertosusila Plus	Malang Raya	Madiun	Kediri	Probolinggo - Lumajang	Blitar	Jember	Banyuwangi
Central	Surabaya Municipality	Malang Municipality	Madiun Municipality	Kediri Municipality	Probolinggo Municipality	Blitar Muncipality	central of Jember	central Banyuwangi

The effectiveness of the implemented East Java's regional spatial plan in terms of the spatial growth disparities needs to be evaluated, which is the focus of this study. Based on the 2011 – 2016 GDP growth of the 38 regencies/municipalities of East Java, this study is aimed at identifying the phase of the growth in the province as the consequence of the designated growth pole/central for each SWP. Is it still in the initial stage in which the growth of the central is dominant, leading to the backwash effect? Or the regions have already in the later stage of the growth with more spread effect leading to a more equal growth across the region? Those questions are derived based on the following assumption:

- The growth in one regency/municipality is the product of the economic interaction with the nearby regencies/municipalities
- The interaction of the economic growth differs in nature and direction for each regency/municipality
- The interaction has a dynamic nature, it evolves over time.
- The role of growth centers to reduce the growth disparity also evolves over time.

To answer those questions, this study does not take an inferential approach (for the causal effect relationship). It takes the advantage of the geographical information of the available data and uses the tools in the Exploratory Spatial Data Analysis (ESDA). Analysis regarding the spatial interaction (spatial clusters) and the dominant effect in terms of location(s) with atypical growth (spatial outliers) and their dynamics, can be done within the context of exploratory spatial data analysis (ESDA) of the economic growth variable for the region under study over a period of time. ESDA is used as the second-best option to model the spillover effects without defining a specific causal effect relation. Moreover, for every tool in ESDA, it is possible to provide visualization of the result, in the form of graphic and map. The visualization the disparity and possible growth interaction is one aspect which has been fully explored by the available similar studies (Resosudarmo and Vidyattama, 2006; Hill, Resosudarmo and Vidyattama, 2009). Ying (2000) applies the technique to prove the existence of the trickle-down effect in the Chinese economy during the reform era (1978 – 1994). Celebioglu & Dall'erba (2010) apply ESDA to investigate the inequalities of the growth across 76 Turkish regions over 1995 – 2001. ESDA is also implemented in some studies (Ertur and Le Gallo, 2003; Dall'Erba, 2005) to explore the spatial distribution of the European region's per capita GDP.

1.2. Review on Economic Growth Theory

Economic growth is an increase in the production of economic goods and services, within a certain period. Theories about economic growth have evolved over the decades. The growth Solow model is the supporter of the neoclassical theory, in which the growth depends on capital and labor with diminishing returns. In the absence of technological progress, which is exogenous, the increase in capital and/or labor no longer increases the economic output. The Romer – Lucas endogenous growth theory "endogenizes" the exogenous factor from the growth model and considers that growth is an endogenous process. In this case, technological progress is assumed as an accumulation of human capital investment. This technological progress leads to more efficient utilization of capital and labor, such that the growth will be maintained.

Both theories have not considered the role of location or space in shaping economic growth. The importance of location is formally adapted by Fujita and Krugman (2004) in the New Economic Geography (NEG). In this theory, the formation of cities, the emergence of the industrial district, the existence of regional disparities or the emergence of core-periphery structure, are considered as the accumulation of the centripetal forces that pull economic activity in a certain location, and the centrifugal forces that push it apart (Fujita and Krugman, 2004). It theoretically explains how the geographical structure of an economy is shaped by the tug of war between those two forces. The concepts, tools and impacts of economic integration employed by NEG actually have been acknowledged before, such as growth pole theory by Perroux (1950) or the spread – polarization concept by Myrdal (1957) and Hirschmann (1966). They are both derived to capture the spatial uneven development process. The growth pole theory is introduced by Perroux (1950). It is proposed by observing the fact that not all business units can promote development. A unit that is capable of being the engine of development of its nearby units is designated as an economic pole of growth. The unit can serve its function well if it is in the most profitable location. According to Myrdal (1957) distance to market and basic input is one of the determinants of profit. Therefore, location defines profit and regional inequalities are the product of business location selection. Once the selected location is developed, it grows and interacts with its nearby location. The interaction is defined by Myrdal (1957)

as a cumulative causation process. The process produces the "backwash effects" on the less developed location due to the mobility of its labor and capital to the growth pole. Therefore, the growth of the pole occurs at the loss of other locations. The pole serves as the polar of the economic agglomeration for the surrounding less developed locations. Hirschmann (1966) defines the resulting spatial pattern as a core-periphery pattern. He also asserts that even though initially the concentration of economic activities creates polarization effects and increases economic disparities between the core and periphery, the benefits will eventually spread to the peripheral locations with the growth of the economy. It is possible that in the long term the gap of the growth will be smaller.

2. Method

2.1. Data

This study uses regency/municipality – level of yearly GDP growth for all 38 regencies/municipalities in the province over 2011 – 2016, from BPS (*Badan Pusat Statistik*) (2017). All data are expressed in 2016 constant price.

2.2. Some Tools in Exploratory Spatial Data Analysis (ESDA)

This study utilizes some tools of ESDA, which are defined in Anselin (1999):
- to visualize the spatial distribution of the economic growth,
- to measure the magnitude of the growth interaction between regencies/municipalities,
- to visualize and measure the magnitude of the growth interaction between each growth center and its surrounding regencies/municipalities.

Each analysis is applied for every 2011 – 2016 data. The use of several years data enables this study to present the dynamic of the growth among the regions in this province. The results are combined to identify the phase of the growth, as the consequence of the designated growth center of each SWP.

Anselin (1999) broadly categorizes the ESDA techniques into a geostatistical perspective and a lattice perspective. The first one deals with the spatial observations as a sample of points from a continuous surface, whereas the latter deals with spatial locations as areal (lattice) units. Both are commonly applied in physical sciences and social sciences, respectively. This study mainly uses the latter perspective.

An essential mean to define the spatial arrangement of the lattice data is a spatial weight matrix $\boldsymbol{W}$. It is used in any statistical test of spatial association or in every spatial model. When there are n locations or spatial units, the dimension of $\boldsymbol{W}$ will be $n \times n$ with each element $w_{ij}, i, j = 1, \dots, n$ is defined as:

$$w_{ij}^* = \begin{cases} 1 \; if \; j \in N(i) \\ 0, otherwise \end{cases}, \text{ for } i \neq j \text{ and } w_{ij}^* = 0 \text{ for } i = j, \; w_{ij} = \frac{w_{ij}^*}{\sum_j w_{ij}^*} \qquad (1)$$

$N(i)$ is the set of neighbors of location i. By formulation in (1), the matrix is row – standardized. Arbia (2014) mentions that there are various concepts to define the neighborhood set. It can be one of the following:
- The adjacency between two administrative units (lattices). The spatial weight matrix defined from this concept is called the contiguity matrix.
- The maximum distance between location i and location j, d_{ij}. The two locations are neighbors if $d_{ij} < d_{max}$
- The k nearest neighbors' criterion.

When the k nearest neighbors criterion is used, following the formulation in Ertur & Le Gallo (2003) the element of the matrix defined in (1) can be represented as:

$$w_{ij}^* = \begin{cases} 1 \; if \; d_{ij} \leq d_i(k) \\ 0, if \; d_{ij} > d_i(k) \end{cases}, \text{ for } i \neq j \text{ and } w_{ij}^* = 0 \text{ for } i = j, w_{ij} = \frac{w_{ij}^*(k)}{\sum_j w_{ij}^*(k)} \qquad (2)$$

in which $d_i(k)$ is the kth smallest distance between location i and location j such that each location i has k neighbors, $k = 1,2,3, ...$ This approach is preferable than the adjacency approach when one (or some) of the administrative units is isolated (e.g. separated island) such that it does not share borders with any other administrative units. It is preferred in this case to avoid having a spatial weight matrix with one (or some) row with all zero elements.

The spatial weight matrix W is used to construct a weighted average of the variable value understudy, observed at the neighbors of a location. Given Y as an $n \times 1$ vector of variable (growth of GDP in this case) of all locations $(Y_i, i = 1, \cdots, n)$, the weighted average is defined as WY. It is known as the spatial lag of Y. The appropriate concept to define W depends on the nature of the spatial interaction of the variable. For the case of East Java's economic growth, the distribution map in Figure 1 indicates that the strongest interaction occurs among the regions which share borders. But since East Java has some administrative units which belong to a separated island, the concept of k nearest neighbors is preferred than the adjacency/contiguity concept.

In ESDA, **distribution map** is used to visualize the spatial interaction of the growth and the possible spatial growth disparities. It is then complemented with the calculation of **Global Moran's I statistic**, to measure the magnitude, to test its significance and to identify the type of global spatial interaction of the economic growth for all regencies/municipalities. The statistic is proposed by Cliff & Ord, (1981), and formally defined as:

$$I = \frac{\sum_{i=1}^{n}\sum_{j=1}^{n} w_{ij}(y_i-\bar{y})(y_j-\bar{y})}{\sum_{i=1}^{n}\sum_{j=1}^{n}(y_i-\bar{y})(y_j-\bar{y})} \qquad (3)$$

for Y_i the variable under study (e.g. the growth of regency/municipality i) $i = 1, ..., n$ for the whole study region. It measures the degree of linear association between the observed value in location i (Y_i) and its spatial lag $(\sum_{j \in N(i)} w_{ij}Y_j)$. Inference for Moran's I is based on a normal approximation, using a standardized z value of the statistic (by its mean and variance) (Anselin, 2001). A positive value of this statistic indicates that locations with similar values tend to be clustered. On the other hand, a negative value of Moran's I is an indicator that nearby locations have dissimilar values.

Local Moran statistic is used to identify the spatial interaction between each regency/municipality and its surrounding regions. The local statistic serves the same purposes as the global one, but it is more useful when the spatial interaction does not have structural stability over space, which is applied for the case of economic growth. This study focuses on the local spatial interaction of the economic growth on each of the designated growth centers. Following the global Moran's I in (2), a Local Moran's I is proposed as:

$$I_i = \frac{\sum_{j=1}^{n} w_{ij}(y_i-\bar{y})(y_j-\bar{y})}{\sum_{j=1}^{n}(y_i-\bar{y})(y_j-\bar{y})} \qquad (4)$$

It is defined as a class of local indicators of spatial association (LISA). The statistic is capable of showing the masked atypical local spatial association, which deviates from the global pattern (Ertur and Le Gallo, 2003). Anselin (1995) argues that LISA (i.e local Moran's I) must be a decomposition of the global statistic (i.e. global Moran's I). The decomposition is the contribution of each individual observation and LISA which is calculated in a location i indicates the degree of spatial association between Y_i and $Y_j, j \in N(i)$. The sum of LISAs for all locations $i = 1, ..., n$ is proportional to the corresponding global statistic of spatial association. The significance level of Local Moran's I in (4) is calculated based on a conditional permutation approach, using 1000 random permutations of each region's neighbors, following the definition in Anselin (1995). It is calculated for each region. A significant - positive local Moran's I is an indication of spatial clustering of similar values around the particular location (hot spots). It can be a location with high value surrounded by locations with also high values of Y (High – High, HH) or the other way around (Low – Low, LL). The local Moran's I can also detect spatial outliers that are characterized by a negative – significant value of the statistic. The negative value of I_i indicates that Y_i is much higher or lower than the average of $Y_j, j \in N(i)$. Anselin (1999) describes the situation as High – Low HL or Low – High LH respectively.

The Moran scatterplot is used to visualize the type (positive or negative) of local spatial interaction for each regency/municipality. It is a scatterplot between one location standardized value of the variable under study (e.g. GDP growth) and the average value of the standardized variable of its neighbors. A combination of the magnitude/the significance of local Moran's I statistic and the type of interaction identified in the Moran scatterplot indicates the dominant growth effect created by the growth centers and the possible stage of the growth. Anselin (1999) proposes the use of a map of significant local Moran's I as a complement for the Moran scatterplot. The map assigns different pattern/color for each regency/municipality, which depends on the type of local association of the economic growth of each location and the significance of the local interaction. Mainly there will be four patterns/colors which correspond to each type of significant local association, namely HH, LL, LH, and HL. There will be no color/pattern assigned for a location with any type of insignificant local association. A combination of both graphs, the Moran scatterplot and the map of significant local Moran's, is a mean to interpret the possible spatial clusters (HH an LL) or spatial outliers (LH or HL).

3. Results

3.1. The Spatial Distribution of Yearly GDP Growth 2011 – 2016

Within the context of the spread – backwash effect of the growth pole theory, a tool to visualize the spatial distribution of regional GDP growth is a choropleth map. It is a preliminary analysis, to indicate possible spatial interaction of the growth among the nearby regions or possible spatial growth disparities across regions. The GDP growth of 38 East Java's regencies/municipalities are classified into 4 classes, using first, second and third quartiles as the class dividers. The classification is the basis for producing the map which represents the GDP through various shading pattern on the geographical areas. Each class has a different shade. The darkest shade corresponds to the class with higher GDP growth. The shade goes lighter for the classes with lower value GDP growth. The map displays the possible clusters of regencies/municipalities with similar GDP growth. The obvious clusters indicate a positive spatial interaction among nearby regencies/municipalities. The choropleth map of yearly GDP growth is made (2011 – 2016). The dynamic of the spatial distribution and spatial interaction can be captured by comparing each map. These yearly GDP growth maps are presented in Figure 1 (only for 2011 growth) and Figure 4 (for 2012 – 2016 growth).
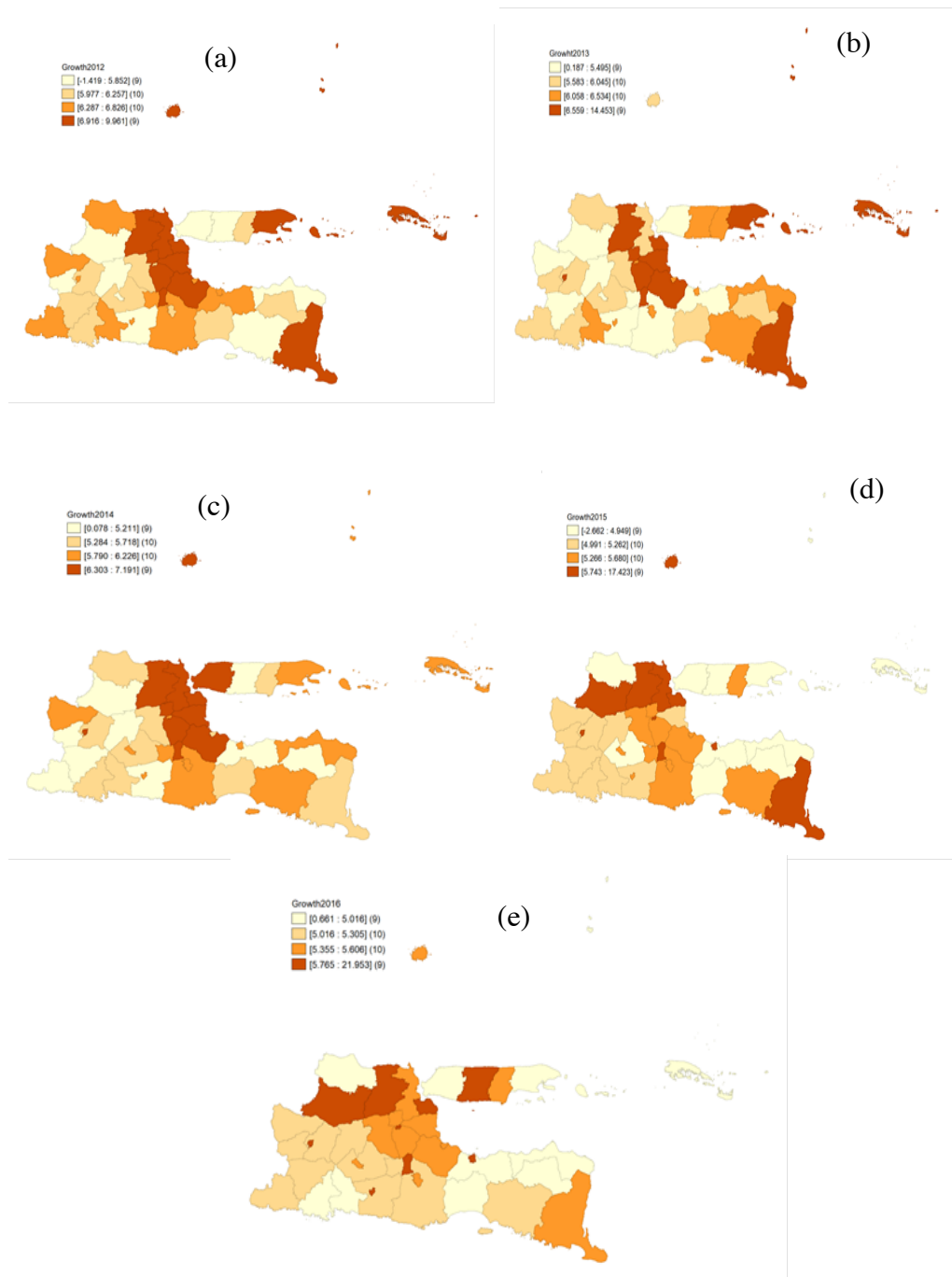
Figure 4 Distribution of Growth Each Regency/Municipality in East Java, (a) 2012 growth, (b) 2013 growth, (c) 2014 growth, (d) 2015 growth, (e) 2016 growth

3.2. *The Measure of the Magnitude of the Growth Interaction between East Java's Regencies/Municipalities*

Global Moran's I is the tool in ESDA which is useful for this purpose. It calculates the interaction, in terms of correlation, between the growth in a regency/municipality with the average growth of its neighboring regencies/municipalities. The calculation of Global Moran's I in (3) requires a definition of a spatial weight matrix (W). Using the concept of k nearest neighbors for East Java's case, some spatial weight matrices W_2, W_3, W_4, and W_5 are defined respectively to define 2, 3, 4 and 5 nearest neighbors. The global Moran's I is calculated for each yearly GDP growth for 2 until 5 nearest neighbors such that for each year GDP growth there are 4 statistics. Their values and significances are depicted in Table 2. The result shows that the most significant interaction occurs for the 2011 GDP growth among 2 nearest regencies/municipalities. The strongest spatial interaction among 2

nearest neighbors (the smallest p value) also occurs for 2013, 2015 and 2016 economic growth, even though the interaction is not as significant as the interaction of the 2011 growth. Therefore, this study conducts further analysis using the concept of 2 nearest neighbors. Using the 2 nearest neighbors' criterion, the dynamic of global spatial autocorrelation of the economic growth over 2011 – 2016 can be observed. The evolution of global Moran's I of GDP growth over those years is depicted in Figure 5. The graph in Figure 5 indicates that over the years there is no apparent global pattern in the interaction of the growth.

Table 2 The Moran's I of yearly Growth of GDP (2011 – 2016) for each k nearest neighbors ($k = 2,3,4,5$) and its significance

		k nearest neighbors							
	Year	2		3		4		5	
		Moran's I	p value	Moran's I	p value	Moran's I	p value	Moran's I	p value
Growth of GDP	2011	0.221	0.021*	0.099	0.098	0.079	0.103	0.061	0.126
	2012	-0.040	0.397	-0.066	0.277	-0.064	0.26	-0.042	0.36
	2013	-0.044	0.368	-0.0334	0.439	-0.022	0.491	-0.017	0.475
	2014	-0.028	0.471	-0.0129	0.398	-0.025	0.455	-0.003	0.342
	2015	0.068	0.117	0.0143	0.337	0.033	0.195	0.026	0.213
	2016	-0.048	0.204	-0.033	0.308	-0.025	0.389	-0.024	0.392

(*) for significant Moran's I, yellow highlight for the smallest p value of the statistics within the same year
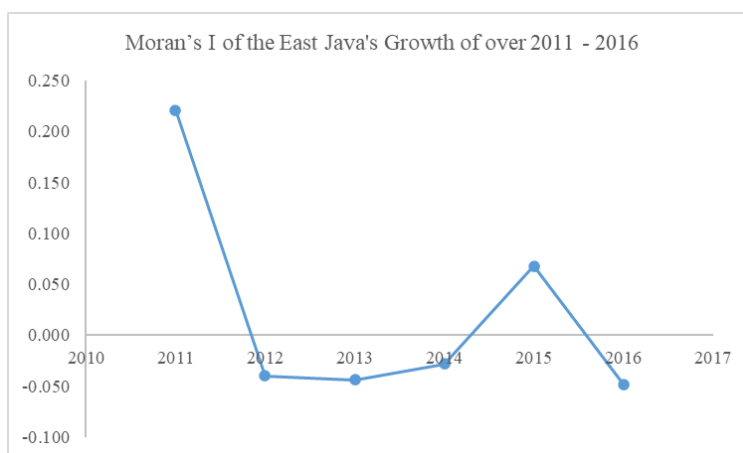
Figure 5 The dynamic of Global Moran's I of the East Java's Growth over 2011 – 2016

3.3. The Visualization of the Local Interaction

A map of the distribution of local GDP growth interaction (the local Moran's I), of each East Java's regency/municipality, can be made to visualize the pattern of the local interaction. To identify the sign, the type, and the significance of the statistic, especially for each growth center, the map is combined with the Moran scatterplot. Each dark blue dot in the presented Moran scatterplots represents a pair of standardized growth and its spatial lag of each growth center. The distribution maps of local Moran's I and the Moran scatterplot for the yearly GDP over 2011 – 2016 are respectively presented in Figure 6 until Figure 11.

3.4. The Measure of the Magnitude of the Growth Interaction between Each Growth Center and Its Surrounding Regencies/Municipalities in East Java

It corresponds to the local spatial autocorrelation of the GDP growth between each growth center and its surrounding regencies/municipalities. This study uses the local Moran's I as the measure of local spatial autocorrelation. The analysis is conducted for each yearly GDP growth (2011 – 2016). It is done by observing each map in Figure 6 until Figure 11 for each corresponding year, focusing on the sign, the type, and the

significance of the local Moran's I of the GDP growth between each growth central and its surrounding. The result of the analysis is summarized in Table 3. They provide some information regarding the role of each growth pole in supporting the growth of its surroundings.

Table 3 The sign, the type and the significance of local Moran's I of East Java's GDP growth of each growth center over 2011 – 2016

SWP	GROWTH CENTER	Local Moran's I 2011		Local Moran's I 2012		Local Moran's I 2013		Local Moran's I 2014		Local Moran's I 2015		Local Moran's I 2016	
		SIGN	TYPE	SIGN	TYPE	SIGN	TYPE	SIGN	TYPE	SIGN	TYPE	SIGN	TYPE
1	Surabaya Municipality	-	HL	-	HL	-	HL	+ (**)	**HH**	- (**)	**HL**	- (**)	**HL**
2	Malang Municipality	-	LH	+	HH	+	HH	+	HH	+	HH	-	HL
3	Madiun Muncipality	-	HL	-	HL	-	HL	-	HL	-	HL	-	HL
4	Kediri Municipalitiy	+	LL	+	LL	+	LL	-	HL	-	HL	+	HH
5	Probolinggo Municipality	+	LL	+	HH	-	HL	-	HL	-	HL	-	HL
6	Blitar Municipality	-	HL	-	HL	-	HL	-	HL	-	HL	-	HL
7	Jember Regency	-	LH	-	LH	-	HL	-	HL	-	HL	+	LL
8	Banyuwangi Regency	-	HL	-	HL	-	HL	+	HH	-	HL	+	LL

(**) the local Moran's I is significant at $\alpha = 0.05$

4. Discussion

Before discussing more detail regarding the phase of the growth in East Java, there are some findings based on the yearly GDP growth maps in Figure 1 (for 2011 growth) and Figure 3 (for 2012 – 2016 growth) which reveal the general conditions of the growth in this province. The first finding is that Surabaya as the central of SWP 1 as well as the capital city of the province has always experienced high economic growth over the observed periods. The result is not surprising since it is designated to be the engine of development, not only for the regions within SWP 1 but also for other regencies/municipalities across the province. The second one is that during the observed years there always have been apparent clusters of regencies/municipalities according to their economic growth. It is an indication of economic interaction among the nearby regencies/municipalities. The last finding is about the dynamic nature of the growth. Initially, most regencies/municipalities from SWP 1 belong to the highest class of economic growth. Over the years the highest growth shifts to the other SWPs in the proximity of SWP 1.
Those findings give preliminary insight regarding the role of the growth pole in spreading the economic growth to the surrounding regions. The distribution maps of the growth only confirm the spatial interaction of the economic growth and the role of Surabaya as the capital city of the province. The maps do not give adequate information regarding the role of the other growth centers in supporting the economic growth of their respective surrounding regions. This study uses a quantitative approach to obtain more detail regarding the role of other centers, and the stage of spread – backwash effect of East Java's economic growth. Which leads to the interpretation of the Global Moran's I and the local Moran's I of the GDP growth among the regencies/municipalities over the observed years.
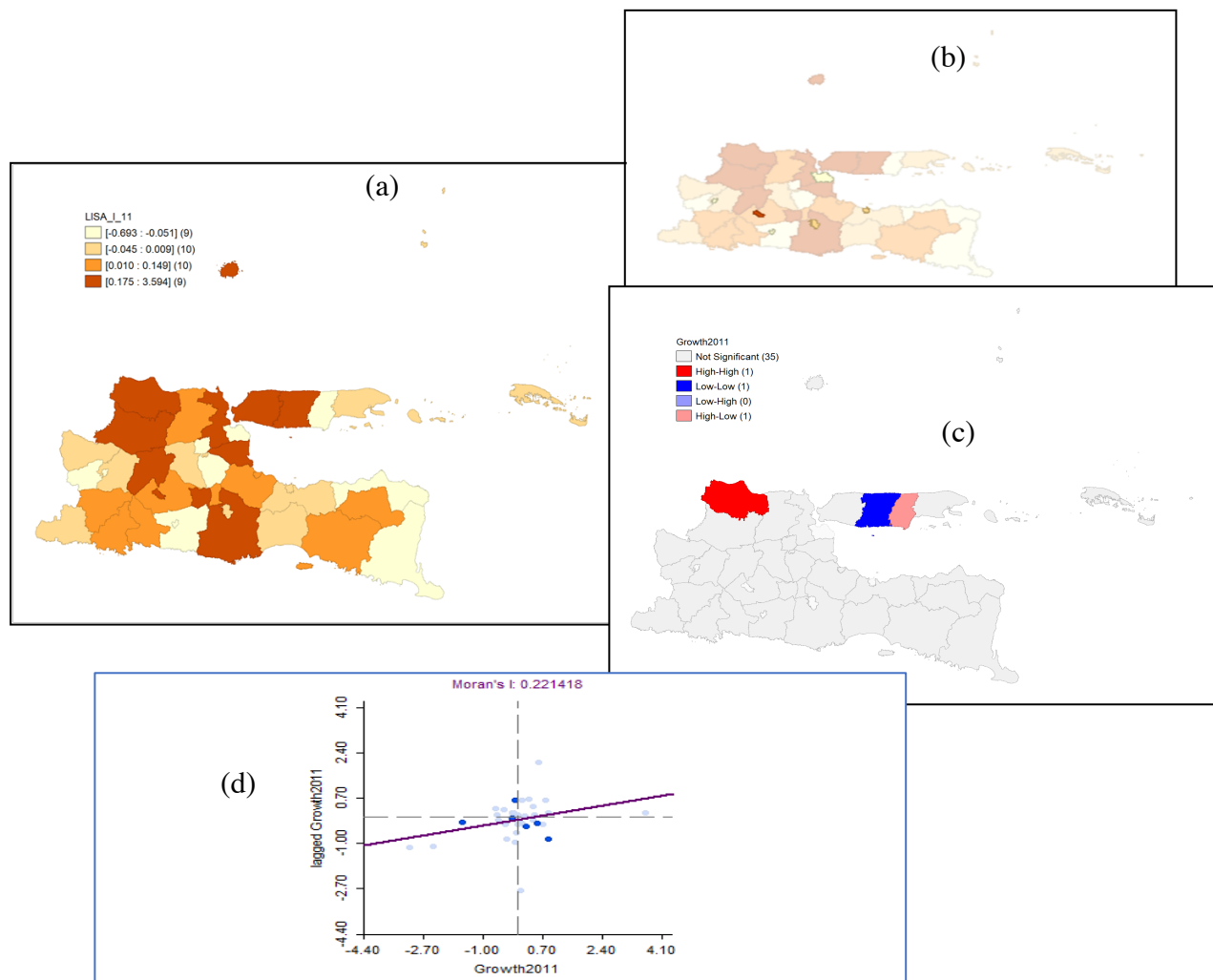
Figure 6 (a) The Distribution Map of Local Moran's I for East Java's 2011 Growth, (b) The value of Local Moran's I for all Growth Poles' 2011 Growth, (c) The map of significant local Moran's I ($\alpha = 0.05$), (d) Moran Scatterplot, for East Java's 2011 Growth

By observing the plot of global Moran's I of the yearly growth (2011 – 2016) in Figure 4, there is no pattern of the global growth interaction. The most possible explanation for this situation is that the direction of the spatial interaction of the GDP growth varies from one regency/municipality to another. The GDP growth in one regency/municipality might positively trigger the growth in its surroundings, while the GDP growth in another one can slow down (negatively affect) the growth of its surroundings. It happens because each regency/municipality has a different role in East Java's development plan. In this case, the aggregate of positive and negative effects leads to a non-significant global effect. Therefore, spatial interaction of the economic growth at the local scale must be carried out. The character of the GDP growth will be discussed for each year based on the Local Moran's I. The local Moran's will be presented in the form of distribution map, and the corresponding Moran Scatterplot is used to visualize the type of local spatial interaction of the growth for each regency/municipality.

4.1. The 2011 Economic Growth

The distribution map of local Moran's I for 2011 economic growth is depicted in Figure 6(a). Clusters of regencies/municipalities with strong positive local spatial interaction emerged mostly in SWP 1. It is the SWP where Surabaya plays its role as the growth center as well as the capital of the province. Focusing the attention only on the growth centers, the map on Figure 6(b) shows that, there are two growth centers with positive local Moran's I. Combining with the map in Figure 6(c), it is revealed that all growth poles have insignificant local Moran's I. But the information regarding the type of interaction occurs in each growth centers will be useful to

identify the phase of spread – backwash effect of the growth. The type of interaction can be revealed by observing the corresponding Moran scatterplot, which is depicted in Figure 6(d), focusing on the dark blue dots. It is mentioned earlier that the dark blue dots correspond to the nature of local spatial autocorrelation between the GDP growth in the growth centers and their corresponding neighboring regencies/municipalities. Table 3 provides a summary regarding the sign, the type and the significance of local spatial interaction of each growth center for 2011. All growth centers experience insignificant local spatial interaction of the growth. The two growth centers with positive local Moran's I are Kediri (SWP 4) and Probolinggo (SWP 5). The dark blue dots which correspond to those growth centers in the Moran scatterplot, fall in quadrant III. It is the quadrant for the LL type of interaction. During this year, even though the interactions are not significant, Kediri and Probolinggo which experienced low growth are surrounded by low growth regencies/municipalities. The remaining growth centers have negative local Moran's I which can fall in quadrant II (LH) or quadrant IV (HL). Malang (SWP 2) and Jember regency (SWP 7) are the growth centers with LH type of interaction. They experienced low economic growth but are surrounded by high growth regencies/municipalities. It can be inferred that during 2011, the growth centers with the insignificant LL and LH types of spatial interaction (Kediri, Probolinggo, Malang, and Jember) still have quite low economic growth such that they could not play their roles in creating the spread – backwash effect to their surrounding regencies/municipalities. The rest of growth centers have insignificant HL type of interaction, including Surabaya. It implies that the high economic growth in each of those growth poles during 2011 is still in the early stage, in which they start to create the backwash effect on its surroundings, even though the effect is not significant.

By observing Figure 6(c) there are some non-growth central regencies/municipalities with significant local Moran's I (the red, blue and pink shaded regencies/munipalities). They are Tuban (HH), Sampang (LL) and Pamekasan (HL). Both are in SWP 1, with Surabaya as their growth center. Both regencies are not the direct neighbors of Surabaya. Furthermore, the earlier analysis indicates that the Surabaya's growth is not strong enough to promote the growth of its neighbors, such that its high growth does not reach Tuban, Sampang and Pamekasan. During 2011 Tuban has experienced high GDP growth which is significantly in line with the high GDP growth of its neighbors. This high growth is mostly due to its local economic condition. Even though Tuban does not have a role as growth central, its economic growth is strong enough to promote the growth of its surroundings. The opposite holds for Sampang. It has low GDP growth, which is mostly due to its local economic condition. It significantly interacts with its neighbors, such that they also suffer from low GDP growth. A different situation is experienced by Pamekasan. It has high GDP growth, the behavior which is completely different from the low growth of its surrounding. A similar reason applies to Pamekasan. Its high growth is also due to its local economic condition.
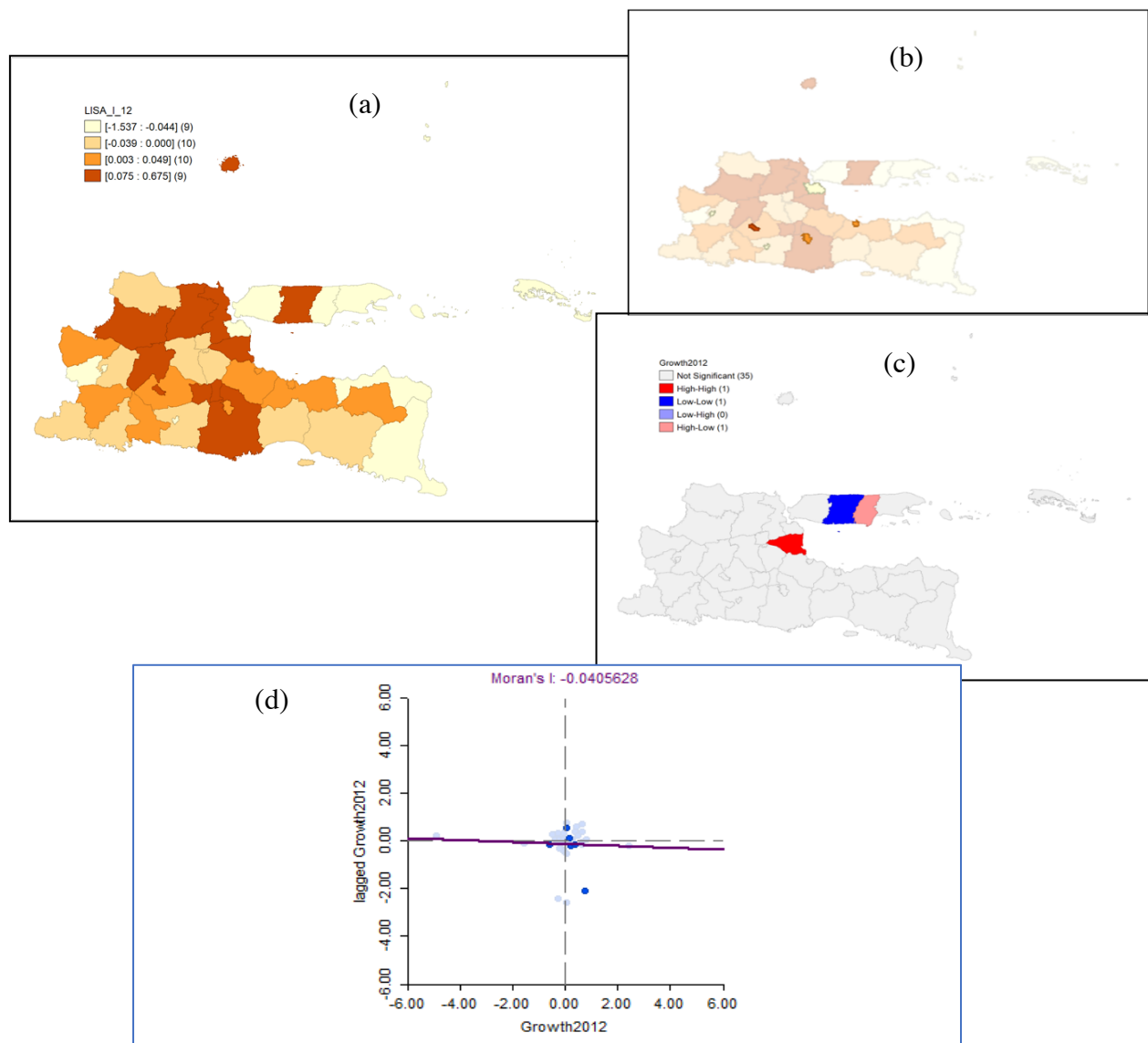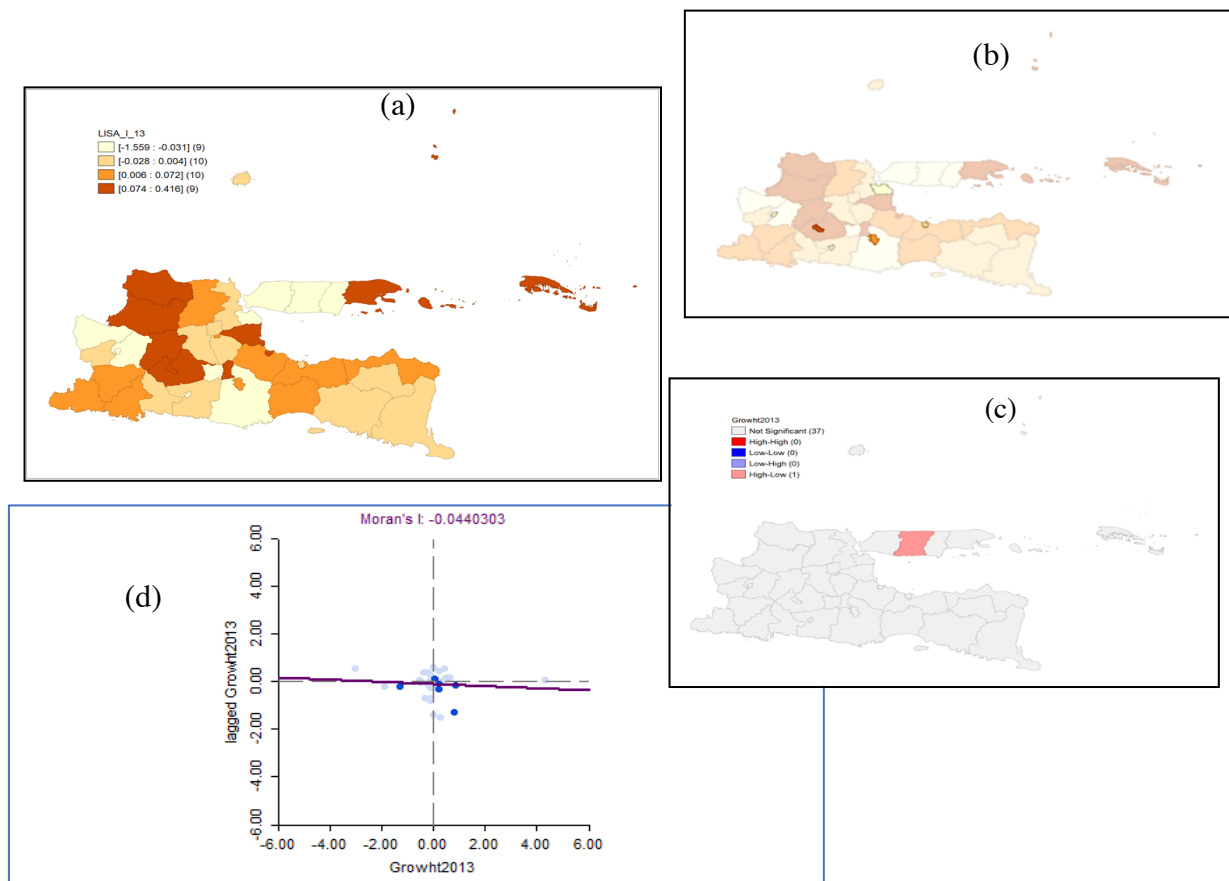
Figure 7 (a) The Distribution Map of Local Moran's I for East Java's 2012 Growth, (b) The value of Local Moran's I for all Growth Poles' 2012 Growth, (c) The map of significant local Moran's I ($\alpha = 0.05$), (d) Moran Scatterplot, for East Java's 2012 Growth

4.2. The 2012 Economic Growth

A similar situation applies to the 2012 economic growth. The map in Figure 7(a) shows clusters of regencies/municipalities with strong positive local Moran's I emerge mostly in SWP 1 and SWP 2. The map in Figure 7(b) reveals that all growth centers still do not have significant local Moran's I. By comparing the result for 2011 and 2012 in Table 3, the dynamic of the local spatial interaction is shown by the change of the type of local spatial interaction of GDP growth in Malang and Probolinggo. Based on the nature of the dark blue dots in the Moran scatterplot in Figure 7(d) which correspond to Malang and Probolinggo, the 2012 GDP growth of those centers are considered high. The high growth in those regions are in line with the high growth of its surrounding regions (HH). For Malang, it is the opposite of what happens in 2011, in which the GDP growth of Malang is lower than the higher growth of its surroundings (LH). On the other hand, in 2011, Probolinggo and its surrounding regions have experienced low GDP growth (LL). Even though the interaction is still not significant, this dynamic indicates that during 2012 Malang's and Probolinggo's economic productivity is getting stronger. This situation is expected to support their role in promoting the economic growth of their neighbors. In a one-year time span, these two growth centers start to spread their effect. The remaining growth centers, however, are still in their 2011 type of local spatial interaction (see Table 3).

The map in Figure 7(c) indicates that in 2012, there are some changes in the pattern of significant local Moran's I. There are still three regencies with significant local Moran's I. The first two are Sampang and Pamekasan. Both have the same type of local Moran's I as the type in 2011, LL and HL, respectively. The third regency, however, changes from Tuban into Sidoarjo. The situation in the first two non-growth centers is due to their local economic characteristic. Sidoarjo which shares borders with Surabaya, on the other hand, has experienced HH type of local spatial interaction. Its proximity to Surabaya indicates that its high GDP growth is mostly due to the spread effect of Surabaya's economic growth.

Generally, in 2012, each of the growth centers in East Java has experienced a different phase of growth. Some of them are still in the early stage, in which they start to create the backwash effect on its surroundings (i.e. Madiun, Blitar, and Banyuwangi). But there are some growth centers (i.e. Malang, Probolinggo, Surabaya) which are already in the later stage of the growth, in which they already have spread their growth to their surrounding regencies/municipalities.
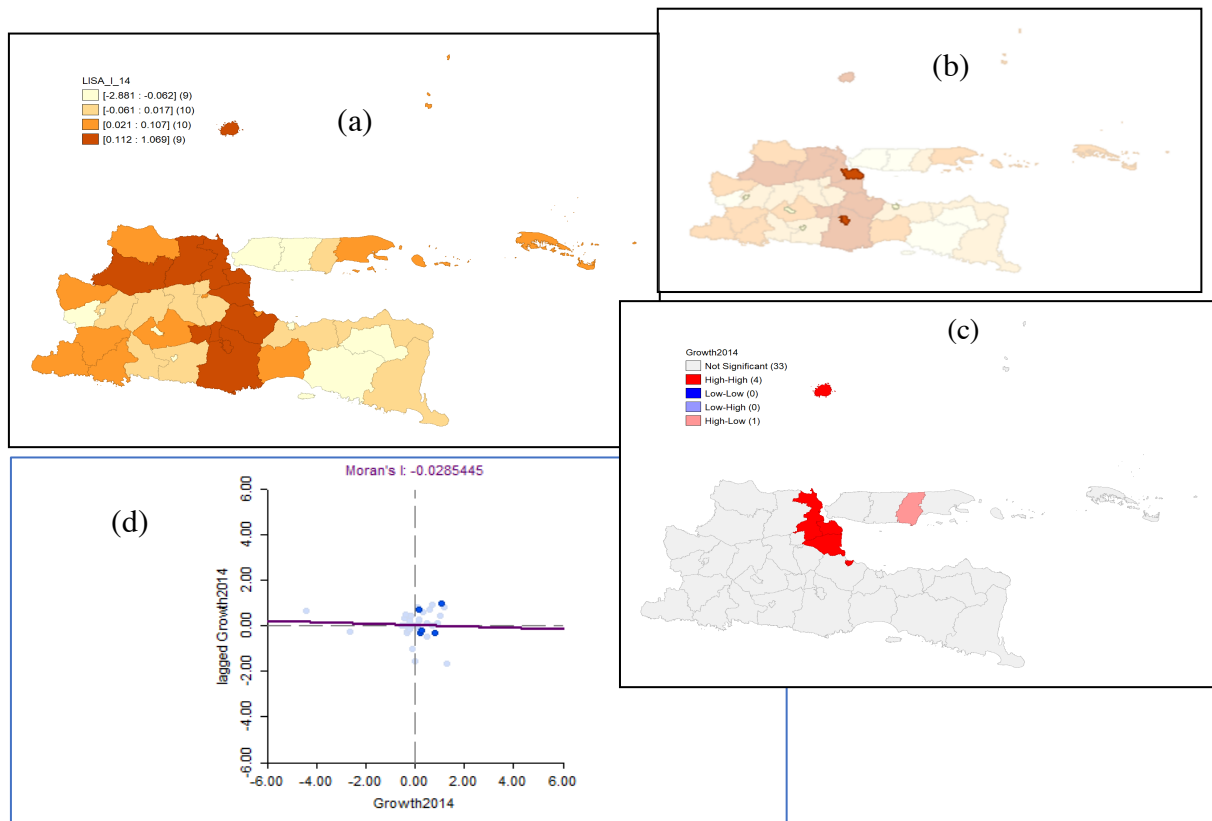

Figure 8 (a) The Distribution Map of Local Moran's I for East Java's 2013 Growth, (b) The value of Local Moran's I for all Growth Poles' 2013 Growth, (c) The map of significant local Moran's I ($\alpha = 0.05$) (d) Moran Scatterplot, for East Java's 2013 Growth

4.3. The 2013 Economic Growth

The general pattern of local spatial interaction of 2013 East Java's economic growth is depicted in Figure 8(a). There is slight change of pattern, but still, the strongest local spatial interaction emerges in SWP 1 and SWP 2. Combining with the map which focuses on the growth centers in Figure 8(b), the local Moran statistics of those centers stay insignificance. The Moran scatterplot in Figure 8(d) and the summary of the result in Table 3 indicate that during this year, Probolinggo and Jember experience some changes of their respective local spatial interaction. The local spatial interaction of the growth of Probolinggo changes from HH in 2012 into HL in 2013. In this case, Probolinggo can maintain its high economic growth within those years, and it starts to absorb the economic activity of its neighbors, even though the pull (backwash effect) is not significant enough. Therefore, the insignificant spread effect it produces in 2012 can easily turn into the backwash effect in 2013. A more drastic change happens

in Jember. Its local spatial interaction of the growth has changed from LH to HL. Jember has experienced much stronger economic growth, such that it can divert the effect to its surrounding regions.

The map in Figure 8(b) reveals that only Sampang (in SWP 1), the non-growth center which has significant local spatial interaction of its economic growth. The type of interaction has changed from LL in 2012 into HL in 2013. Since Sampang is not the direct neighbors of Surabaya, therefore the change of its GDP from low to high is mostly due to its own local condition. Generally in 2013, most of the growth centers are still in the stage of creating a backwash effect on their neighbors.

Figure 9 (a) The Distribution Map of Local Moran's I for East Java's 2014 Growth, (b) The value of Local Moran's I for all Growth Poles' 2014 Growth, (c) The map of significant local Moran's I ($\alpha = 0.05$), (d) Moran Scatterplot, for East Java's 2014 Growth

4.4. The 2014 Economic Growth

The pattern of local spatial interaction of 2014 East Java's economic growth is depicted in Figure 9(a). Most of the regencies/municipalities in SWP 1 and 2 have the strongest positive local spatial interaction. Focusing on the growth centers, the map in Figure 9(b) indicates that the local Moran's I of those centers stay insignificance. The dark blue dots in the Moran scatterplot in Figure 9(d) and the summary of the result in Table 3 show that compares to the situation in 2013, during 2014 there are three growth centers that change their type of local spatial interaction. Surabaya and Banyuwangi change from HL type of local spatial interaction into HH type of local spatial interaction. Banyuwangi stays to have insignificant local spatial interaction, but Surabaya changes its status from insignificant into significant local spatial interaction. The third growth center which changes the status is Kediri. It shifts from LL to HL, even though it stays insignificant. Those changes indicate that some of the growth centers start to shift the stage from creating the backwash effect into the spread effect. Especially Surabaya as the capital city of the province, its high GDP growth significantly supports the high GDP growth of its surroundings. With the change of Kediri's status, all growth centers in 2014 experience high GDP growth, which is relatively high than their respective surrounding regencies/municipalities. The higher GDP growth of Surabaya leads to higher growth of its direct neighbors, Sidoarjo and Gresik, such that both locations (Surabaya, Sidoarjo and Gresik) have significant HH type of interaction (see Figure 9(c)). Pamekasan also has a significant HL type of interaction. Since it is in SWP 1 and Surabaya creates a significant spreading effect, even though it is not Surabaya's direct neighbor, its high GDP growth in 2014 partly due to Surabaya's strong economic growth.

In general, all growth centers in 2014 have high economic growth. Most of them are still creating the backwash effect, except for Surabaya, Malang and Banyuwangi which start to spread their growth to their respective neighbors. The most significant spread effect is produced by Surabaya.

4.5. The 2015 Economic Growth

The distribution map in Figure 10(a) indicates that in 2015 there is a decrease on the number of growth centers with positive local spatial Moran LISA of GDP growth. Only Malang stays at positive HH local spatial interaction. The rest of the growth centers experience negative HL local spatial interaction. Most of them have the same condition as the condition in 2014, except for Surabaya and Banyuwangi (see Table 3 for complete comparison). The local spatial interaction of their GDP growth returns to the condition in 2013. After experiencing the HH type of interaction in 2014, in 2015 they return to the HL type of interaction. Therefore within 1-year time duration, East Java's economic growth phase changes from spread to backwash stage (again).

Figure 10(c) shows that during 2015 there are 4 regencies/municipalities which have significant local Moran's I. They are Surabaya (HL), Tuban (LH), Sampang (LL), and Pamekasan (HL). Among them, Surabaya is the only growth center. Both are in SWP 1. Even though they are not the direct neighbors of Surabaya, their current situation is partly due to the backwash effect created by Surabaya.
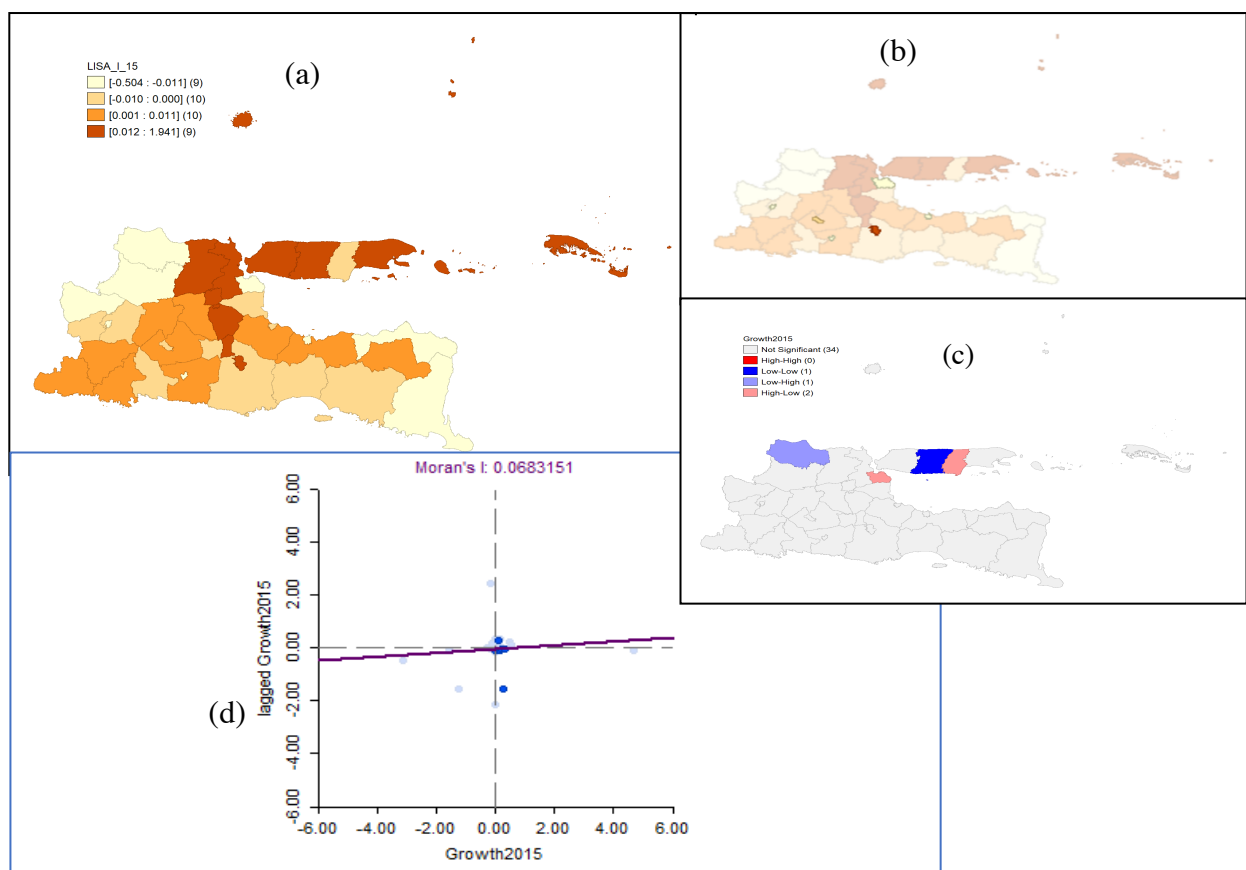

Figure 10 (a) The Distribution Map of Local Moran's I for East Java's 2015 Growth, (b) The value of Local Moran's I for all Growth Poles' 2015 Growth, (c) The map of significant local Moran's I ($\alpha = 0.05$), (d) Moran Scatterplot, for East Java's 2015 Growth

4.6. The 2016 Economic Growth

Based on the distribution map in Figure 11(a), in 2016, the clusters regencies/cities with positive local spatial interaction of GDP growth are shifted from SWP 1 to SWP 5, 6, 7 and 8. However, since the positive local Moran's I might correspond to either HH or LL, an additional tool of ESDA is needed to decide the type. The focus is limited to only the growth centers (see Figure 11(b)). Combining the map in Figure 11(b) and the Moran scatterplot in Figure 11(d), from HL type of interaction in 2015 (negative interaction), Kediri, Banyuwangi and Jember change

their type of interaction into HH, LL and LL, respectively. The rest of the growth centers still have an HL type of negative local spatial interaction (see the summary in Table 3). Among those growth centers, Surabaya is the only growth center that has significant HL type of negative local spatial interaction. Tuban and Sampang are the non-growth central with significant local spatial interaction occurs. Each has an LH and HL type of interaction, respectively. Since Surabaya creates a significant effect, the low growth in Tuban is partly due to the indirect backwash effect of Surabaya's growth, in addition to its local economic condition. On the other hand, the local economic condition of Sampang might dominate the indirect backwash effect of Surabaya, such that its GDP growth is still considered significantly high than its neighbors.

Generally in 2016, even though the local spatial interaction in each of the growth centers is not significant, the mostly HL type of interaction indicates that the economic growth in this province is in the phase of creating the backwash effect from the growth center to its surrounding. Kediri is the only growth center that tends to stimulate the high growth of its neighbors. This year, Banyuwangi and Jember do not perform high enough GDP growth, such that they fail to stimulate the growth of their respective neighbors.
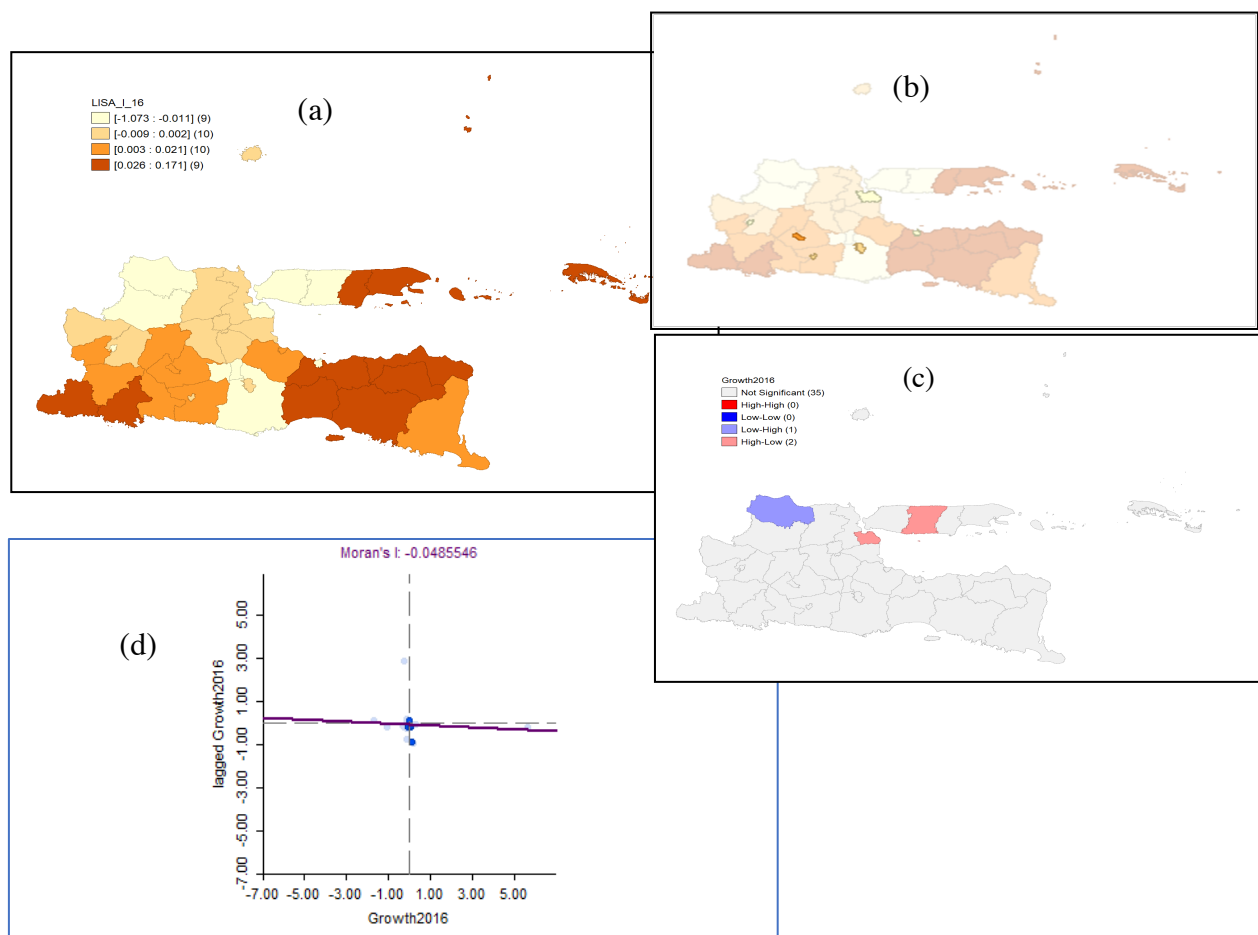

Figure 11 (a) The Distribution Map of Local Moran's I for East Java's 2016 Growth, (b) The value of Local Moran's I for all Growth Poles' 2016 Growth, (c) The map of significant local Moran's I ($\alpha = 0.05$), (d) Moran Scatterplot, for East Java's 2016 Growth

5. Conclusions

After completing the ESDA for East Java's GDP growth over 2011 – 2016, some conclusions regarding the nature and the phase of economic growth within the province can be drawn, which are related to the implemented spatial plan. The strength of the spatial interaction of the growth decreases over the year. It is an indication of the dynamic of spatial interaction, which is more apparent locally over the years. Until 2016, the regional economic growth is

still not evenly distributed. Some regencies/municipalities (mostly the growth centers) have considerably high economic growth compared to their respective neighbors. The growth of each growth centers does not significantly affect the growth of each of their neighbors, except for Surabaya. The significant effect of Surabaya is expected because it is the capital city of the province. The phase of the growth has dynamically changed. The growth centers start from mostly low GDP growth in 2011, then change slightly into higher GDP growth which partly creates backwash effect, until the growth is high enough to spread its effect in their neighbors. However, the stage of spreading the growth applies only two years after the spatial plan is implemented (in 2012). The stage of the growth, unfortunately, returns into the backwash effect – stage, and some growth centers act dominantly as the polar for their surroundings.

The results suggest that the implemented spatial plan needs to be evaluated. The growth centers, especially which are too distant from Surabaya must be provided with better infrastructure. With the improvement of better road infrastructure from the growth centers to their respective neighbors hopefully, strengthen the role of the growth centers in promoting the growth of their neighbors.

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Climate Change and Cocoa Production in Côte d'Ivoire: Should we Worry?

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Abstract

This study investigates the effects of climate change on cocoa production in Côte d'Ivoire. The data ranged from 1961 to 2016. An *ARDL* model was used to investigate short and long-run dynamics between climate variables and cocoa yield. We found that in the short run, high temperatures have negative impact on cocoa trees and rainfall has a positive impact on cocoa yield. In the long run, while increase in rainfall may negatively impact cocoa yield, increases in temperature could be beneficial to cocoa yield in the country. Given IPCC's weather predictions for the country there is need to worry.

Keywords: Climate change, Cocoa yield, Time series, Bounds tests

JEL Classification: C22, D24, O13, O55, Q15

1. Introduction

By providing 40% of the world cocoa supply, cocoa production in Côte d'Ivoire mobilizes nearly 1 million producers and provides income for more than 5 million people or about 1/5 of the Ivorian population. It is the country's largest foreign exchange provider. It accounts for around 14% of GDP and almost 10% of government tax revenue (World Bank, 2019). However, history retains that the country's economy is very sensitive to fluctuations in world cocoa prices. Indeed, the drop in coffee and cocoa prices in the 1980s led the country into a process of indebtedness causing the deterioration of its economic and financial situations. This prompted the country into the Structural Adjustment Programs (SAP) (Losch, 2000). Similarly, in June 2017 the Ivorian leadership lamented over the brutal fall in world cocoa prices by more than 40% in late 2016, negatively impacting his economy and thus reducing government budget forecasts (Conseil Café Cacao, 2017).

On the other hand, referring to the increase in cocoa production in West Africa, Steijn (2018) argues that the current pace of cocoa production is likely to slow down as cocoa trees are very sensitive to climate change and therefore, periods of drought and rainfall or excessive winds will negatively impact yields in the future. Although N'Zué (2018) argued that climate change has not yet significantly impacted the economic performance of Côte d'Ivoire and thus there was no need to worry more than necessary, some empirical studies have shown that crops (including tree crops) in many parts of the world were affected by progressive climate change, which had impacts on food supply, (Lobell et al. 2008; Läderach et al. 2010) as well as the ecosystems (Schroth et al. 2009).

The cocoa sector, which provides 14% of Côte d'Ivoire's GDP, does not remain on the fringes of these climatic impacts. Indeed, among the factors that influence the supply of cocoa, climate variables (rainfall and temperature) play a determining role. In addition, Carr and Lockwood (2011) argue that cocoa is a tree in the rainforest known for its sensitivity to drought. According to Conseil Café Cacao (2017), drier than normal conditions in the main cocoa regions over the period 2013/2014 to 2015/2016 have dampened world cocoa supply.

This downward trend in cocoa supply will continue as climatologists at the Intergovernmental Panel on Climate Change (IPCC) predict rapid and intense climate change by the end of the 21st century. For Côte d'Ivoire in particular, an average temperature increase in the order of 2°C (up to a peak of 3°C in January) and a variation in precipitation ranging from a drop of 9% to an increase of 9% are expected. These changes were reflected in the country by the recent El Niño episode which caused cocoa production to fall over the periods 2013/2014 and 2015/2016 (Conseil Café Cacao, 2017). This study therefore aims to gain a better understanding of the effects of global warming on cocoa production in Cote d'Ivoire where such studies are limited.

The rest of the paper is structured as follows: in section 2 we review the stylized facts; section 3 provides a review the literature on the impact of global warming on cocoa production; section 4 presents the method of analysis and data used. Sections 5 and 6 present a discussion of the empirical results and concluding remarks respectively.

2. Stylized Facts

Interactions between temperature and precipitation have been identified as critical determinants of cocoa viability (Läderach and al, 2013). Figure 1 below shows the trend of rainfall (mm) and cocoa crop yield (kg/ha) over the period 1960 to 2016. It indicates a high volatility of rainfall in Côte d'Ivoire, while the cocoa yield curve has generally been upward sloping.

Over the 1960-1969 decade, the wettest period, precipitation fluctuated between 1,200 mm and 1,700 mm. Cocoa yield followed an upward trend which was politically motivated. Indeed, the authorities wanted to stimulate the cultivation of cocoa as an export crop (Wessel and Foluke 2015). Over the same period, a scenario of decrease (or increase) in precipitation leading to an increase (or decrease) in cocoa yields is observed. For example, precipitation was 1,531.78 mm, 1,662.4 mm and 1,289.42 respectively in 1962, 1963 and 1964; while in these same years, cocoa yields were 397.1,393.8 and 451.5 kg / ha, respectively. Over the decade 1970-1979, the drop in precipitation was of particular importance because it did not exceed 1,200 mm. Cocoa yield evolved like a seesaw.

As for precipitation over the period 1990 to 2004, it was generally modest and fluctuated between a minimum value of 1,075 mm and a maximum value of 1,344 mm; which beneficial for cocoa farming as a rapid increase in yields was witnessed, reaching a record level in 2000 at 700 kg / ha.

Figure 1. Trend of cocoa yield (kg/ha) and precipitation (mm) in Cote d'Ivoire from 1961 to 2016.
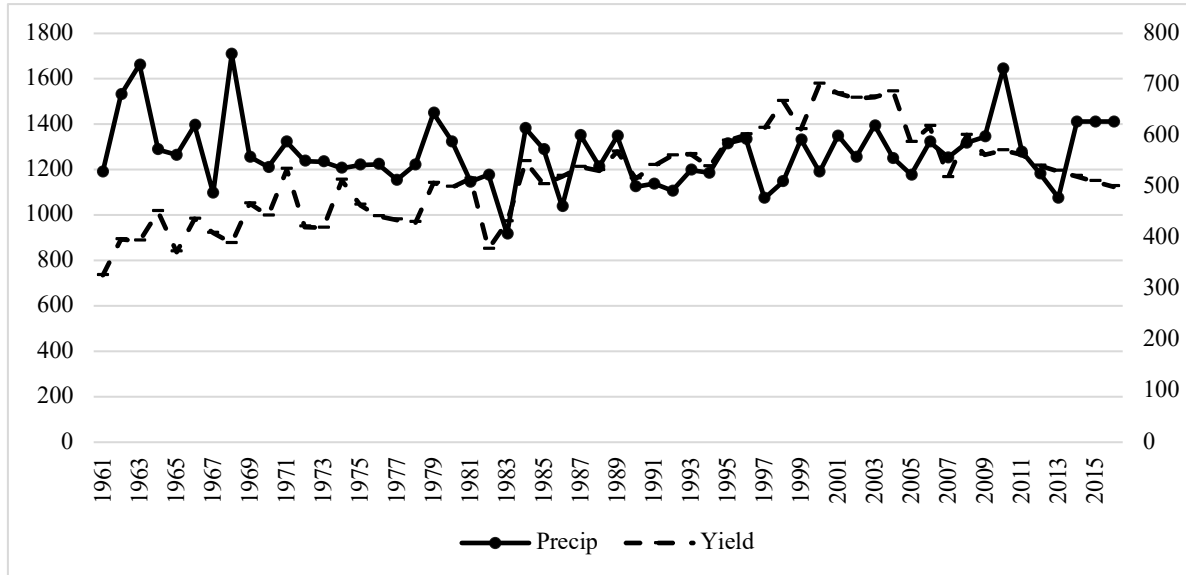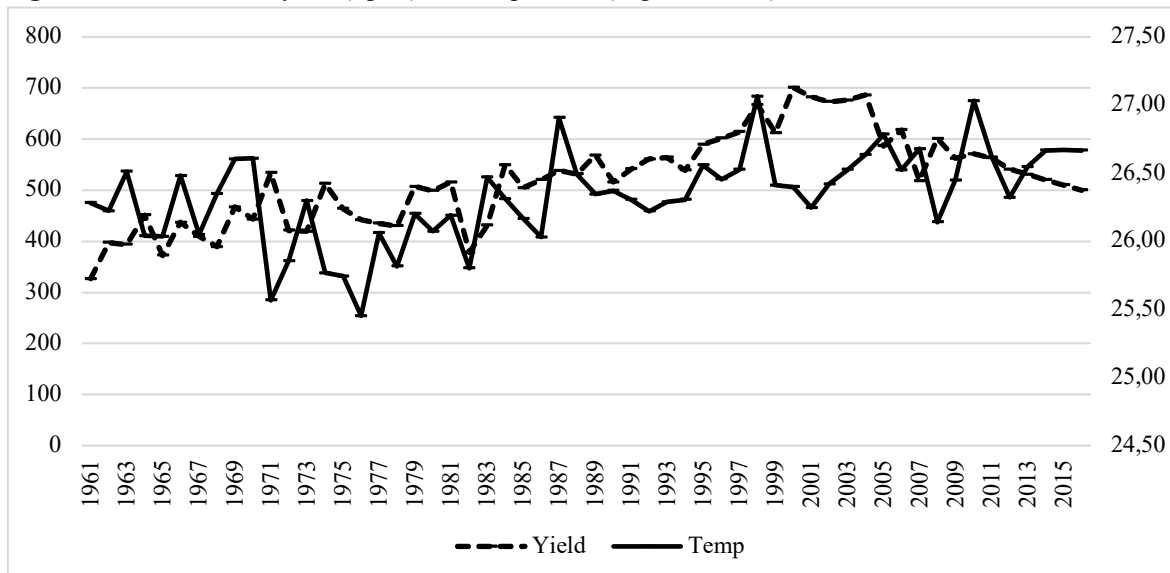

Sources: Author using data from FAOSTAT, Harris and Jones (2017).

Moreover, this peak reached by cocoa yield is also due to the use of a new improved variety of cocoa called "fast growing Mercedes cocoa" (UN-REDD, 2018). From 2005 to 2016, precipitation alternated from high to low levels. The upward trend in precipitation began in 2005 and peaked at 1,644 mm in 2010 after those in 1963 and 1968; according to climatologists, this increase is due to the El Niño episode. The downward trend started in 2011 and continued until 2013 before rising again from 2014. With regard to yield, it followed a downward trend throughout the 2005 to 2016. This phenomenon is attributable to the aging of the cocoa trees (PNUD, 2013). The Ivorian cocoa tree is known to reach its highest production at the age of 16/20 years with 631 kg/ha and then declines to an average production of 244 kg/ha at the age of 36/40 years.

In Figure 2 we consider temperature (°C) and cocoa yield. Both curves are positively sloped. From 1960 to 1970, we observed that temperature stood on average at 26.20 °C with a minimum of 26.03 °C in 1965 and a maximum of 26.6 °C in 1969. Over the period ranging from 1975 to 1989 we observed that after reaching its lowest level in 1976 which stood at 25.45°C, the temperature rose sharply in the years after. During this period, cocoa yield fell drastically and was at its lowest level (378.2 kg/ha) since 1965.

Figure 2. Trend of cocoa yield (kg/ha) and temperature (degree Celsius) in Cote d'Ivoire from 1961 to 2016.
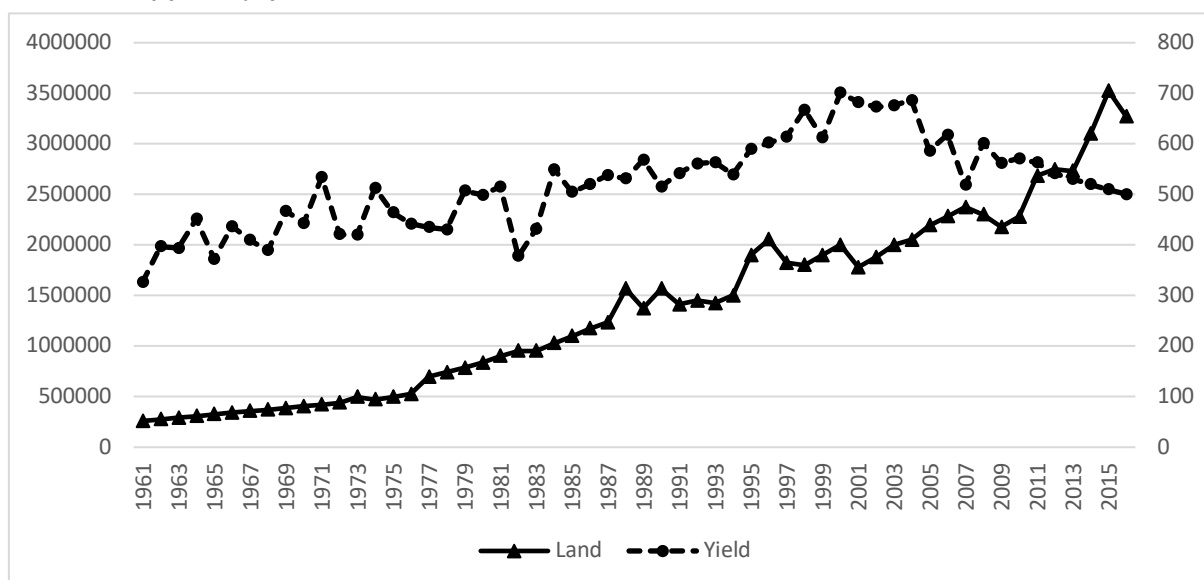

Sources: Author using data from FAOSTAT, Harris and Jones (2017) and WDI.

We observe also that Cocoa yield has a steeper upward slope when temperature stood in the neighborhood of 26.25°C. This could be due to a combination of favorable temperature[1] and the use of the new improved variety of cocoa. Over the period ranging from 2001 to 2010, the year 2010 was the warmest with a difference of +1.2°C (PNCC, 2014). The period from 2005 to 2016 is marked by a fall in cocoa yield despite temperature fluctuating between 26.14°C and 26.78°C with the exception of the year 2010 where the temperature reached another peak standing at 27°C.

Looking at the area of cultivated land, we observe an increase over the years, from 260,000 hectares in 1961 to 1,412,000 hectares in 1990 and 2,036,000 hectares today.

Indeed, in Figure 3 observe that the cultivated area for cocoa as well as cocoa yield over the period of analysis, show upward sloping trends. The increase in the cultivated area is partly linked to the expansion of the cocoa cultivation zones which started in the 1970s, when cocoa production moved from the south-east to the south-west, due to the shortage of arable land in the traditional production area and the availability of large areas of untouched rainforest (Wessel and Foluke, 2015). We also observed an upward trend for cocoa yield from 1960 to 2004, with a historic drop of 318 kg/ha in 1982 and a peak of 700 kg/ha in 2000. From 2005 to 2016 we observe declining yields due to deforestation which renders the land less fertile (World Bank, 2018). Conversely, over the study period i.e. from 1960 to 2016, the area of land occupied by cocoa plantations has continued to increase.

Figure 3. Trend of cocoa yield (kg/ha) and cultivated area dedicated to cocoa (hectares) in Cote d'Ivoire from 1961 to 2016.

Sources: Author using data from FAOSTAT, Harris and Jones (2017) and WDI.

3. Review of Literature

Theoretical Literature

In the economic literature, there are several theoretical models for analyzing the link between climate change and agricultural production. The most utilized are the agronomic approach which is production function based and the Ricardian model.

The agronomic approach stems from Angstrom's (1936) work. It is an experimental approach that seek to assess the direct impact of climate change on various crops. This theory takes into account the influence of the weather on crops in the analysis of agricultural production by combining rainfall and temperature into composite "aridity" indices. It assumes that weather variables as "costless" inputs to the production process *Ceteris Paribus* (Ofori-

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[1] According to Ofori Boateng and Insah (2014) good yields of cocoa requires an average temperature of 27°C and annual precipitation between 1100 mm to 3000 mm

Boateng and Insah, 2014). It should be observed that studies carried out using this model conclude that climate change has very damaging effects on agriculture (Rosenzweig 1985; Robertson et al. 1987). In 1995, Darwin and al. revealed that previous agronomic studies did not take into account the adaptation made by farmers and that the few studies, including farmers' adaptation, have omitted the induced effects of climate on the availability of water and allocation of agricultural land.

Failure to take into account farmers' rationality, through the adaptations they make, led to the Ricardian model, which considers the above approach as that of a "dumb farmer scenario". It is an approach developed by Mendelsohn and al (1994) to assess the impact of climatic hazards on agricultural income. By considering farmers' income rather than yield, was a way to account for farmers' adaptation strategies (Ofori-Boateng and Insah, 2011 and 2014). The Ricardian model was criticized for assuming price constancy and also that adaptation strategies were cost-free (Cline, 1996; Deressa et al., 2005; Deschênes and Greenstone, 2007) thus underestimating the true impact of climate change. Overall, unlike the agronomic model which is accused of overestimating the effects of climate change on agriculture, the Ricardian model tends to underestimate climate change damage on agriculture.

Empirical Literature

Several scholars have investigated the link between climate change and the production of perennial crops such as cocoa. Their findings suggest broadly speaking that climate change has negative impact on cocoa farming. However, this impact is spatially differentiated from a geographical perspective. Indeed, while some cocoa producing regions will be unsuitable in the future for cocoa production and thus will require a change in the type of crop to cultivate, others will become suitable (climate wise) for cocoa cultivation (Läderach et al. 2013, Schroth et al. 2017, Ofori-Boateng and Insah 2014 etc…).

Oyekale et al. (2009) investigated the effect of climatic parameters on cocoa production and assessed the degree of vulnerability and adaptation strategies adopted by farmers. They reported that climate change significantly affects cocoa production especially during hot and humid seasons. They recommended that, for production to be meaningful, skilled labor and the correct application of agronomic practices were necessary.

Ojo and Sadiq (2010) investigated the effect of climate change on cocoa yield. They assessed the effect of rainfall and temperature on cocoa yields in Ibadan State, Nigeria over a 10-year period (1999-2008). They concluded that a combination of a temperature of 29°C and minimum rainfall of 900 mm to 1000 mm resulted in higher yields and improved cocoa production in Nigeria.

Moraes et al. (2012) assessed the potential risk of occurrence of moniliasis[2] and the impacts of climate change on this disease, over the decades 2020, 2050 and 2080 in Brazil. They projected that climatic conditions will favor the expansion of moniliasis in the main cocoa-producing regions of Brazil.

Jacobi et al. (2013) assessed the resilience of cocoa farms in the Alto Beni region of Bolivia through a time series analysis covering the period from 1964 to 2010. They found that cocoa farms are very sensitive to climate change and that the establishment of successional agroforestry was a key strategy to adapt to climate change risks and also to facilitate the resilience of cocoa farms.

Kimengsi and Tosam (2013), examined the effect of climate variability on cocoa production in the Meme division in Cameroon over a 21-year period (1990-2010). They argued that high climate variability resulted in a decline in the yield per hectare of cocoa.

Läderach and al. (2013), in their paper entitled " Predicting future climatic suitability for Cocoa farming of the World's leading producer countries Ghanan, and Côte d'Ivoire", showed that some regions currently producing cocoa (the lagoon and Sud-Comoe region in Côte d'Ivoire) will become unsuitable for cocoa cultivation and thus,

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[2] One of the most destructive diseases affecting cocoa trees in the world, and responsible for the decline in cocoa production in tropical America

will require a change in cultivation. While in the Kwahu Plateau region of Ghana and the South-West of Côte d'Ivoire, the climatic suitability for cocoa cultivation is expected to increase.

Friedman (2014) examined the bioclimatic suitability of current cocoa growing areas in relation to future climate change projections. The author concluded that climate change reduces cocoa yields. Thus, cocoa cultivation will be increasingly threatened as time goes on.

Ofori-Boateng and Insah (2014), examined the current and future impact of climate change on cocoa production in West Africa from 1969 to 2009. They demonstrated that extreme temperatures have had a negative effect on cocoa production in West Africa, and that increasing temperature and declining trend of rainfall will reduce cocoa production in the future.

Eitzinger et al. (2015) explored the consequences of climate change on cocoa and tomato production in Trinidad and Tobago. They found that reduced rainfall during the dry season and changes in rainfall patterns were the most likely direct causes of reduced crop yields. To reduce the impact of climate change, they recommended that cocoa farmers put in place efficient irrigation systems to ensure the survival of cocoa trees during prolonged drought periods.

Hutchins et al. (2015) in their assessment of climate change impacts on cocoa production and approaches to adaptation and mitigation found that reduced rainfall and increased temperatures, caused a reduction in soil moisture during the dry seasons and decreased soil fertility. Conditions that often lead to cocoa seedling mortality. They also found that in other cocoa production zones, during periods of high rainfall, soil fertility is also negatively impacted by increased leaching of the soils which subsequently has negative impact on cocoa yield if proper fertilizer is not applied to replace the natural nutrients.

Raufu et al. (2015) examined the perceived effect of climate change on cocoa production in South-Western Nigeria. They found that climate variations were detrimental to cocoa production in the study area. However, the implementation of educational programs through extension activities, encouraging young farmers to grow cocoa and assisting farmers, were useful ways to reduce the effects of climate change on tree crops.

Utomo et al. (2015) assessed the environmental performance of cocoa production from cocoa monoculture and cocoa agroforestry systems in order to promote sustainable agricultural practices in cocoa farming. They showed that cocoa and coconut agroforestry system had a better environmental performance than other cocoa monoculture systems. Thus, cocoa and coconut agroforestry could be a sound option to promote environmental sustainability in cocoa farming.

Schroth et al. (2016) analyzed the vulnerability of cocoa to climate change in the West African cocoa belt. The authors highlighted the existence of a strong differentiation of climate vulnerability within the cocoa belt. The most vulnerable areas are located near the forest-savanna transition in Nigeria and eastern Côte d'Ivoire, and the least vulnerable areas are in southern parts of Cameroon, Ghana, Côte d'Ivoire and Liberia. This spatial differentiation of climate vulnerability could lead to further deforestation in new areas favorable for cocoa cultivation.

Ehisuoria and Ilenre (2018), investigated the impact of rainfall and temperature on Cocoa yield in Ekpoma, Nigeria. They found that excessive rainfall, prolonged dry season and inadequate rainfall were factors that reduced cocoa yields.

Gateau-Rey et al. (2018) measured the effect of severe drought related to the El Niño event of 2015-2016 on cocoa trees in northeast Brazil. Their results showed that the drought caused high mortality rate (15%) of cocoa tree and a large decrease in cocoa yield (89%). Drought also increased the rate of moniliasis infection. Thus, they showed that Brazilian cocoa agroforests were under threat and that the increased frequency of severe droughts is likely to lead to a decline in cocoa yields in the coming decades.

Afriyie-Kraf et al. (2020) in their paper on adaptation strategies of Ghanaian cocoa farmers under a changing climate in Ghana concluded that climate change had serious and very serious effects on the cocoa production and on their livelihoods. They recommended the development of adaptation technologies and the implementation of more transformational adaptation policies for producers, as the effects were noticeable among farmers who have tried adaptation techniques (Irrigation of young cocoa plantations, Mixed cropping with cashew trees etc...), and those who have not implemented any adaptation strategy.

4. Method of Analysis

Following the work of Ofori-Boateng and Insah (2014) we use a translog production function applied to the crop yield response approach. The most important aspect of using the production function in crop yield studies is that it allows the incorporation of climate variables as direct inputs into the production process.

Theoretically, the traditional approach to translog function in crop yield studies is of the form:

$$\ln Y_t = \alpha_0 + \sum_{i=1}^{n} \alpha_i \ln(x_i) + \frac{1}{2}\sum_{i=1}^{n-1}\sum_{j=i+1}^{n} \beta_{ij} \ln(x_i)\ln(x_j) + \sum_{k+1}^{m} \gamma_k Z_k + \varepsilon_t \qquad (1)$$

Where ε_t is normally distributed, Y_t is the yield per hectare of the crop, x_i are the inputs, Z_k is the vector of productivity change. In this study, this model relates cocoa yield (Y) to capital (K), labor (L), area cultivated (S), temperature (T) and rainfall (P).

Specifically, we have:
$$Y_t = f(x_t) \qquad (2)$$

Where Y_t stands for cocoa yield in Côte d'Ivoire and x_t is the vector of inputs which are labor (L) is the share of rural population total population, gross capital formation (K) as a percentage of GDP, cultivated area (S) in hectares, temperature (T) in degree Celsius (°C) and rainfall (P) in millimeters. More specifically,
$$x_t = (L_t, K_t, T_t, P_t, S_t) \qquad (3)$$

By substituting equation (3) into equation (2), we have:
$$Y_t = f(L_t, K_t, T_t, P_t, S_t) \qquad (4)$$

The translog function of our time series is therefore:

$$\ln Y_t = \ln A + \alpha_L \ln(L_t) + \alpha_K \ln(K_t) + \alpha_T \ln(T_t) + \alpha_P \ln(P_t) + \alpha_S \ln(S_t) + \beta_{LL} \ln(L_t)\ln(L_t) +$$
$$\beta_{KK} \ln(K_t)\ln(K_t) + \beta_{TT} \ln(T_t)\ln(T_t) + \beta_{PP} \ln(P_t)\ln(P_t) + \beta_{SS} \ln(S_t)\ln(S_t) + \theta_{LK} \ln(L_t)\ln(K_t) +$$
$$\theta_{LT} \ln(L_t)\ln(T_t) + \theta_{LP} \ln(L_t)\ln(P_t) + \theta_{LS} \ln(L_t)\ln(S_t) + \gamma_{KL} \ln(K_t)\ln(L_t) + \gamma_{KT} \ln(K_t)\ln(T_t) +$$
$$\gamma_{KP} \ln(K_t)\ln(P_t) + \gamma_{KS} \ln(K_t)\ln(S_t) + \eta_{TL} \ln(T_t)\ln(L_t) + \eta_{TK} \ln(T_t)\ln(K_t) + \eta_{TP} \ln(T_t)\ln(P_t) +$$
$$\eta_{TS} \ln(T_t)\ln(S_t) + \psi_{PL} \ln(P_t)\ln(L_t) + \psi_{PK} \ln(P_t)\ln(K_t) + \psi_{PT} \ln(P_t)\ln(T_t) + \psi_{PS} \ln(P_t)\ln(S_t) +$$
$$\phi_{SL} \ln(S_t)\ln(L_t) + \phi_{SK} \ln(S_t)\ln(K_t) + \phi_{ST} \ln(S_t)\ln(T_t) + \phi_{SP} \ln(S_t)\ln(P_t) + \varepsilon_t$$
$$(5)$$

From this form, the following symmetrical terms emerge:

$$\theta_{LK} = \gamma_{KL} \; ; \; \theta_{LT} = \eta_{TL} \; ; \; \theta_{LP} = \psi_{PL} \; ; \; \theta_{LS} = \phi_{SL} \; ; \; \gamma_{KT} = \eta_{TK} \; ; \; \gamma_{KP} = \psi_{PK}$$
$$\gamma_{KS} = \phi_{SK} \; ; \; \eta_{TP} = \psi_{PT} \; ; \; \eta_{TS} = \phi_{ST} \; ; \; \psi_{PS} = \phi_{SP}$$

As a result, we go from 30 variables to 20 variables. So we have:

$\ln Y_t = \ln A + \alpha_L \ln(L_t) + \alpha_K \ln(K_t) + \alpha_T \ln(T_t) + \alpha_P \ln(P_t) + \alpha_S \ln(S_t) + \beta_{LL} \ln(L_t)\ln(L_t) +$

$\beta_{KK} \ln(K_t)\ln(K_t) + \beta_{TT} \ln(T_t)\ln(T_t) + \beta_{PP} \ln(P_t)\ln(P_t) + \beta_{SS} \ln(S_t)\ln(S_t) + \theta_{LK} \ln(L_t)\ln(K_t) +$

$\theta_{LT} \ln(L_t)\ln(T_t) + \theta_{LP} \ln(L_t)\ln(P_t) + \theta_{LS} \ln(L_t)\ln(S_t) + \gamma_{KT} \ln(K_t)\ln(T_t) + \gamma_{KP} \ln(K_t)\ln(P_t) +$

$\gamma_{KS} \ln(K_t)\ln(S_T) + \psi_{PS} \ln(P_t)\ln(S_t) + \eta_{TS} \ln(T_t)\ln(S_t) + \eta_{TP} \ln(T_t)\ln(P_t) + \varepsilon_t$

(6)

By simplifying and reorganizing we obtain:

$\ln Y_t = \ln A + \alpha_L \ln(L_t) + \alpha_K \ln(K_t) + \alpha_T \ln(T_t) + \alpha_P \ln(P_t) + \alpha_S \ln(S_t) + \frac{1}{2} \beta_{LL} \ln(L_t)^2 + \frac{1}{2} \beta_{KK} \ln(K_t)^2 +$

$\frac{1}{2} \beta_{TT} \ln(T_t)^2 + \frac{1}{2} \beta_{PP} \ln(P_t)^2 + \frac{1}{2} \beta_{SS} \ln(S_t)^2 + \theta_{LK} \ln(L_t)\ln(K_t) + \theta_{LT} \ln(L_t)\ln(T_t) +$

$\theta_{LP} \ln(L_t)\ln(P_t) + \theta_{LS} \ln(L_t)\ln(S_t) + \gamma_{KT} \ln(K_t)\ln(T_t) + \gamma_{KP} \ln(K_t)\ln(P_T) + \gamma_{KS} \ln(K_t)\ln(S_t) +$

$\psi_{PS} \ln(P_t)\ln(S_t) + \eta_{TS} \ln(T_t)\ln(S_t) + \eta_{TP} \ln(T_t)\ln(P_t) + \varepsilon_t$

(7)

Based on the work of Guan et al (2006), which stated that the effects of climate on the growth of perennial crops such as cocoa and thus on its production is not immediate and following Ofori-Boateng and Insah (2011 and 2014), we lagged our climate variables. A dynamic translog is therefore obtained by introducing *p* lags on the climate variables and *q* lags on the dependent variable in equation (7). Thus, we have:

$\ln Y_t = \ln A + \ln Y_{t-q} + \alpha_L \ln(L_t) + \alpha_K \ln(K_t) + \alpha_S \ln(S_t) + \alpha_T \ln(T_{t-p}) + \alpha_P \ln(P_{t-p}) + \frac{1}{2} \beta_{LL} \ln(L_t)^2 +$

$\frac{1}{2} \beta_{KK} \ln(K_t)^2 + \frac{1}{2} \beta_{SS} \ln(S_t)^2 + \frac{1}{2} \beta_{TT} \ln(T_{t-p})^2 + \frac{1}{2} \beta_{PP} \ln(P_{t-p})^2 + \theta_{LK} \ln(L_t)\ln(K_t) +$

$\theta_{LS} \ln(L_t)\ln(S_t) + \theta_{LT} \ln(L_t)\ln(T_{t-p}) + \theta_{LP} \ln(L_t)\ln(P_{t-p}) + \gamma_{KS} \ln(K_t)\ln(S_t) + \gamma_{KT} \ln(K_t)\ln(T_{t-p}) +$

$\gamma_{KP} \ln(K_t)\ln(P_{T-p}) + \psi_{PS} \ln(P_{t-p})\ln(S_t) + \eta_{TS} \ln(T_{t-p})\ln(S_t) + \eta_{TP} \ln(T_{t-p})\ln(P_{t-p}) + \varepsilon_t$

(8)

Given the nature of our data (time series), it is important to assess its. Indeed, the regression of a non-stationary series on another non-stationary series leads to what is known as spurious regression i.e. one that makes no economic sense. In this study, we use two unit root tests i.e. the Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests. The results of these tests will guide the way forward. Indeed, the test results will enable us determine whether the series are integrated of order zero i.e. *I(0)* or integrated of order one i.e. *I(1)*. Having determined the order of integration, we will then move to assess whether there are the short and long run dynamics or not, between cocoa yield and the variables of interest (temperature, rainfall). This will be done using the Bounds test proposed by Pesaran et al (2001) in an Autoregressive Distributed Lags model (*ARDL*) setting.

For the Bounds test, we use Akaike (AIC) and Schwarz (SC) information criteria to determine the optimal lag order. Thus, based on the procedure of Pesaran et al (2001) we have the following error correction model adapted to our functional form as follows:

$\Delta \ln Y_t = \ln A + \sum_{p=1}^{P} \alpha_Y \Delta \ln Y_{t-p} + \sum_{q=1}^{Q} \alpha_L \Delta \ln(L_{t-q}) + \sum_{q=1}^{Q} \alpha_K \Delta \ln(K_{t-q}) + \sum_{q=1}^{Q} \alpha_S \Delta \ln(S_{t-q}) +$

$\sum_{q=1}^{Q} \alpha_T \Delta \ln(T_{t-q}) + \sum_{q=1}^{Q} \alpha_P \Delta \ln(P_{t-q}) + \frac{1}{2}\sum_{q=1}^{Q} \beta_{LL} \Delta \ln(L_{t-q})^2 + \frac{1}{2}\sum_{q=1}^{Q} \beta_{KK} \Delta \ln(K_{t-q})^2 + \frac{1}{2}\sum_{q=1}^{Q} \beta_{SS}$

$\Delta \ln(S_{t-q})^2 + \frac{1}{2}\sum_{q=1}^{Q} \beta_{TT} \Delta \ln(T_{t-q})^2 + \frac{1}{2}\sum_{q=1}^{Q} \beta_{PP} \Delta \ln(P_{t-q})^2 + \sum_{q=1}^{Q} \theta_{LK} \Delta \ln(L_{t-q})\ln(K_{t-q}) +$

$\sum_{q=1}^{Q} \theta_{LS} \Delta \ln(L_{t-q})\ln(S_{t-q}) + \sum_{q=1}^{Q} \theta_{LT} \Delta \ln(L_{t-q})\ln(T_{t-q}) + \sum_{q=1}^{Q} \theta_{LP} \Delta \ln(L_{t-q})\ln(P_{t-q}) + \sum_{q=1}^{Q} \gamma_{KS}$

$\Delta \ln(K_{t-q})\ln(S_{t-q}) + \sum_{q=1}^{Q} \gamma_{KT} \Delta \ln(K_{t-q})\ln(T_{t-q}) + \sum_{q=1}^{Q} \gamma_{KP} \Delta \ln(K_{t-q})\ln(P_{t-q}) + \sum_{q=1}^{Q} \psi_{PS} \Delta$

$\ln(P_{t-q})\ln(S_{t-q}) + \sum_{q=1}^{Q} \eta_{TS} \Delta \ln(T_{t-q})\ln(S_{t-q}) + \sum_{q=1}^{Q} \eta_{TP} \Delta \ln(T_{t-q})\ln(P_{t-q}) + \ln Y_{t-1} + \alpha_1 \ln(L_{t-1}) +$

$\alpha_2 \ln(K_{t-1}) + \alpha_3 \ln(S_{t-1}) + \alpha_4 \ln(T_{t-1}) + \alpha_5 \ln(P_{t-1}) + \frac{1}{2}\beta_1 \ln(L_{t-1})^2 + \frac{1}{2}\beta_2 \ln(K_{t-1})^2 + \frac{1}{2}\beta_3 \ln(S_{t-1})^2 +$

$\frac{1}{2}\beta_4 \ln(T_{t-1})^2 + \frac{1}{2}\beta_5 \ln(P_{t-1})^2 + \theta_1 \ln(L_{t-1})\ln(K_{t-1}) + \theta_2 \ln(L_{t-1})\ln(S_{t-1}) + \theta_3 \ln(L_{t-1})\ln(T_{t-1}) +$

$$\theta_4 \ln(L_{t-1})\ln(P_{t-1}) + \gamma_1 \ln(K_{t-1})\ln(S_{t-1}) + \gamma_2 \ln(K_{t-1})\ln(T_{t-1}) + \gamma_3 \ln(K_{t-1})\ln(P_{t-1}) +$$

$$\psi_1 \ln(P_{t-1})\ln(S_{t-1}) + \eta_1 \ln(T_{t-1})\ln(S_{t-1}) + \eta_2 \ln(T_{t-1})\ln(P_{t-1}) + \varepsilon_t \qquad (10)$$

Where Δ is the first difference operator, lnA is the constant, α_Y, α_L, α_K, α_S, α_T, α_P, β_{LL}, β_{KK}, β_{SS}, β_{TT}, β_{PP}, θ_{LK}, θ_{LS}, θ_{LT}, θ_{LP}, γ_{KS}, γ_{KT}, γ_{KP}, ψ_{PS}, η_{TS}, η_{TP} are the coefficients of the short run dynamics, α_1 ,..., α_5 ; β_1,..., β_5 ; θ_1,....,θ_4 ; γ_1,..., γ_3 ; ψ_1 ; η_1, η_2 represent the coefficients of the long run dynamics, p and q denote the optimal lags order and $\varepsilon_t \sim iid(0,\sigma)$ is the error term.

The dynamic model as specified above raises the problem of the multicollinearity of the variables, and makes it impossible to estimate. We therefore eliminate the correlation source variables because the existence of a very high correlation between the explanatory variables lead to a risk of multicollinearity. Moreover, in the presence of multicollinearity, it is difficult, if not impossible, to isolate the intrinsic effect of each of the explanatory variables on the endogenous (there is confusion of effects), because any variation in one of the explanatory variables implies a variation in the other variables. By dropping each variable one at a time, we are left with variables with significant coefficients. Thus, our *ARDL* model is represented as follows:

$$\Delta \ln Y_t = lnA + \sum_{p=1}^{P} \alpha_Y \Delta \ln Y_{t-p} + \sum_{q=1}^{Q} \alpha_L \Delta \ln(L_{t-q}) + \sum_{q=1}^{Q} \alpha_K \Delta \ln(K_{t-q}) + \sum_{q=1}^{Q} \alpha_S \Delta \ln(S_{t-q}) +$$

$$\sum_{q=1}^{Q} \alpha_T \Delta \ln(T_{t-q}) + \sum_{q=1}^{Q} \alpha_P \Delta \ln(P_{t-q}) + \ln Y_{t-1} + \sum_{q=1}^{Q} \gamma_{KS} \Delta \ln(K_{t-q})\ln(S_{t-q}) + \alpha_1 \ln(L_{t-1}) +$$

$$\alpha_2 \ln(K_{t-1}) + \alpha_3 \ln(S_{t-1}) + \alpha_4 \ln(T_{t-1}) + \alpha_5 \ln(P_{t-1}) + \alpha_6 \ln(K_{t-1})\ln(S_{t-1}) + \varepsilon_t$$
$$(11)$$

The Bounds test is equivalent to testing the null hypothesis of the absence of cointegration i.e. the coefficients of the level variables are zero. This is done by comparing the Fisher statistic to the critical values that form the bounds. If the Fisher statistic is greater than the upper bound I(1) then the null hypothesis of no cointegration is rejected, which is equivalent to concluding that a cointegrating relationship exists between the variables. If the Fisher statistic is less than the lower bound I(0), then accept the null hypothesis of absence of cointegration. If the Fisher statistic is between the upper and lower bounds (I(1) and I(0)) then no conclusion can be drawn about cointegration.

Our study covers the period ranging from 1961 to 2016. We use annual data on climate variables (precipitation and temperature) obtained from Harris and Jones (2017). The non-climatic variables are from the Food and Agriculture Organization of the United Nations (FAO, 2019) and the World Development Indicators of the World Bank (2019).

5.   Empirical Results and Discussion

We start with the descriptive statistics presented in Table 1 below. We observe that, from 1961 to 2016, cocoa yields in Côte d'Ivoire stood on averaged at 520.22 kg/ha. The lowest yield was registered in 1961 and stood at 326.9 kg/ha whereas the highest yield registered in 2000 stood at 700.6 kg/ha. We also observe that land dedicated to cocoa farming stood on average at 1,387,862.839 hectares. It has been increasing over time. Indeed, going from just 260,000 hectares in 1961, it reached its highest level in 2015 at 3,522,413 hectares.

Given that cocoa production is mainly done in rural areas it is important to see the share of rural population in total population. We observe that rural population stood on average at 62.23% of the total Ivorian population. The highest recorded rural population share stood at 81% in the early days of the country's independence from the colonial power in 1961. This was quite significant and thus constituted an abundant workforce for agricultural production. This share of the rural population in the total population has steadily declined over time going from 81.09% in 1961 to 51.12 in 2016. Gross capital formation was low throughout the period of analysis. Indeed, it stood on average at 16.3% of GDP. Its lowest level which stood at 4.7% of GDP was registered in 2011, following the post-electoral crisis, whereas its highest level registered in 1978 stood at 29.76% of GDP during the period characterized as the Ivorian miracle.

Table 1: *Descriptive Statistics of Variables of Interest.*

Variables	Mean	Std. Dev	Min	Max
Yield (Y_t)	520.225	88.806	326.900	700.600
Rurpop (L_t)	62.234	8.232	50.119	81.089
Inv (K_t)	16.305	6.155	4.704	29.762
Cult_area (S_t)	1,387,862.839	880,412.113	260,000	3,522,413
Rainfall (P_t)	1,273.280	147.611	917.033	1,708.070
Temperature (T_t)	26.331	0.334	25.453	27.064

Sources: Author using data from FAOSTAT, Harris and Jones (2017) and WDI.

The temperature registered in the country over the study period stood on average at 26.33°C. The lowest temperature registered stood at 25.45°C and the highest at 27.06°C. The coldest year was 1976 whereas the warmest was 1998. The annual rainfall that the country registered stood on average at 1,273.28mm. We observe that 1983 was the year in which the country registered its lowest level of rainfall which stood at 917.03mm. That was the year of the severe drought that the country experienced. The year with the highest level of rainfall 1968 where the country registered 1,708.070mm.

We conducted the Unit root tests as indicated in the section on methods of analysis. The results presented in Table 2 below reveal that our variables are integrated of different orders i.e. namely *I(0)* and *I(1)*. This makes Granger and Engle's (1987) and Johansen's (1988) tests inappropriate. The most appropriate test when we are faced with mixed order of integration is the Bounds tests of the *ARDL* model of Pesaran et al. (2001). This test assesses the possibility of long term relationships between the variables.

Table 2: Results of Unit Root tests

Variables	Level		First Difference		Conclusion
	ADF	PP	ADF	PP	
lnY_t	-3.289*	-3.173*			*I(0)*
	(0.015)[a]	(0.022)			
lnP_t	-6.929**	-6.939**			*I(0)*
	(0.000)	(0.000)			
lnT_t	-4.489**	-4.479**			*I(0)*
	(0.000)	(0.000)			
LnL_t	-4.273**	-8.512**			*I(0)*
	(0.001)	(0.000)			
lnK_t	-2.718	-2.647	**-10.419****	**-10.433****	*I(1)*
	(0.071)	(0.084)	**(0.000)**	**(0.000)**	
lnS_t	-1.313	-1.512	**-8.332****	**-8.496****	*I(1)*
	(0.623)	(0.528)	**(0.000)**	**(0.000)**	
lnK_tS_t	**-3.206***	**-3.250***			*I(0)*
	(0.020)	**(0.017)**			

Sources: Author using data from FAOSTAT, Harris and Jones (2017) and WDI.
[a] The values in brackets indicate the p-values. (**) and (*) represent significance at the 1% and 5% probability levels respectively.

We next move to the bounds test. Here, it is critical to determine the optimal lag to be used for the *ARDL(p,q)* model. We make use of the Akaike Information Criterion which indicates that the optimal lag order of our *ARDL* model is (2,1,4,1,2,0,1). The results of the Bounds test are presented in Table 3. The value of the F-statistic obtained (4.062), is above the upper bound at the 2.5% and 5% probability levels. We therefore reject the null hypothesis of no cointegration and conclude that there is evidence of long run dynamics among the variables.

Table 3: Results of the *Bounds Test for Cointegration*

	ARDL(2,1,4,1,2,0,1)		
Ho ➔ *No level relationship*		F_{stat} = **4.062**	
K=6	[I(0) - I(1)]		[I(0) - I(1)]
Critical value at 5%	[- 2,86 - 4,38]	Critical value at 2.5%	[2,75 3,99]
Reject Ho if $F_{stat} > F_\alpha$ for I(1) ➔ we conclude that the variables are cointegrated			

Source: Author's calculations

Given the results of the bounds test, we move to estimate our *ARDL*(2,1,4,1,2,0,1) model. The results are presented in Table 4 below. All the diagnosis tests conducted are in support of the model. These tests include the normality test, the heteroscedasticity test, the autocorrelation test and the stability test. For the stability test, the graph of the cumulative sum of squares (CUSUM of Squares) shows clearly that the model is stable.

We then move to analysis the estimated coefficients. Let's consider the error correction term (ECT). We observe that it is negative **(-0.371)** and significant. This confirms the results obtained from the Bound test and provide support for a long run relationship between cocoa yield and the set of explanatory variables. The error correction coefficient expresses the speed with which the dependent variable (*yield*) will adjust to its long run equilibrium after a shock. This speed of adjustment is relatively low since only 37% of the imbalances of a previous year are restored during the following year.

Let's look at the long run coefficients. We observe that the rainfall variable is negative and significant. This is to say that too much rain reduces cocoa yield. The estimated coefficient which could be interpreted as rainfall elasticity is -3.876 indicating that a 1% increase in rainfall in the long run will lead to -3.876% decrease in cocoa yield *ceteris paribus*. This is in line with Hutchins et al (2015) in their assessment of climate change impact on cocoa production. They found that increases in rainfall intensity affect the blooming of cocoa tree's flowers thereby causing a decreased in tree productivity. From the above empirical result, there is a clear indication that, there is a long run causality running from precipitations to cocoa yield. Unlike the long run dynamics, in the short run rainfall has a positive and significant impact on cocoa yield. The positive impact persist till the third year. This finding is in line with results obtained by Ofori-Boateng and Insah (2014). Here also there is a short run causality running from rainfall to cocoa yield.

Now let's consider the temperature variable. We observe that in the short run higher temperatures are harmful to cocoa yield whereas in the long run the impact of temperature on cocoa yield is positive and significant at the 10% probability level. This is in line with findings from Ofori-Boateng and Insah (2011), Läderach et al (2010) and Hutchins et al (2015). In the long run, the coefficient associated with temperature is 19.313. Thus, given the climatic situation of the country, especially the cocoa production zones, a 1% increase in temperature in the long run will lead to 19.313% increase in cocoa yield.

Table 4: Estimation r*esults of the ARDL*(2,1,4,1,2,0,1) model

Variables	ARDL(2,1,4,1,2,0,1)	
	Coefficients	p-value
Long run dynamics		
C	-20.281	(0.040)**
lnS$_t$	2.166	(0.100)
lnP$_t$	**-3.876**	**(0.052)***
lnT$_t$	**19.313**	**(0.076)***
lnK$_t$	**12,202**	**(0.056)***
lnL$_t$	-1.188	(0.634)
lnK$_t$S$_t$	**-0.874**	**(0.053)***
ECT (u_{t-1})	**-0.371**	**(0.020)***
Short run dynamics		
Δ*lnY$_{t-1}$*	-0.330	(0.019)**

|		
ΔlnS_t	**-1.618**	**(0.002)*****
ΔlnP_t	**1.402**	**(0.000)*****
ΔlnP_{t-1}	**1.266**	**(0.000)*****
ΔlnP_{t-2}	**0.747**	**(0.001)** ***
ΔlnP_{t-3}	**0.375**	**(0.004)*****
ΔlnT_t	**-3.575**	**(0.011)****
ΔlnK_t	**-7.106**	**(0.008)*****
ΔlnK_{t-1}	**0.107**	**(0.071)***
ΔlnK_tS_t	**0.496**	**(0.007)*****
Normality (Jarque-Bera)	2.070	(0,259)
Heteroscedasticity (White / Breuch-	52.000	(0,435)
Godfrey-Pagan)	0.010	(0,924)
Autocorrelation (Breuch-Godfrey)	2.437	(0,119)

Source : Author's calculations

Asterisks (***), (**) and (*) indicate the significance at the 1%, 5% and 10% probability levels respectively.

Now, let's look at the other variables i.e. gross capital formation as a proxy for investment and rural population as a proxy for labor. In the short run, the capital variable has a negative impact on cocoa yield. However, the lag variable has a positive and significant impact on cocoa yield. This is so because there is a time lag for investment to produce the necessary impact on cocoa yield. We can see that in the long run, the gross capital formation variable has a positive impact on cocoa yield. There is here also a long run causality running from investment to cocoa yield. Thus in the long run, a 1% increase in investment will boost cocoa yield by 12.2%.

When we consider the relationship between the cultivated area and cocoa yield, we found a negative **(-1.618)** and significant coefficient in the short run. This indicates that a 1% increase in the cultivated area significantly reduces the yield by 1.62%. This result is in line with the findings of Vigneri et al. (2016) that cocoa profitability declines for farmers cultivating larger areas. The interaction between investment and cultivated area has a positive (**0.496**) and significant impact on cocoa yield in the short run but not in the long run.

Figure 4. Cumulative Sum of Squares for model stability tests
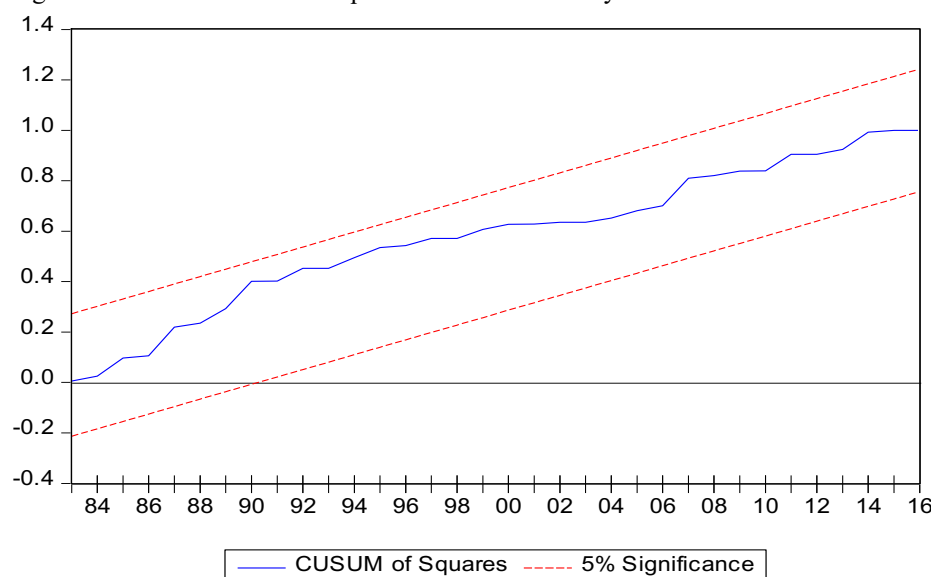
Source : Author's estimation

6. Conclusion

The objective of this paper was to provide a better understanding of the effects of global warming on cocoa production in Côte d'Ivoire. To achieve this, we used data from the World Development Indicator and FAOSTAT from 1961 to 2016. The climatic variables considered were temperature (in degrees Celsius) and rainfall (in millimeters of rain). After conducting a bounds test to assess whether there is a long run relationship among the variables we estimated an *ARDL(2,1,4,1,2,0,1)* model. The empirical results confirmed the existence of long run dynamics via the negative and significant error correction term. The results also indicated that rainfall positively affect cocoa yield in the short run but not in the long run. Indeed, in the long run the impact is negative. Unlike rainfall, the temperature variable has a negative impact on cocoa yield in the short run but positive impact in the long run. Other key results include the positive impact of the interaction between investment and cultivated area on cocoa yield in the short run as well as that of gross capital formation in the long run. Given these results it would be good if thresholds for both rainfall and temperature are determined. Such thresholds would provide clear indications to policy makers in terms of the type and timing of mitigation strategies to implement. Knowing that the IPCC predicts for Côte d'Ivoire an average temperature increase of around 2°C (peaking at 3°C in January) and an average decrease in rainfall, it is clear that cocoa plantations are likely to face a bleak future, which is worrisome for the Ivorian cocoa economy.

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