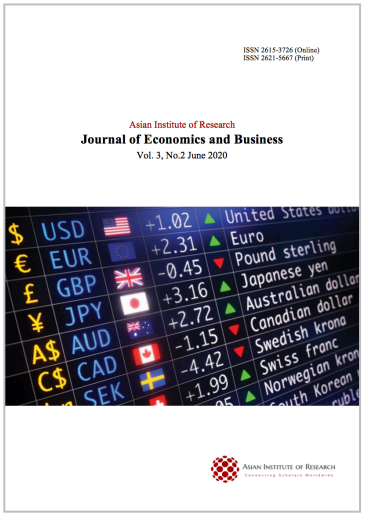

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Capital Adequacy Requirements and Profitability: An Empirical Study on Banking Industry in Sri Lanka

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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.

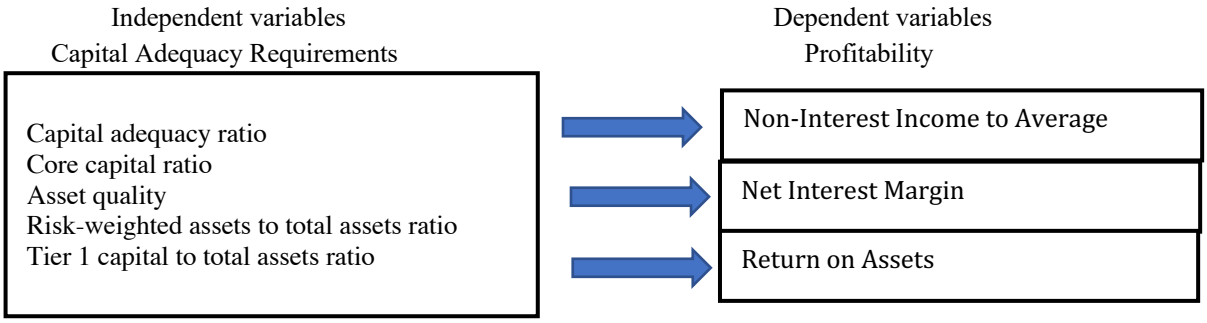
2.2 Data Collection

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



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	
Dependent variable (Profitability)	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)
	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:

$NIIAA = \beta0 + \beta1\ CAR + \beta2\ CCR + \beta3\ AQ + \beta4\ RWATA + \beta5\ T_1CTAR + \varepsilon$

$NIM = \beta0 + \beta1\ CAR + \beta2\ CCR + \beta3\ AQ + \beta4\ RWATA + \beta5\ T_1CTAR + \varepsilon$

$ROA = \beta0 + \beta1\ CAR + \beta2\ CCR + \beta3\ AQ + \beta4\ RWATA + \beta5\ T_1CTAR + \varepsilon$

Where:

CAR: Capital adequacy ratio
CCR: Core Capital ratio
AQ: Asset quality
RWATA: Risk-weighted assets to total assets ratio
T_1CTAR: 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_1CTAR	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_1CTAR 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)
T_1CTAR	-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_1CTAR	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_1CTAR	DNIIAA	DNIM	DROA
DCAR	1							
DCCR	0.8567***	1						
DAQ	-0.1741	-0.1497	1					
DRWATA	-0.1657	-0.1791	-0.2373	1				
DT_1CTAR	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_1CTAR	-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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