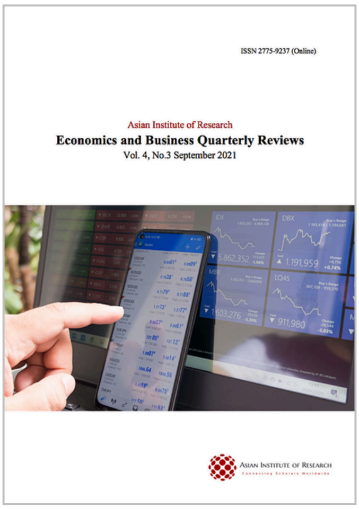

Economics and Business Quarterly Reviews

Hossain, Md Ekram, Dechun, Huang, Zhang, Changzheng, Neequaye, Ebenezer Nickson, Van, Vu Thi, and Ali, Muhammad. (2021), Trade Deficit of Bangladesh with China: Patterns, Propensity and Policy Implications. In: *Economics and Business Quarterly Reviews*, Vol.4, No.3, 34-51.

ISSN 2775-9237

DOI: 10.31014/aior.1992.04.03.367

The online version of this article can be found at:
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The Asian Institute of Research
Economics and Business Quarterly Reviews
Vol.4, No.3, 2021: 34-51
ISSN 2775-9237

DOI: 10.31014/aior.1992.04.03.367

Trade Deficit of Bangladesh with China: Patterns, Propensity and Policy Implications

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Abstract
This paper aims to examine export, import and trade intensity, export specialization index, Herfindahl-Hirschman index for bilateral concentration and diversification indices to analyze the specializations, structure and trends of deficit in bilateral trade between Bangladesh and China from 1995 to 2018 and policy recommendations in this regard. The results reveal that the gap of export and import intensity between Bangladesh and China is widening rapidly perennial. The export specialization indices expose very significant outcomes where among the analyzed 16 sectors; 6 sectors exhibit high specialization, 3 sectors demonstrate medium, 3 sectors exhibit low and the rest of the 4 sectors disclose no specialization for Bangladesh's export to China. The findings of the Herfindahl-Hirschman Index (HHI) reveal that from 1995 to 2010 the export of Bangladesh to China concentrated within few sectors but from the year 2011 to 2018 the export has been reclassifying steadily into diversification. The overall analysis of the indices suggests the necessity to be improved of the level of intra-industry trade between China and Bangladesh. Moreover, emphasis should be given to the sectors having a high specialization that endure the capacity to narrow the trade deficit. Furthermore, the export baskets of Bangladesh to China require to be diversified. Hereafter, various measures and implications are also suggested in the policy recommendation for further improvement.

Keywords: Bilateral Trade, Trade Deficit, Export Specialization, Bangladesh, China

1. Introduction

The relationship between the overall trade balance and its determinants may not necessarily be the same as with the bilateral trade balances (Figure 1). It is imperative to mention that export has performed strongly in Bangladesh's context with the aid of the booming manufacturing sector. Although Bangladesh performed impressively in increasing its exports, imports at the same time were enhanced to a greater degree together with the presence of a narrow export basket (Kundu 2015). The Sino-Bangla ties date back to 1975 and over the years, it has been deepened and fostered. Currently, Bangladesh and China are enjoying a robust and comprehensive

partnership. Bangladesh-China bilateral trade has been increasing significantly over the years, both in terms of absolute amount and percentage change among Bangladesh's top trade partners.

Bangladesh-China trade volume is on the rise and grew roughly seven-fold between 2004 and 2018 (figure 1). Notably, from 1971 till 2004, India was the largest trading partner of Bangladesh which has been replaced by China from 2004 onward (Kohli 2015).

'The share of Chinese exports in all exports to Bangladesh increased from 13.6 percent in 2000 to 22 percent in 2018 (Appendix 2). According to the Chinese Embassy in Dhaka, 'the economic and trade cooperation between China and Bangladesh have maintained good momentum in recent years. Bangladesh now has become China's third-biggest trade partner in South Asia, while China is the largest origin of Bangladesh's imports (DCCI 2016). The trade volume reached 913.4 million USD in the year 2000 to 14,708.5 million USD in 2018; around 16 times more than that of 2000.

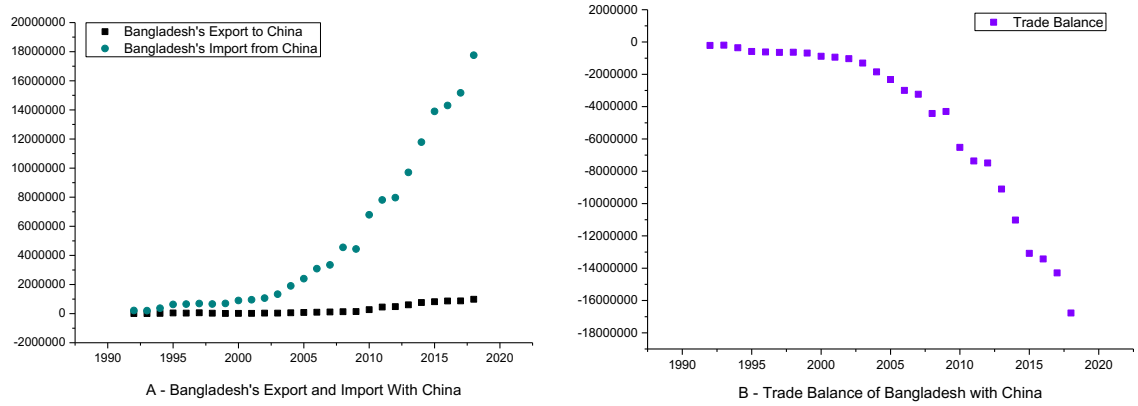

Figure 1: Export-Import (A) and Trade Balance (B) of Bangladesh with China from 1995-2018

Source: World Integrated Trade Solution statistics (WITS) [4] and WTO [5] database, compiled by the Authors in March 2021

But the problem lies in a huge trade imbalance that favors China. For instance, in 2018, Bangladeshi imports from China amounted to $ 17,759.54 million while Bangladeshi exports to China amounted to $ 985.41 million, resulting in a trade ratio between Dhaka and Beijing in 1:17.3 and a trade gap of $ 16774.13 million as noted by Dhaka Chamber of Commerce and Industry and Bangladesh Bank (Bank 2021; DCCI 2016)and WITS trade data.

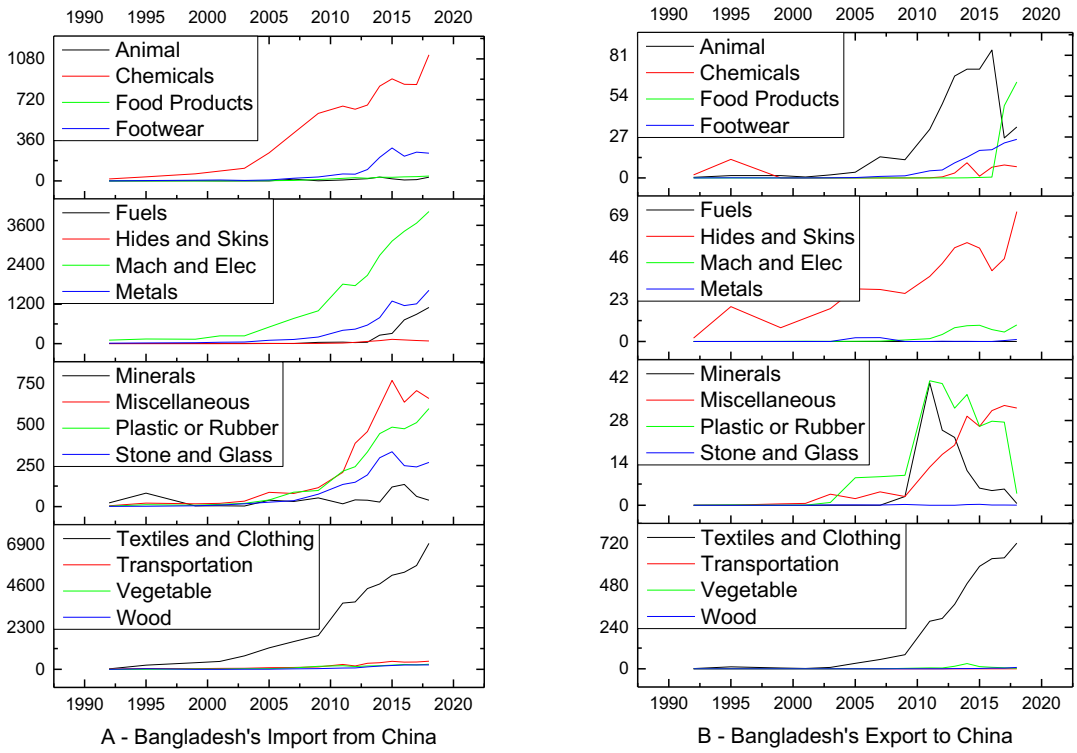

Figure 2: The Composition of Bangladesh's Import (A) and Export (B) (Million USD) with China for all products from 1995-2018

Source: World Integrated Trade Solution statistics (WITS) [4] and WTO [5] database, compiled by the Authors in March 2021

Bangladesh's trade with China is now about 26.5 percent of its total trade with the world, which is the highest with a rising trend. Bangladesh's export growth to China has averaged about 40 percent per annum in the past five years. On the other hand, import growth averaged 23 percent annually (Kabir 2016; Islam 2016). Figure 1 shows the trade balance of Bangladesh with China from 1995 to 2018 and the figure reveals the immense trade deficit of Bangladesh with China.

According to the data of Bangladesh Bank (Database 2021), China is the largest import partner accounting for 29 % of the import share. Accordingly, India 14%, Singapore 6%, Indonesia 3%, Japan 3% South Korea 2%, Malaysia 3% and the USA 3%, are the top import partners of Bangladesh's import basket. If we look at the import share of Bangladesh from China in 2018; Textiles 29%, Machines 23%, Chemical Products 6.3%, Metals 9.1% Miscellanies 4%, plastic and rubbers 3.4%, transportation 2.5%, Fuels 6% and stone and glass 1.5% mineral products 2.4 % of the share of total import products (Lab 2021).

According to the statistics of 2018 (Database 2021), it shows, the intermediate product group accounts for the largest import share and the others are textile and clothing, capital goods, machine and electronics metals, chemicals, etc. (figure 2). The latest data of Bangladesh Bank reveals that the country imported cotton, cotton yarn/thread and cotton fabrics 19.6 %; man-made staple fibers and knitted or crocheted fabrics 10.1 %; man-made filaments, strip and the like of manmade textile materials 3.8 %; and other fabrics and apparel accessories 2.8 %. The other notable import items are boilers, machinery, mechanical appliances and their parts 16.4 %; electrical machinery and equipment and parts 12.2 %; and fertilizer, plastic, chemicals, iron and steel 13.1%. The country also imports some food items from China. (Kabir 2016, Bank 2016).

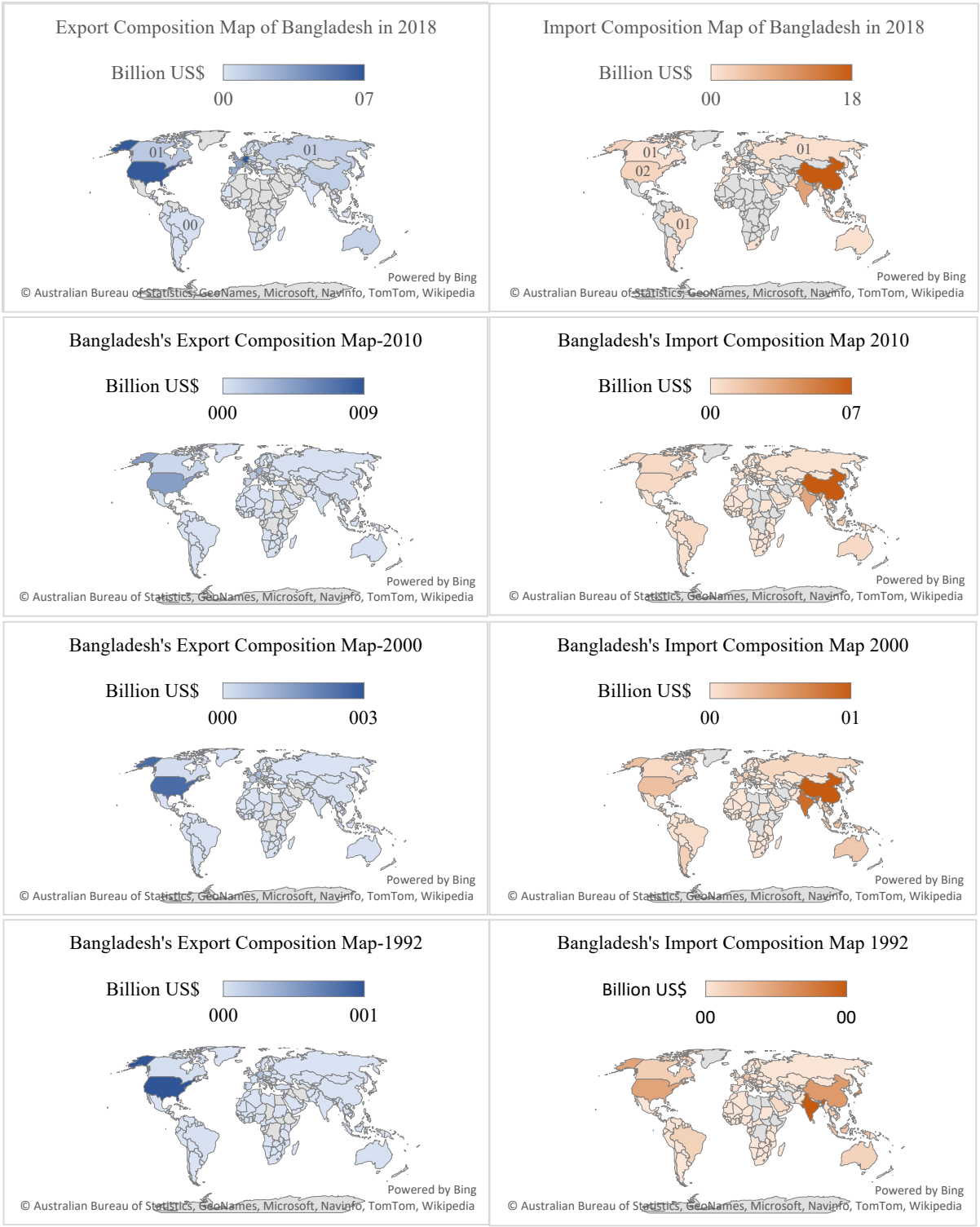

Figure 1: Top Export Destinations (left) and Import Sources (Right) of Bangladesh in 2018

Source: Export Promotion Bureau of Bangladesh, [46], compiled by the Authors in February 2021;
http://epb.gov.bd/site/view/epb_export_data/-

However, in terms of export China accounts for 1% of the total export share of Bangladesh. China offered a zero-tariff facility to 95 percent of products of the least developed countries (LDCs) since July 2010 and Bangladesh got a zero-duty benefit for exports of 4,721 types of products to China China (Islam 2012). After that, the export basket of Bangladesh to China has changed significantly. In 2009 the export amount to China was USD 118.30 Million and it became more than double in 2010 amounting to $259.20 million; in 2018 the export grew up to 6 amounting to USD 803.70 million (Database 2021). According to the database of MIT Media lab, in 2018 Bangladesh's export products group to China were textile and clothing 74%, animal products 3.4&, hides and skin

7.2%, 2.6%, vegetable items 3.9%, instruments 3.2%, foot wares 2.6%, mineral products 0.6% are shared the largest ones (Wahid 2016; Lab 2016) . Among the products group, the textile and clothing sector showed the most potential sector for Bangladesh's export to China (figure 2). Next to textile and apparel, consumer goods, intermediate goods, raw materials, animal products, hides and skin, plastic and rubber, miscellaneous, foot wares, and vegetables are accounted for the most share of export of Bangladesh to China in 2018 (figure 2).

Despite these positive developments in bilateral trade, there are certainly gray areas and constraining factors disfavoring Bangladesh in optimizing mutual gains from trade. The first and foremost is a very high amount of negative trade balance of Bangladesh, which is currently 85 percent of total bilateral trade. According to the data (figure 2), the trade deficit of Bangladesh with China becomes around three times in 2018 (USD 16.8 Billion) than in 2010 (USD 6.5 Billion).

In our investigation, it is found that except for some articles in newspapers, there exist very little academic researches regarding the deficit of trade of Bangladesh with China and its patterns and policy implications. The facts inspire us to explore the insights which could add value to the current literature gap in this area as well as for the policymakers on both sides. We've contributed to the literature by providing a theoretical background as well as empirical analysis on the bilateral trade between Bangladesh and China. We tested several indices related to trade intensity, specializations and diversification of trade between the two nations. Moreover, in this research we explored the following objectives;

(i). To explore the trend of export, import and trade deficit of Bangladesh to China.
(ii). To evaluate and explore the potential sectors for Bangladesh which could minimize the deficit.
(iii). To find reasonable solutions and policy implications to reduce the trade deficit of Bangladesh with China.

The article itself is divided into four additional sections. Section II briefly introduces the status of the trade imbalance between Bangladesh and China and summarizes the theoretical background of the analyzed methods based on related constructs of international trade. The explanation of applied data and methods is covered in section III. Section IV covered the core findings and discussion part of the article. The brief concluding remarks and policy implications are presented in Section V.

Brief literature review on the Trade Deficit and Bilateral Trade of Bangladesh with China

Trade deficits have further widened in most of the developing countries since the early 1990s, and the growth of exports has been fairly robust except 2008 and 2009 when there was a sharp drop in this growth because of economic recession. Bangladesh, as a comparatively new player in the trade game, has made considerable progress in the last two decades. Bangladesh's trade growth has been one of the significant characteristics of the country for the last couple of decades. Specifically, export has displayed robust growth in the face of diverse economic and political setbacks, both in the local and the global context. Bangladesh has progressed from a predominantly aid-dependent economy to a trading economy in the last two decades and able to make one of the manufacturing hubs of the world (Kundu 2015).

The major trade partners of Bangladesh are European countries where Germany accounts for 15%, UK 9.4%, France 6.7%, Span 6%, Italy 4.2%, Netherlands 3.6%, Poland 2.5%, Belgium 3.6%Russia 2%, Denmark1.9%, and Australia 1.6% are most mentionable. The second destination is North America, where the USA acconted16% and Canada 3.3% of Bangladesh's export share. In recent year's Asian region has emerged as a potential export destination for Bangladesh's export. In 2014 Bangladesh's export share to Turkey was 3.1% accordingly, Japan 2.8%, China 2.2%, India 1.5%, South Korea 1% are the largest ones. In terms of her import, China is the largest partner accounting for 32 % of the import share. Accordingly, India 17%, Singapore 8.5%, Indonesia 3.7% Hong Kong 3.7%, South Korea 3.4%, Malaysia 3.3%, and Japan 3.1% are the top partners of Bangladesh's import basket (Lab 2016). In the last couple of decades, Bangladesh has been continuing with a negative trade balance being an import-oriented manufacturing country. From the last decade, China is the largest import partner but the export to China is so insignificant that results in a huge trade deficit between the two nations, and the deficit has been in favor of China.

Very few researches have been found that investigated the bilateral trade deficit of Bangladesh with China. Among them, Kundu (2018) explored the phenomenon and relationships between the trade balances of Bangladesh with BRICS countries from 1991-2013 and the analysis showed that the economy of Bangladesh in recent years had improved its growth performance and strengthened its macroeconomic structure, despite an unfavorable trade balance position. Mohammad Rafiqul Islam Islam (Islam, Mahfuz, and khanam 2013) and et al. explored the motives for investing in Chinese companies in Bangladesh and their outwards FDI. Although the article was not related to the bilateral trade and trade deficit between Bangladesh and China, the article gave an insight into Chinese outward investment in Bangladesh that could contribute to minimizing the trade gap between the two nations to some extent Islam (Islam, Mahfuz, and khanam 2013).

Researchers have explained variations in the indexes over time and across bilateral trading relationships by analyzing the nature and importance of various resistance factors. Trade may be more intense with a country and its trading partners than with the rest of the world because the resistance between them is lower (Bano 2014). Trade intensity provides a way of measuring these trading relations without the bias resulting from the comparative size of the trading partners (Raj, Wing, and Ambrose 2014). Several studies have developed various indexes to analyze the bilateral trade cooperation and the extent countries trade with each other (Folfas 2010). There are two models analyzing the trade flows; one is a gravity model and the other one is a trade intensity index model and they used the later method, because it might help to more readily understand the current Sino-Australian trade. Brown (Brown 1974) and Kojima (Kojima 1964) proposed trade intensity (TI) to monitor trade flows and patterns (Ji, Hu, and Mao 2014).

The empirical findings are also inconclusive. More specifically, Chang-In Yoon and Jiheung Kim (2006) (Yoon and Kim 2006) analyzed the Comparative Advantage of the Service and Manufacturing Industries of Korea, China and Japan using RCA and Trade Specialty Index. Narayan Chandra Nath (Nath 2012) examined the dynamics of trade pattern and competitiveness of Bangladesh and implications for her future development. He highlighted the trade intensities as indicators of global integration and analyzed the dynamics of structure and growth of exports and imports of Bangladesh by commodities and markets. Dalia Bernatonyte and Akvile Normantiene (2001) estimated the trade specialization for the Baltic States. Where they found that trade specialization evolves over time, bringing with it patterns of economic development that vary from country to country and from region to region. Therefore the nature and pattern of trade specialization has been the subject of much study (Bernatonyte and Normantiene 2015). Moreover, Mohammad Mafizur Rahman (Rahman 2005) applied trade intensity to examine the trend, structure of Bangladesh-India trade and suggested to have cooperation among governments, private investors and businessmen of both countries must work together to bring these measures into reality, where there exists similar trade balance like China and Bangladesh.

However, another index named export diversification theory came to the fore in the second half of the twentieth century, in opposition to the classical and neoclassical theories of foreign trade. It defends the positive impact of trade diversification on the economic performance of a country. The question of how much big economies diversify their exports in the case of product groups and export destinations was answered in that paper. Bohdan Vahalík (VAHALÍK 2015) analyzed the export diversification of the European Union and BRICS countries with Herfindahl–Hirschman index of diversification. The findings of his research was that the EU achieved the greatest long-term export diversification on the contrary the BRICS countries have increased their export position in the world economy through the intensive and extensive margin, but from the perspective of diversification, they experienced very different developments of product and territorial diversification. Yanrui Wu and Zhangyue Zhou (Wu and Zhou 2006) investigated the major trends of and changes in the bilateral trade between China and India and explored the issues associated with trade intensity, intra-industry trade and comparative advantages in the two countries. Sayeeda Bano and Jose Tabbada (Bano and Tabbada 2012) analyzes the direction, composition and trends in the trade relations between New Zealand and the Philippines; identified the trade intensity indices, trade potentials, complementarities and revealed comparative advantages.

While a common characteristic observed in the export compositions of developing countries is a broadening of their productive base, and a diversification in their export offerings. A mainstream theme developed as early as Adam Smith's Wealth of Nations (1776) links higher productivity and economic growth with an increased degree

of specialization. This is notably proper in the tradition associated with Ricardo's Classical Comparative Advantage model of trade (Kellman 2010). Successful expansion of exports requires relatively high levels of productivity, either as determinant, or as the result of an increased specialization. Hence, one would expect to find a positive relationship between increased exports and production specialization. The direct relationship between export driven economic growth and specialization is given an additional theoretical foundation when explicit consideration is given to scale economies. (Iapadre 2001; Ferrarini and Scaramozzino 2011).

In this research, we've analyzed the factors related to the bilateral trade and trade deficit of Bangladesh with China by constructing several indices. Among them, Export, Import and Trade Intensity (TI) results exhibit the clear scenario of the intensity of trade between Bangladesh and China. Through the Trade Specialization Index [31] we've analyzed the specialization of the export of Bangladesh to China for 20 sectors/product groups. The findings produce very impressive results that provided a clear indication regarding the sector specialization of Bangladesh's export to China. The Herfindahl-Hirschman Index (HHI) for Bilateral Concentration of Indices/Export Diversification Index also exhibits very inclusive results to illustrate the prospects of concentration and diversification of bilateral trade between Bangladesh and China.

Empirical Model Specification and Data

Trade Intensity

The intensity of trade index was pioneered by Brown (Brown 1974) and was later developed and popularized by Kojima (Kojima 1964). Kojima's intensity of trade index concentrates on variations in bilateral trade levels that result from differential resistances Bano (Bano 2014). Trade may be more intense with a country and its trading partners than with the rest of the world because the resistance between them is lower. Trade intensity provides a way of measuring these trading relations without the bias resulting from the comparative size of the trading partners (Bano 2014). In studying the strength of trade ties, it is often desirable to take into account the importance of a country's trade partners' share in world trade (Bhattacharyay and Mukhopadhyay 2015). One group of indices that does this is the trade intensity index (TII) (WITS 2021). The intensity of bilateral trade between two countries can be measured from either an export or import perspective. The trade intensity statistic is the ratio of two export shares (Raj, Wing, and Ambrose 2014). The numerator is the share of the destination of interest in the exports of the region under study. The denominator is the share of the destination of interest in the exports of the world as a whole (UNSCAP 2021).

In order to examine whether the bilateral trade relationship between Bangladesh and China is strengthening or weakening, here export-intensity index, import-intensity index and Trade intensity have been estimated. Here, Bangladesh is reported as the home country i and trading partner (China) as country j. For trade flows from country i to country j, the indices are measured as follows:

i. Export Intensity Index

$$MII = \frac{M_w / M_{iw}}{X_{jw} / (Xw - Xiw)} \tag{1}$$

ii. Import Intensity Index

$$MII = \frac{M_w / M_{iw}}{X_{jw} / (Xw - Xiw)} \tag{2}$$

iii. Trade Intensity Index

$$TII = \frac{X_{ij} / X_{it}}{X_{jw} / X_{wt}} \tag{3}$$

Where; XII_i represents the export intensity index for country i; MII_i represents the import intensity index for country i; TII represents the trade intensity index for country i; X_{ij} represents the value of country i's exports to country j; X_{iw} represents the value of country i's total exports to the world; M_{jw} represents the total value of imports from the world into country j; M_w represents the value of total world imports; M_{iw} represents the total value of imports from the world into country i; M_{ij} represents the value of imports from country j into country i; X_{jw} represents the total value of country j's exports to the world; X_w represents the total value of world exports; X_{ij} represents the value of country i's exports to country j; X_{it} represents the value of country i's total exports to the world; X_{jw} represents the total value of country j's exports to the world and X_{wt} represents the total value of world exports.

The index determines whether bilateral trade between countries i and j is greater or lesser than might be expected given the importance of the trading partner's share in total world trade. As discussed by Bano (2008) (Bano and Tabbada 2012), trade intensity indices provide a way to measure the strength of trading relations without the bias caused by the comparative size of the trading partners. A value greater than one (TII>1) indicates that the relationship between the home country and the trading partner is greater than is expected given the trading partner's share of world trade, while a value of less than one (TII<1) indicates that the strength of the trading relationship is less than is expected (Bano and Tabbada 2012).

Limitations: As with trade shares, high or low-intensity indices and changes over time may reflect numerous factors other than trade policy (WITS 2021).

Export Specialization Index

A country's production capabilities is an important pattern of its trade flows as existence of capabilities is seen essential for the long-term growth prospects of a country. It is very difficult to measure capabilities directly, because of their complex nature (Ferrarini and Scaramozzino 2011). The recent analysis of capabilities and trade rests on the notion that the observed profile of trade specialization of a country provides indirect information about its productive capacity. Hushmann (Hausmann and Klinger 2006) used sectoral trade flow data to obtain a representation of the product space that is consistent with the global pattern of revealed comparative advantage. The location of a country in the product space is related to its underlying production capabilities. In turn, export specialization is able to explain cross-section differences in growth performance (Hausmann, Hwang, and Rodrik 2007) (Ferrarini and Scaramozzino 2011).

The export specialization (Reshetnikova) index is a slightly modified Revealed Comparative Advantage (RCA) index, in which the denominator is usually measured by specific markets or partners. It provides product information on revealed specialization in the export sector of a country and is calculated as the ratio of the share of a product in a country's total exports to the share of this product in imports to specific markets or partners rather than its share in world exports:

$$ESI = \frac{X_{ij} / X_{it}}{M_{kj} / M_{kt}} \quad (4)$$

Where; X_{ij} and X_{it} are export values of country i in product j, respectively, and where M_{kj} and M_{kt} are the import values of product j in market k and total imports in market k. If the ESI is near to 1, this indicates a greater level of specialization in the market while a value nearer to 0 implies comparative disadvantage in the export in a specific market (Lee 2011; WITS 2021).

1.1 Herfindahl-Hirschman Index (HHI) for Bilateral Concentration of Indices

The Hirfindahl-Hirschman Index (HHI) index posited by both Hirschman (1945, 1964) (Hirschman 1945, Hirschman 1964) and Herfindahl (Herfindahl 1950) (1950) as a measure of trade and industry concentration. The concentration index shows how exports and imports of individual countries or group of countries are concentrated on several products or otherwise distributed in a more homogeneous manner among a series of products

(Vassilopoulos 2003). The index is normally calculated for all trading partners, but it can be broken down by specific trading partners for more detailed analysis (Berger 2014). Therefore bilateral concentration index enables user to specify the group of countries as destination/origin (Tesfay and Solibakke 2016). It has been normalized to obtain values ranking from 0 to 1, with values close to 0 indicating highly diversified exports and values close to 1 indicating highly concentrated exports. The formula is as following:

$$H_{jk} = \frac{\sqrt{\sum_{i=1}^{n}\left(\frac{X_{ijk}}{X_{jk}}\right)^2} - \sqrt{1/n}}{1-\sqrt{1/n}} \tag{5}$$

With $X_{jk} = \sum_{i=1}^{n} X_{ijk}$

Where H_{jk} = concentration index of country or country group *j* exports to / imports from partner country group *k*. X_{ijk} = exports or imports of product *i* for reporter country *j* and trading partner *k*. X_{ik} = total value of exports/imports for country *j* to/from country *k* and product *i*
and *n* = number of products (WITS 2021; Canada 2016).

Data Sources and Preparation

We've explored the issues by constructing various trade indices using secondary data in various aspects and aggregated at the product group classification based on 2 digits level Standard International Trade Classification (SITC Rev 2) and Harmonized System (HS) 1988/92 for the period 1995-2018 based on the data sources of United Nations Commodity Trade database-UN COMTRADE (Database 2021), World Trade Organization (WTO 2021), Bangladesh Bank (Bank 2021), and Export Promotion Bureau of Bangladesh (EPB) (Export Promotion Bueraue of Bangladesh 2021). To analyze the indices, Microsoft Excel and SPSS software were used and the following product codes (table 1) have been applied:

Table 1: The Products code according to HS and SITC System

Product Group	Classification	Product Codes
Animal	HS 1988/92	01,02,03,04,05
Vegetable	HS 1988/92	06,07,08,09,10,11,12,13,14,15
Food Products	HS 1988/92	16,17,18,19,20,21,22,23,24
Minerals	HS 1988/92	25,26
Fuels	HS 1988/92	27
Chemicals	HS 1988/92	28,29,30,31,32,33,34,35,36,37,38
Plastic or Rubber	HS 1988/92	39,40
Raw Hides, Skins, Leather, & Furs	HS 1988/92	41,42,43
Wood and Wooden Products	HS 1988/92	44,45,46,47,48,49
Textiles and Clothing	HS 1988/92	50,51,52,53,54,55,56,57,58,59,60,61,62,63
Footwear	HS 1988/92	64, 65, 66, 67
Stone and Glass	HS 1988/92	68,69,70,71
Metals	HS 1988/92	72,73,74,75,76,78,79,80,81,82,83
Mach and Elec.	HS 1988/92	84,85
Transportation	HS 1988/92	86,87,88,89
Agricultural Raw Materials	SITC Rev2	114
Chemicals	SITC Rev2	367
Food Products	SITC Rev2	306
Fuels	SITC Rev2	50
Textiles	SITC Rev2	370

2. Empirical Results and Discussion

The analyzed results of the intensity, specialization and concentration indices of bilateral trade between Bangladesh and China are as following;

The intensity of Export, Import and Trade

Figure 3 gives the export, import and trade intensity indices between Bangladesh and China. From the analyzed results the following reconciliations are come out. The export intensity value of Bangladesh to China is derived near to zero (0) which means that the export level from Bangladesh to China is highly lower than that of China's in the world market share. Even according to the statistics of MIT media lab, in 2014 China's export share to Bangladesh was 0.49 % (accounting for $11.7 billion) of its total export to the world ($2.37 Trillion). Moreover, the export share of Bangladesh to China in 2018 (appendix 3) shows 3% which is a bit higher than past years but still lower than the import share (22%). The result shows a bit decreased in 2000 (0.006) than the value of 1995 (0.049). Later on, the intensity has been increasing a little year by year reaching 0.027 in 2018. It can be concluded from such a declining trend that Bangladesh could not diversify its export basket enough over the years to the Chinese market, and it has been exporting similar items, whose demands have been declining over the years. This demonstrates that Bangladesh`s commodity concentration in export is more than in its import from China.

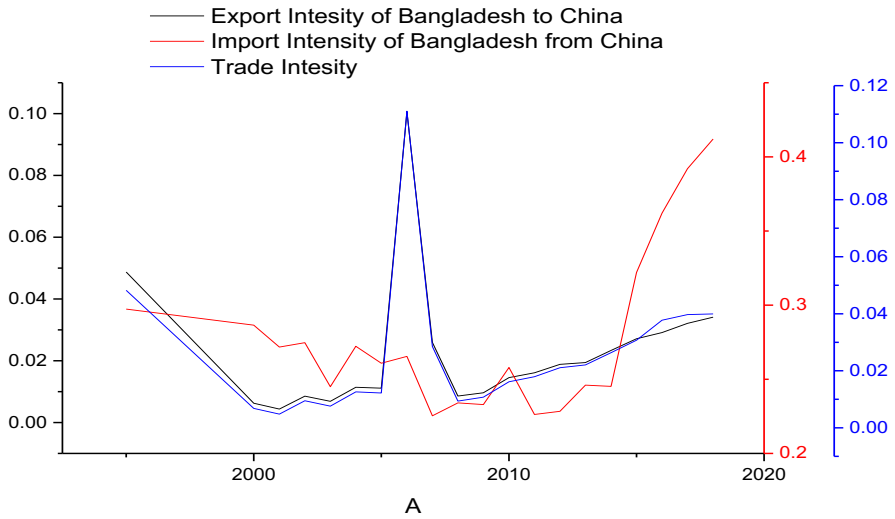

Figure 3: Analyzed values of Trade Intensity Indices for Bangladesh's Bilateral Trade with China, from 1995-2018.

In terms of import intensity of Bangladesh from China during 1995 to 2018 is less than one [13] but not very near to Zero (0) which interprets that the import level from China to Bangladesh is higher than that of Bangladesh's share of import from the world. If we see the statistics, it shows the share of imports of Bangladesh from China is 22%. The inter-temporal change of import intensity over years shows; in 1995 it was 0.30 in 2005 it was 0.26 and in 2018 the value increased to 0.32. The bilateral trade balance also shows the same scenario (figure 1) indeed. However, the import intensity index is much more noticeable compare to the export intensity index. The increasing trend in imports may be credited to the fact that China is also a major import partner of Bangladesh and its importance has been growing in recent years.

Regarding the trade intensity, the intensity declined to 0.01 then the value in 1995 (0.05) but from 2010 the intensity has been increasing. This implies Bangladesh has much potential to increase its trade with China. This also may be due to immense economic structural change in both countries in the last two decades. In 1995 Bangladesh was more an importing country than an exporting. On the contrary in 2018, Bangladesh becomes one of the important manufacturing countries in the world. Especially, the textile and apparel sector of Bangladesh which is in the top second suppliers of readymade garments in the world after China.

Export Specialization Index

The examined export specialization patterns of Bangladesh with China for 16 sectors throughout 1995-2018 are shown in appendix 4 as well as categorized according to their degree of specialization in table 2.

Table 2: Level of Specialization of Sectors according to the analyzed values of ESI

Hierarchy	High Specialization (ESI≥1)	Medium Specialization (1>ESI>o.5)	Low Specialization (0.5>ESI>0)	No Specialization (ESI=0)
1	Animal Products	Footwear	Vegetables	Mach and Elec.
2	Hides and Skins	Wood Products	Metals	Food Products
3	Textiles and Clothing	Transportation	Chemicals	Stone and Glass
4	Minerals			Fuels
5	Plastic or Rubber			
6	Miscellaneous			

Note: In table 2 we categorized the sectors/product group according to the TSI value range based on our understanding and analysis.

The analyzed results of the export specialization indices compose very splendid findings regarding the specialization of the export of Bangladesh to China from 1995 to 2018. According to the analyzed result, the 8 sectors reveal the highest specialization having an average score of 1 or more than 1 (ESI≥1) which means a very high level of specialization of these 8 sectors for Bangladesh's export to China. Among these 8 sectors, the Animal and Animal Products sector reveal the highest specialization having an average score of 126.0 in the last two decades. This sector includes major export products of the agricultural sector of Bangladesh. According to the trend, this sector shows future potentiality where Bangladesh's exporters and policymakers should focus further.

The next sector's (Hides and Skins) average ESI value is 118.3 from 1995-2018. This sector also shows high potentiality for Bangladesh's export basket to China. The third one is the textiles and clothing sector which exhibited very high specialization having an average ESI score of 32.8 in the last two decades. Being the major manufacturing sector of Bangladesh, the textile and clothing sector accounts for more than 85% share of the total export of the country. For export to China, this sector also accounts the highest share (65% in 2014). In our observation, the textile and clothing sector shows the most diverse of products in terms of Bangladesh's export to China and this sector has immense capacity to contribute further expansion of her export to China (Md. Ekram Hossain et al. 2017).

The fourth positioned sector is the raw materials sector which also exhibits a very high level of specialization from 1995 (ESI-27.82) up to 2018 (ESI- 8.14) and 17.9 average ESI value for the last two decades. During this entire two-decade, this sector has maintained steady decreasing synopsis. If the economic structure of Bangladesh is analyzed the causes are very clear. Being manufacturing countries both Bangladesh and China import the raw materials for their respective industries. The ESI value gives us a clear scenario of the structural change of Bangladesh's manufacturing sector as well as the economy as a whole. The industrial diversification of Bangladesh was not more diverse in 1995 as now. The steady decrease of this value indicates the more utilization of its raw resources for the domestic manufacturing sector rather than export. The fifth positioned one the mineral products exhibit an average ESI value of 4.5 from 1995 to 2018. The sector revealed quite potential for the export of Bangladesh to China. The statistics show that this sector is a new product group for the export basket of Bangladesh to China where the concerned stakeholders could focus on future improvement.

The next one, the Plastic or Rubber sector's analyzed average ESI value is 2.7 which indicates high specialization for Bangladesh's export to China. According to the trends, the sector could lose specialization in the coming years. According to the manufacturing industry structure, this sector also poses a potential sector for Bangladesh. The consumer goods sector stands in the seventh position having an ESI 1.7 average in the last two decades. According to our observation and analysis, this sector is a new sector for the export basket of Bangladesh for its export to China. In sum, it can be said that the ESI growth of this sector is very impressive and this sector could be one of the core sectors which have the potentiality to contribute to reducing the existing trade deficit of Bangladesh with

China. The 8th positioned sector belongs to the miscellaneous sector which exhibited an average ESI value of 1.6 in the last two decades. The sector could also grow more if the export basket of Bangladesh in this sector could be diversified. Because of the massive change in the economic structure in China and their increasing middle class, more demand on this sector will appear and this sector has future potential to get more shares in Bangladesh export basket to China. In this regard, the exporters and other stakeholders should focus on it very tactically.

The sectors having medium ESI values are the Footwear sector, Wood Products sector, and Transportation sector respectively. Having an average ESI value from 1>ESI>o.5, the sectors exhibit medium specialization for the export of Bangladesh to China. Among the sectors, the footwear sector has quite potential for its export because of the availability of raw materials (raw skins, garments) in Bangladesh. The low specialization category belongs to four sectors accordingly; Vegetables, Metals, Intermediate goods and the Chemicals sector. The sectors score values ranging from 0.5>ESI>0 from 1995 to 2018. In our investigation, it is found that among the sectors in the last decade; the agriculture sector of Bangladesh has developed very significantly and the country has got its sufficiency of production in this sector while exporting the rest portions. Bangladesh has been exporting vegetable products to many other destinations since the last decade. Because of the growing rate of middle-class demand and their purchasing power parity (PPP) in China, the future potentiality of this sector is highly anticipated.

The rest of the sectors that have no specialization for Bangladesh's export to China are respectively, Machinery and Electronics sector, Capital goods, Food Products, Stone and Glass and Fuels. Since the sector's ESI value equal to zero (0), the sectors have no specialization for Bangladesh's export. The trade structure of Bangladesh could explain these sectors to some extent. Bangladesh mostly imports the products belongs these sectors from other nations for her domestic market's demand rather than export.

Herfindahl-Hirschman Index (HHI) for Bilateral Concentration of Indices

Figure 4 shows the analyzed value of Herfindahl-Hirschman Index (HHI) or the Export Diversification indices for Bangladesh's Bilateral Trade with China from 1995-2018.

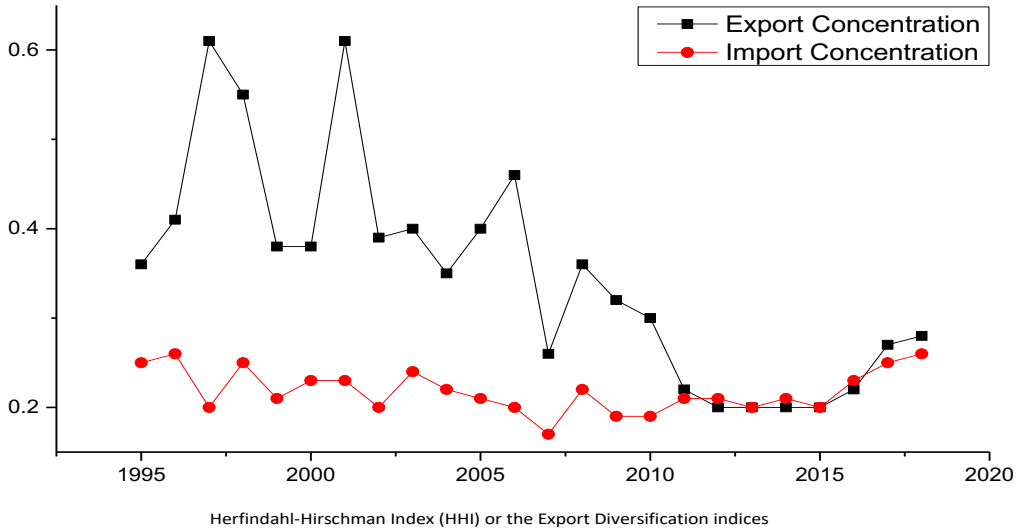

Figure 4: Analyzed values of Herfindahl-Hirschman Index (HHI) or the Export Diversification indices for Bangladesh's Bilateral Trade with China, 1995-2018

The analyzed result of export concentration shows; from 1995 to 2006 the HHI values range on average 0.5 which means concentration of export in particular industries of Bangladesh to China. From 2007 to 2018 the export concentration has changed significantly and the average HHI values shrank down to 0.21 which indicates; during this period the export pattern of Bangladesh to China has gradually converted from concentration to diversification. The export share of Bangladesh in 1995 was 1.2% but the share dropped down up to 2005. The export share began

to increase from 2005 and after a decade to share reached 2.89% in 2018. After the year 2010, the export share showed growing significantly. At the same time, the HHI value for export concentration also dropped down significantly and changed steadily to export diversification. It could be the effect of China's duty-free, quota-free (DFQF) market access program for 33 LDCs including Bangladesh on 1 July 2010 covering products of 4,788 tariff lines (8-digit level) to export to the Chinese market (Bangladesh 2020).

However, the trend of import concentration values shows 0.21 on average from 1995 to 2018. The values indicate import diversification because China is one of the largest import sources of Bangladesh and the imports are from various products and industries.

Concluding Remarks and Policy Implications

This paper explores the propensity of export, import and trade deficit of Bangladesh with China on an empirical basis alongside constructing several trade indices through a rigorous data analysis. An empirical analysis, our results imply that Bangladesh has been facing a high deficit of trade with China and the trend shows a higher deficit will be continued in coming years. Based on the findings as well as existing literature review, policy implications are recommended at the end of this concluding part. Let's summarize our findings and suggested implications based on the results.

Regarding export, import, and trade intensity; our results reveal that the gap between import intensity and export intensity is widening year by year. So the level of intra-industry trade between the two countries becoming worse and needed to be improved. This may be because China's import items from Bangladesh are composed of primary and intermediary goods on the contrary Bangladesh's imports from China are mostly the intermediate, capital, and machinery goods for her manufacturing industry. Therefore, it is stated from the results that the volume of imports from Bangladesh is much higher than its export to China. Secondly, very lower indices for exports and imports are far from the desired level of 1 which implies that Bangladesh-China trade was not as high as it should be. So there is a scope for mutual trade expansion too.

Through the analysis of the export specialization index, very impressive and prudent outcomes have been explored. Especially, our analysis has given a very clear indication for the potential sectors of Bangladesh that could contribute to minimizing the trade deficit of Bangladesh with China. In this research, we've analyzed 20 sectors/product groups of Bangladesh in its export to China. Among the sectors; 8 sectors found high specialization and revealed very potential sectors for Bangladesh's export to China. We've also discovered 3 moderate potential sectors and 4 sectors having low specialization for the export basket of Bangladesh to China. On the other hand, 5 sectors reveal no specialization for the export of Bangladesh to China. Based on our analysis it is suggested that the 15 sectors that belong to three levels of specializations respectively (table 2) have the potential to minimize the deficit of trade for Bangladesh with China. Concerning this, initiatives should be taken by the stakeholders in all sectors at public, private, and industry levels.

The last one is the analyzed values of Herfindahl-Hirschman Index (HHI) or the export diversification indices for Bangladesh's Bilateral Trade with China. The results confess the indications of Bangladesh's export to China where still a wide level of export diversification is needed to grab the huge diversified demand of the Chinese market. Especially with the rapid growth of the Chinese economy as well as the middle classes in China, the opportunity for Bangladesh to expand its export product and market diversification is immense. The policymakers in the public and private sector of Bangladesh, exporters, and industry stakeholders should be attentive enough to take initiative to grab this opportunity.

However, based on our overall analysis of the indices, the existing literature, and reports, several policy recommendations are suggested to minimize the trade deficit of Bangladesh with China. First of all, special focus should be given to the high potential sectors of Bangladesh that can narrow the exiting trade deficit. Among the sectors; Animal Products, Hides and Skins, Textiles and Clothing, Raw materials, Minerals, Consumer goods, and Miscellaneous exhibit the most potential sectors for Bangladesh to boost up its export basket to China.

Secondly, Bangladesh should focus on product diversification, especially on the goods that China imports for its local consumption. Despite enjoying a zero-tariff facility in exporting its products to the Chinese market Bangladesh has failed to utilize the facility fully due to a lack of product diversification.

Thirdly, Bangladesh could join the 'One Belt One Road and 21st Century Maritime Silk Road Project of China' that creates an enormous investment opportunity for Bangladesh in its infrastructure sector as well as investment from the emerging Chinese multinationals in different sectors of Bangladesh.

Fourthly, establishing a Bangladesh-China free trade area to get duty-free access to more Bangladeshi products to the Chinese market could reduce the deficit to a bigger extent. According to the suggestion of the Bangladeshi Commerce ministry, Bangladesh needs to sign a free trade agreement (FTA) with China aiming to narrow the yawning trade gap between the two nations as well as to access the trillion dollars' worth Chinese consumer market.

Finally, China's outward investment in Bangladesh could assist to reduce the gap in another aspect [49]. Chinese investment in Bangladesh's industry sectors, particularly relocating some of its low-value-added industries that are not cost-effective due to higher labor costs in China could contribute to narrow the gap to some extent. Bangladesh government should also remove trade barriers and bottlenecks in attracting outward investments from [49, 50].

Hereafter, regarding further research direction, we would like to suggest more dense research on the textile and clothing industry of Bangladesh to what extent the sector could contribute to narrow the gap. Furthermore, academic research is needed to find out the potentiality of Bangladesh to join and to be benefited from the 'One Belt One Road and 21st Century Maritime Silk Road Project' of China. Moreover, very rigorous and investigative research is also needed to explore the FTA potentialities and insights between the two countries.

Funding Information

Financial support from the Innovative Team Project of Philosophy and Social Sciences in Jiangsu Higher Learning Institutions, Lancang-Mekong Cooperation Innovation and Risk Management under the "Belt and Road Initiative" (Grant Serial Number: 2017ZSTD002) of Hohai University is gratefully acknowledged.

Acknowledgments

The authors gratefully acknowledge the anonymous researchers at Hohai University's Institute of Industrial Economics for their helpful suggestions in improving this article.

Conflict of Interests Statement

There are no conflicts of interest declared by the authors.

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APPENDIX

Appendix 1: Analyzed values of Sectoral Export Specialization indices (ESI) for Bangladesh's Bilateral Trade with China, 1995-2018

Sectors	1995	2000	2005	2007	2011	2013	2017	2018
Raw Materials	27.82	14.83	32.35	12.45	20.27	13.98	10.56	8.14
Consumer Goods	0.07	1.48	1.03	0.77	1.71	2.99	2.80	3.21
Intermediate Goods	0.77	0.70	0.49	0.43	0.23	0.37	0.38	0.34
Capital Goods	0.37	0.11	0.29	1.50	0.04	0.05	0.05	0.04
Animal	4.72	0	8.23	3.76	7.91	8.18	3.04	6.12
Hides and Skins	3.23	4.06	7.28	7.49	4.7	3.67	9.27	6.68
Textiles and Clothing	9.56	0.45	0.57	0.92	1.52	1.31	1.62	1.94
Plastic or Rubber	0	0.27	2.22	8.17	4.05	3.63	1.27	0.93
Miscellaneous	3.5	5.56	2.9	0.66	0.47	1.07	0.75	0.59
Footwear	0	0.01	0.45	0.56	1.04	1.51	1.01	1.07
Vegetable	0	0	0	0	0.76	0.45	2.39	0.94
Mach and Elec.	0.33	0.14	0.63	0.24	0.04	0.03	0.05	0.05
Minerals	0	0	0	0.02	1.88	38.67	6.48	0.75
Wood	0	0	0.06	0.17	0.01	0.04	0.13	0.17
Chemicals	5.95	0	0	0.01	0	0.06	0.18	0.02
Food Products	0	1.7	0	0.12	0	0.04	0.03	0.17
Stone and Glass	0.33	0	1.45	0.01	0.11	0.01	0.01	0.02
Transportation	0.31	0	3.68	1.77	0.22	0.66	0.02	0.03
Metals	0	0	0.49	1.38	1.38	0.02	0.02	0.02
Fuels	0	0	0	0	0.12	0.01	0.01	0.02

Appendix: 2 Analyzed Herfindahl-Hirschman Model, Export, Import and Trade Intensity Index Results between Bangladesh and China from 1995-2018

Year	Intensity Index			Herfindahl-Hirschman Index	
	Export Intensity of Bangladesh to China	Import Intensity of Bangladesh from China	Trade Intensity	Export Concentration	Import Concentration
1995	0.05	0.3	0.05	0.36	0.25
2000	0.01	0.29	0.01	0.38	0.23
2001	0	0.27	0	0.61	0.23
2002	0.01	0.27	0.01	0.39	0.2
2003	0.01	0.24	0.01	0.4	0.24
2005	0.01	0.26	0.01	0.35	0.22
2006	0.1	0.27	0.11	0.4	0.21
2007	0.03	0.23	0.03	0.46	0.2
2008	0.01	0.23	0.01	0.26	0.17
2009	0.01	0.23	0.01	0.36	0.22
2010	0.01	0.26	0.02	0.32	0.19
2011	0.02	0.23	0.02	0.3	0.19
2012	0.02	0.23	0.02	0.22	0.21
2014	0.02	0.25	0.02	0.2	0.21
2016	0.02	0.25	0.03	0.2	0.2
2018	0.03	0.32	0.03	0.2	0.21