

*Original Research*

# Trade Intensity and Revealed Comparative Advantage: An Empirical Analysis of Trade between China and Bangladesh

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## Abstract

This paper examines the intensity of trade between Bangladesh and China along with analyzing sector level comparative advantage of 16 export sectors of Bangladesh and China in bilateral trade. The Trade Intensity and Balassa Revealed Comparative Advantage (RCA) indices of the 20 export sectors of Bangladesh and China are examined from 1995 to 2019 to achieve the research objectives. Bangladesh's trade strength with China shows that the country has a lot of space to expand its trade with China. The revealed comparative advantage analysis of 20 exports sector of Bangladesh and China exhibits that among those 20 sectors, Bangladesh reveals high comparative advantage over 5 sectors, moderate over 4 sectors, and comparative disadvantage over 11 sectors of its export to China. Moreover, China reveals moderate comparative advantage over 8 sectors and comparative disadvantage over 12 sectors of its export to Bangladesh. Based on the empirical analysis and the literature, recommendations are addressed to improve the export sectors of Bangladesh.

**Keywords:** Trade Intensity, Comparative Advantage, Bilateral Trade, Bangladesh, China

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## Introduction

Bangladesh's increasing global integration emphasizes restructuring its relationship with major global economies. By 2024, the country would have graduated from the lower-income group to the lower-middle-income group, and will no longer be classified as a Least Developed Country (LDC). China's global leadership on economic issues has got increasing attention from the LDCs and other developing countries. The Asian economic giant has a gross domestic product or GDP (2018) of US\$10.9 trillion, per capita GDP (2018) of \$7924, export and import (2018) of \$2.14 trillion and \$1.58 trillion respectively, outward foreign direct investment or FDI (2018) of \$187.8 billion, and overseas development assistance or ODA (2013) of \$7.5 billion (Moazzem, 2016). Bangladesh's trade with China accounts for around 26.5 percent of the country's overall trade with the rest of the world, which is the highest and on the rise. If this rate holds, total bilateral trade in 2021, when the country celebrates its 50th anniversary, will be USD18 billion (Kabir, 2016).

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. Bilateral trade between Bangladesh and China has risen significantly in recent years, both in terms of absolute value and percentage change among Bangladesh's top trading partners. The two countries have long partnered in several areas, and their relationship has yielded positive results (Agency, 2016). Bangladesh's economic relations with China are extremely important. Over the years, bilateral trade and economic relations between the two countries have vastly improved (Karim, 2018). Bilateral trade between the two countries crossed over \$13 billion in 2018. Bangladesh's infrastructure is still being developed, and China has become a significant partner in this endeavor (Sobhan, 2016). 'The economic and trade cooperation between China and Bangladesh has sustained strong momentum in recent years,' according to the Chinese Embassy in Dhaka. Bangladesh is now China's third-largest trading partner in South Asia, and China is Bangladesh's largest source of imports (DCCI, 2016) (Kohli, 2018).

Bangladesh currently profits from duty-free access to China through the Asia-Pacific Trade Agreement (APTA), as both countries are members of the trade bloc (Karim, 2018). Furthermore, as a Least Developed Country (LDC), Bangladesh has had duty-free quota-free (DFQF) market access to China since July 1, 2010, for 4,788 tariff lines (8-digit level), accounting for 60% of all tariff lines in China (Export Promotion Bureau of Bangladesh, 2021) (Bangladesh, 2020).

However, after having all these positive bilateral trade relations Bangladesh still suffers a negative trade balance with China that raised to US \$13.1 billion in 2018 while Bangladesh could export to China only US \$803 million in 2018 (M. Shahidul Islam, 2016). Although China has been providing duty-free access to Bangladeshi products to enter into the Chinese market since 2010, Bangladesh couldn't able to increase its export to China to some significant extent which could contribute to narrow the existing negative trade balance between the two nations. Few academic researchers also conducted to explore the insights that inspired us to investigate the export composition of Bangladesh to China to find out the products that reveal comparative advantage in exports of Bangladesh. In this study, we analyzed the 20 export sectors of Bangladesh in its export

to China to find out the competitive sectors. This research explores the following objectives;

- a) What is the level of intensity of Trade between Bangladesh and China?
- b) Which sectors of Bangladesh possess the highest comparative advantage to export to China?
- c) Which sectors Bangladesh should focus more on to enlarge the export volume to China?
- d) What are the recommendations to improve the export basket of Bangladesh to grab a larger share of China's imports?

### **Literature review**

China's rapid economic development has made it a dominant economic force in the global economy. Bangladesh expects more free access to the Chinese market for its goods, increased Chinese direct investment, and China's continued help in improving the country's infrastructure from China as a trading partner. Bangladesh's largest development partner in China and the two countries are expected to cooperate further in the future (Samad, 2017). Trade has historically controlled Bangladesh's economic ties with China (M. Shahidul Islam, 2016). According to the International Trade Centre, two-way trade between China and Bangladesh crossed USD 16.8 billion in 2016. In the last five years, Bangladesh's exports to China have grown at a rate of about 40% per year. Imports, on the other hand, grew at a rate of 23% per year on average. A back-of-the-envelope estimate suggests that two-way trade between the two countries could reach USD 30 billion by 2021, even under the most conservative trade growth scenario (M. Shahidul Islam, 2016).

The export-import compositions of Bangladesh with China in last two decades confess that in 1995 the export to China was the US \$47.6 million while import from China was the US \$632.9 million and balance of trade was negative US \$585.3 million (figure 1). Gradually the export increased and the growth of export was average around 25% by year, especially from 2010 the growth increased significantly when China declared duty-free quota-free access for LDCs countries including Bangladesh (Export Promotion Bureau of Bangladesh, 2016). During this period, the import from China also increased accordingly with around 18% growth by year. In 2018 the export to China reached US \$803.7 million and imports the US \$13.9 billion having a trade deficit of US\$13.1 billion (figure 1).

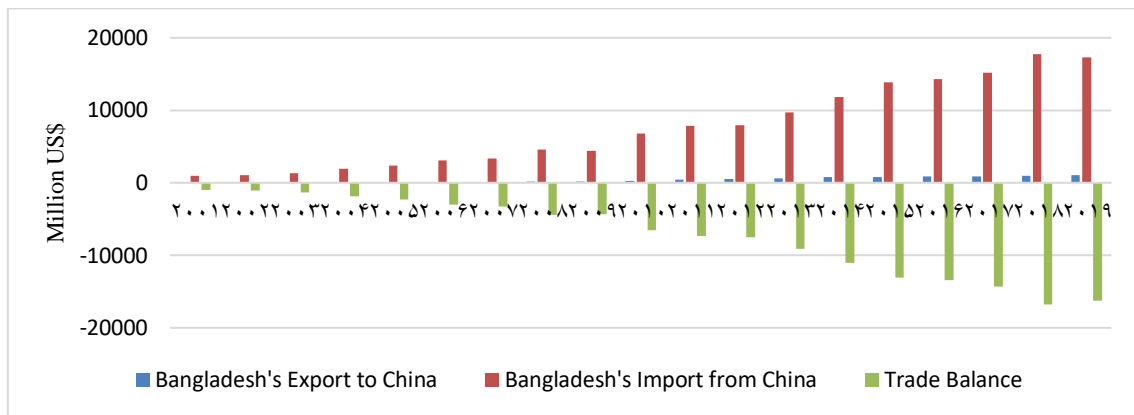


Figure 1: Trade Balance between Bangladesh and China from 1995-2019  
 Source: WITS (World Integrated Trade Solution); <http://wits.worldbank.org>

The export-import composition between Bangladesh and China in the last two decades shows a very interesting scenario. We analyzed 20 export sectors of Bangladesh that conquest almost the whole export sector of Bangladesh. Regarding the export of Bangladesh to China, the statistics show that in 1995 among those 20 sectors, the Intermediate goods sector occupied the largest share having US \$22.8 million, while Chemicals sector the second (the US \$16.24 million), Raw materials sector fourth (the US \$14.31 million), Textile and clothing the fifth (the US \$9.32 million), Hides and skin the sixth (the US \$6.25 million), Animal sector seventh (the US \$5.51 million), Miscellaneous sector eighth (the US \$5.55 million), Capital goods the ninth (the US \$4.76 million) and the Machine and Electronic sector the tenth position (the US \$3.58 million) that are the mentionable export sector of Bangladesh to China (figure 2).

During the last twenty years period, the structure of the export of Bangladesh to China changed in many aspects. In 2018 the textile and apparel sector occupied the highest (the US \$582.06 million) share overcoming the intermediate goods sector. Furthermore, the Consumer goods sector grabbed the second-largest share (the US \$539.08 million), Intermediate goods the third (the US \$146.34 million), Raw materials the fourth (the US \$110.04 million), Animal sector fifth (the US \$69.12 million), Hides and Skin the sixth (the US \$51.45 million), Plastic and rubber seventh (the US \$26.05 million), Miscellaneous eighth (the US \$26.01 million), Footwear sector the ninth (the US \$18.15 million), Vegetable sector the tenth (the US \$12.73 million), Machinery and electronic eleventh (the US \$8.93 million) and Capital goods grabbed the twelfth (the US \$8.25 million) position among the 20 sectors of our analysis (figure 2). The intertemporal change of the export sectors reveals that Consumer goods which had very little export share (0.33%) in 1995 appeared as the second-largest export sector of Bangladesh to China in 2018 having a 33.54% share in the total export of Bangladesh. While the textile and apparel sector also appeared as the largest export sector for Bangladesh in 2018 having 36.21% share in total export and the share of the Chemical sector dropped down 0.08% these are the mentionable change that occurred during 1995 to 2018 in the exports segments of Bangladesh to China.

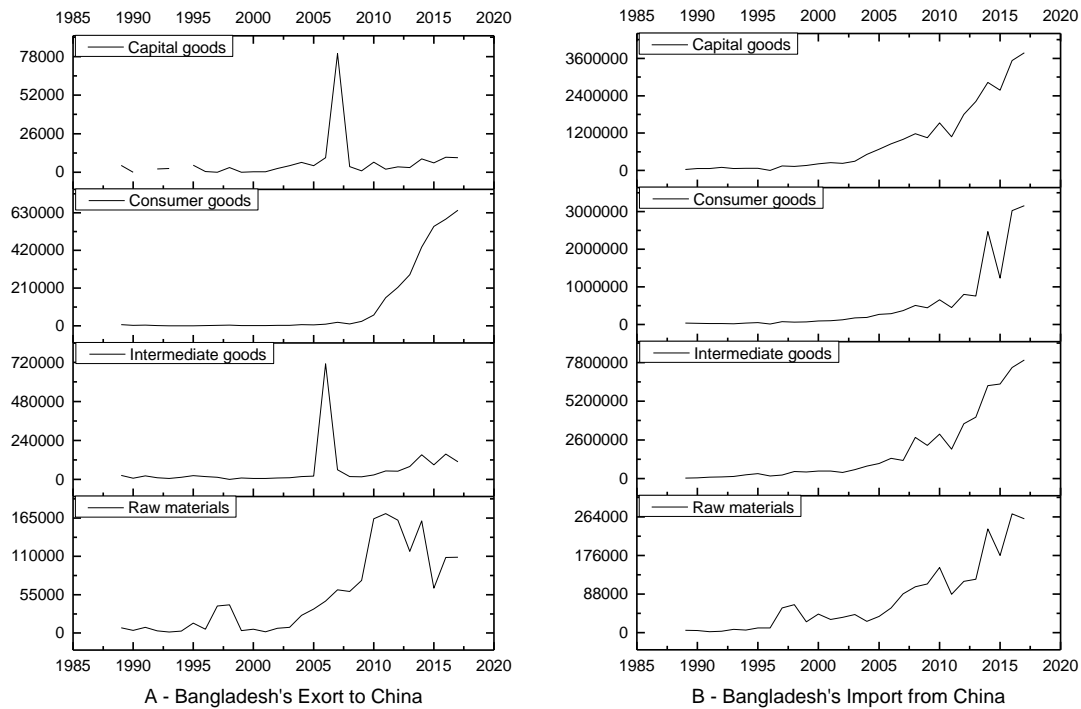


Figure 2 (A, B): Bangladesh's Exports (Thousand US\$) to China for all products from 1995-2018

Source: WITS (World Integrated Trade Solution); <http://wits.worldbank.org>, compiled by the authors in January 2021

However, the import composition of Bangladesh from China shows a bit different scenario as import segments reveal the intermediate goods, capital goods, and textile and apparel sectors are the major import segments. These sectors cover the products mainly the goods and machinery for the backward linkage supply for the manufacturing industry of Bangladesh. The intertemporal movement of the import share of Bangladesh's in 20 sectors from China reveals that in 1995 the Intermediate goods sector (the US \$391.09 million) grabbed the largest share in imports. Moreover, the Capital goods (US\$170.50 million) positioned the second, Machine and electronic goods (the US \$142.29 million) the third, Mineral Products (the US \$82.10 million) the fourth, Consumer goods the fifth, Transportation goods in the sixth, Chemicals the seventh, Wood products the eighth, Metals ninth and the Miscellaneous sector the tenth sector.

These mentioned sectors are the larger sectors according to the value and share of total imports of Bangladesh in 1995 (figure 3). After 20 years later in 2018 the import composition shows some new sectors appeared at the top while some sectors dropped down in the total export share. Most mentionable, the textile and apparel (the US \$ 5201.76 million) came in a frontline positioning in the second as this sector has grown in an immense volume (84% share in total export of Bangladesh in 2018) in Bangladesh and many of its raw materials and intermediate product's main source belong to China. However, some emerging sector also showed higher share those hold in very low share in 20 years back; Plastic and Rubber (the US \$484.43 million), Fuels (the US \$309.46

million), Footwear (the US \$292.75million), and Wood Products (the US \$213.19 million) are those sectors of Bangladesh's import in last decade.

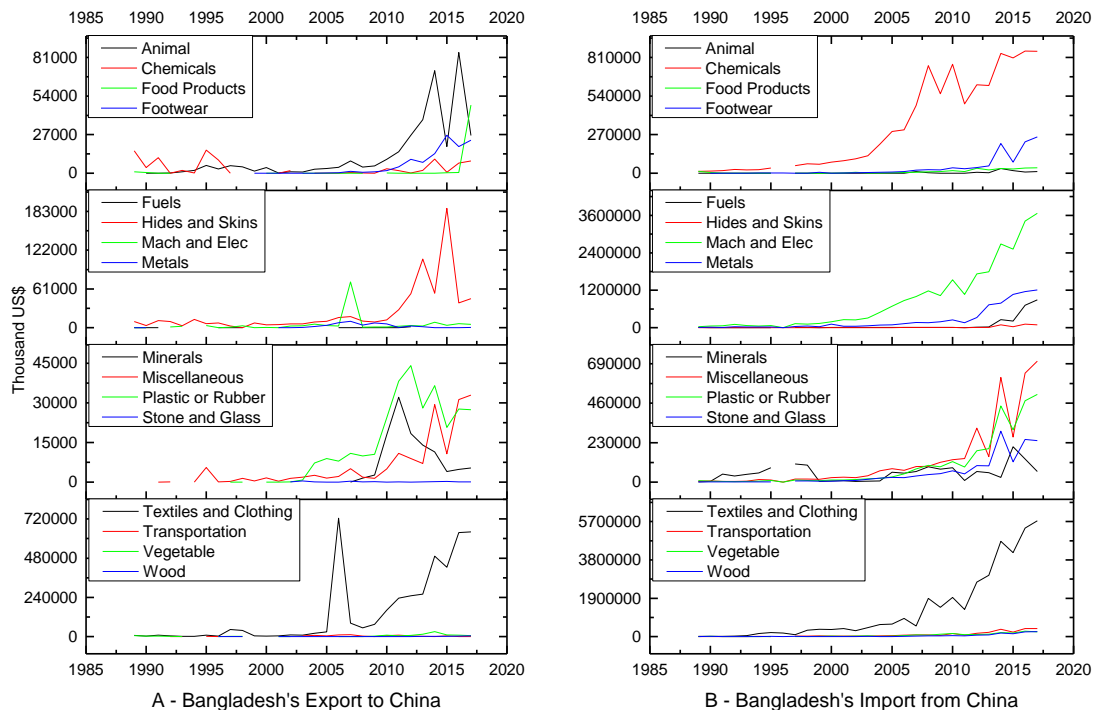


Figure 3: Bangladesh's Imports from China for all products from 1995-2018  
 Source: WITS (World Integrated Trade Solution); <http://wits.worldbank.org>, compiled by the authors in January 2021

The analysis of the trade composition between Bangladesh and China, trend reveals that Bangladesh has been undergoing a negative trade balance with China since 1995 the year we choose to analyze. To close the gap, China has granted Bangladeshi goods duty-free and quota-free access to the Chinese market under the AFTA and LDCs agreements (Md Shariful Islam, 2018). Since July 2010, Bangladesh has been enjoying the duty-free status of more than 4,700 items of Bangladesh-made goods exported to China (Embassy, 2010). Despite these positive developments in bilateral trade, Bangladesh's export couldn't able to occupy a significant amount of China's import share that could contribute to narrow the existing trade gap. In this regard, some deeper investigation is needed to explore sector and product base exploration of the competitiveness of Bangladesh in exporting to China. Furthermore, the factors of the Chinese market and consumer demand also important to explore for the greater expansion of Bangladesh's export into China.

During our literature review, academic researchers related to these issues are found few except some articles in daily newspapers and magazines. Among them, Md Shariful Islam (2018) exposes the trade deficit issues while Chinese President Xi Jinping visited Bangladesh in October 2016. In his write up some important insights came out regarding the deficit and recommendations to narrow the gap. Dr. Mahfuz Kabir (2016) also exposes some other insights regarding the issues and he more suggested Chinese investment in Bangladesh to improve the situation. Rezaul Karim (2018) addressed some action plans



to reduce the negative trade gap. S.C. Kohli (2018) analyzed Bangladesh's sprouting bilateral relations with China since the independence of the country in terms of diplomatic and trade relations. Md. Ekram Hossain and et al (2017) analyzed the dynamic comparative and competitiveness of the textile and apparel industry of Bangladesh and China where the strengths of the industry were explored in international trade as well as bilateral trade aspects with China. In his deeper analysis of the trade between China and Bangladesh and the consequences were addressed by Dr. Khondaker Golam Moazzem (2016) in his article in the daily sun. Furthermore, Farooq Sobhan (2016) addressed the strategic issues and policies regarding China-Bangladesh ties in the last four decades. Shahnoor Wahid (2016) analyzed some more insights of trade between China and Bangladesh where he suggested emphasizing more on Textile and apparel, Leather goods, and Agriculture products for the father expansion of Bangladesh's export to China. However, there exist academic research and literature gap in terms of analyzing the sector-based comparative advantage of Bangladesh's export to China that motivated us to conduct this research. We believe this research will contribute to some extent to narrow the literature gap in this area as well as will find out some solutions regarding the discussed issues.

### Data, model, and methodology

We investigated the issues by constructing various trade indices using export and import data disaggregated at the Product group classification level based on 2 digits Standard International Trade Classification (SITC Rev 2) and Harmonized System (HS) 1988/92 for the period 1995-2018 based on secondary data sources of United Nations Commodity Trade database UN COMTRADE (Database, 2021), World Trade Organization (WTO, 2021), Bangladesh Bank (Bank, 2020), and Export Promotion Bureau of Bangladesh (EPB) (Export Promotion Bureau of Bangladesh, 2020).

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
Intermediate goods	HS 1988/92	2049 (UNCTAD-SoP2)
Chemicals	HS 1988/92	28,29,30,31,32,33,34,35,36,37,38
Raw Hides, Skins, Leather, & Furs	HS 1988/92	41,42,43
Textiles and Clothing	HS 1988/92	50,51,52,53,54,55,56,57,58,59,60, 61,62,63
Raw materials	HS 1988/92	584 (UNCTAD-SoP1)
Consumer goods	HS 1988/92	1532 (UNCTAD-SoP3)
Vegetable	HS 1988/92	06,07,08,09,10,11,12,13,14,15
Capital goods	HS 1988/92	905 (UNCTAD-SoP4)
Transportation	HS 1988/92	86,87,88,89
Food Products	HS 1988/92	16,17,18,19,20,21,22,23,24
Mach and Elec.	HS 1988/92	84,85
Metals	HS 1988/92	72,73,74,75,76,78,79,80,81,82,83

Product Group	Classification	Product Codes
Fuels	HS 1988/92	27
Wood and Wooden Products	HS 1988/92	44,45,46,47,48,49
Stone and Glass	HS 1988/92	68,69,70,71
Plastic or Rubber	HS 1988/92	39,40
Animal	HS 1988/92	01,02,03,04,05
Agricultural Raw Materials	SITC Rev2	114
Chemicals	SITC Rev2	367
Food Products	SITC Rev2	306
Fuels	SITC Rev2	50
Textiles	SITC Rev2	370

### *Trade Intensity*

Brown (Brown, 1974) invented the intensity of trade index, which was later created and popularized by Kojima (Kojima, 1964). The strength of the trade index established by Kojima focuses on changes in bilateral trade levels as a result of differential resistances Bano (2014). Since the resistance between them is smaller, trade between a country and its trading partners can be more intense than trade with the rest of the world. Trade intensity is a way to measure these trading relationships without being skewed by the size differences between the trading partners (Bano, 2014). When assessing the strength of trade relations, it's common to consider the value of a country's trade partners' share of global trade (Bhattacharyay & Mukhopadhyay, 2018). The trade intensity index (TII) is one category of indices that does this (WITS, 2021). From either an export or import perspective, the intensity of bilateral trade between two countries can be calculated. The ratio of two export shares is the trade intensity statistic (Raj, Wing, & Ambrose, 2014). The numerator is the percentage of the study region's exports that go to the destination of interest. The denominator is the percentage of total world exports that go to the destination of interest (UNSCAP, 2021).

Both the export-intensity index and the import-intensity index have been measured to see if the bilateral trading relationship between Bangladesh and China is improving or worsening. Bangladesh is listed as the home country *i* and China are listed as the trading partner (country *j*). These indices are determined as follows for trade flows from country *i* to country *j*:

$$TII = \frac{X_{ij} / X_{it}}{X_{jw} / X_{wt}} \quad (1)$$

Where TII MII is the trade intensity index for country *I*,  $X_{ij}$  is the value of country *i*'s exports to country *j*,  $X_{it}$  is the value of country *i*'s total exports to the world,  $X_{jw}$  is the total value of country *j*'s exports to the world, and  $X_{wt}$  is the total value of world exports.

The index measures whether bilateral trade between countries *i* and *j* is higher or lower than one would anticipate based on the importance of the trading partner's share of global trade. As discussed by Bano (2008), Trade intensity indices help you to determine the



strength of your trading relationships without being swayed by the scale of your trading partners. A value greater than one indicates that the frequency of the trading relationship between the home country and the trading partner is greater than expected given the trading partner's share of global trade, while a value less than one indicates that the trading relationship is weaker than expected given the trading partner's share of global trade (Bano & Tabbada, 2012).

Limitations: High or low-intensity indexes, as well as changes over time, can represent several factors other than trade policy (WITS, 2021).

### *Revealed Comparative Advantage*

Comparing the trade profile of the country of interest to the world average, revealed comparative advantage indices (RCA) use the trade trend to classify the sectors in which an economy has a comparative advantage. In other words, it's the ratio of the commodity's exports to overall exports from the source, relative to the same ratio for the entire world (Fertő & Hubbard, 2002). We used Balassa's (1965) RCA model to calculate relative export output by country and industry/commodity, which is characterized as a country's share of global commodity exports divided by its share of total global exports (Balassa, 1977, 1979; Bela, 1986; Seyoum, 2007). The following formula is used to measure the index for country  $i$  commodity  $j$ :

$$RCA_{ij} = \frac{X_{ij} / X_{wj}}{X_i / W_i} \quad (2)$$

Where  $RCA_{ij}$  is revealed comparative advantage of country  $i$  for Product  $j$ ,

The value of  $i$  implies from 1 to  $n$  numbers, likely  $j$  implies from 1 to  $m$  numbers.

$X_{ij}$  denotes export by country  $i$  of Product  $j$ ;  $X_{wj}$  denotes the total amount of global exports of Product  $j$ ;  $X_i$  denotes total global exports of country  $i$ ;  $X_w$  denotes the total amount of global exports.

Range of values:

The index of revealed comparative advantage  $RCA_{ij}$  has a relatively simple interpretation. It Takes values between  $-\infty$  and  $+\infty$ . The value may be equal, greater, or less than 1.

If it is greater than one;  $RCA_{ij} > 1$  it means the country  $i$  has a comparative advantage in exports of commodity  $j$  because its market share is larger in the commodity than its share in total exports and vice versa. If the value  $RCA_{ij} < 1$  is interpreted the vice versa.

The comparative advantage index has the advantage of taking into account the inherent advantage of a specific export asset while still being compatible with improvements in an economy's relative factor endowment and productivity. The downside is that it is unable

to differentiate between changes in factor endowments and a country's pursuit of effective trade policies (De Benedictis & Tambari, 2001) (Sanidas & Shin, 2010), (Hanson, Lind, & Muendler, 2018) (FAO, 2018).

## Empirical results and discussion

### Trade Intensity

The export and import intensity indices between Bangladesh and China are shown in Figure 4. The following reconciliations are derived from the analyzed data. Bangladesh's export intensity value to China is close to zero (0) (figure 4), suggesting that Bangladesh's export level to China is substantially lower than China's global 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 increased a little year by year reaching 0.027 in 2018 (figure 4). It can be inferred from such a downward trend that Bangladesh has not been able to diversify its export basket enough for the Chinese market over the years, and it has been exporting similar products whose demand has been decreasing over time. This indicates that Bangladesh's export product concentration is higher than its import from China.

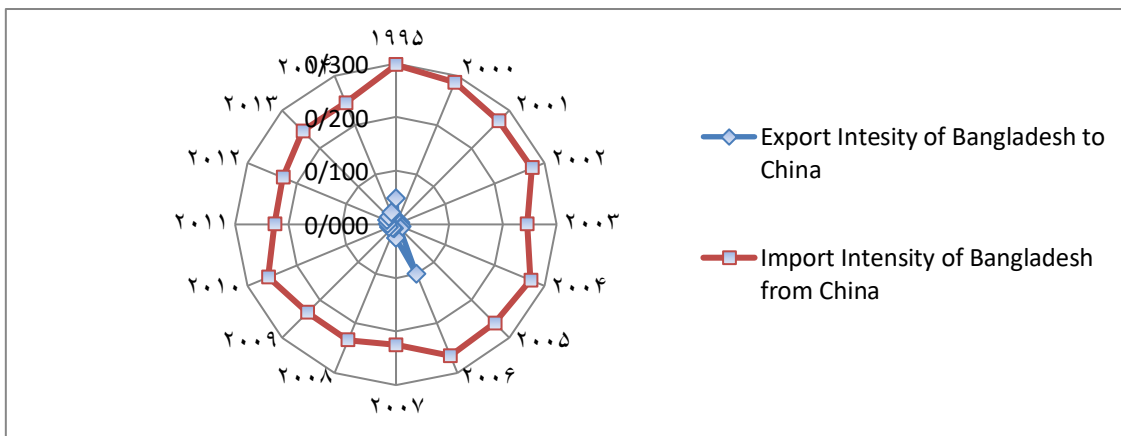


Figure 4: Trade Intensity Indices for Bangladesh's Bilateral Trade with China, 1995-2018

Between 1995 and 2018, Bangladesh's import intensity from China was less than one (1) but not quite zero (0) (figure 4), implying that the import amount from China to Bangladesh is higher than Bangladesh's share of global imports. According to figures, Bangladesh imports 22 percent of its total imports from China. 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 (figure 4). The bilateral trade balance also shows the same scenario indeed. However, as compared to the export intensity index, the import intensity index is even more apparent. The rising trend in imports can be attributed to the fact that China is Bangladesh's main trading partner, and its importance has grown 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. As a result, Bangladesh has a lot of room to develop 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.

### Revealed Comparative Advantage Analysis of the 4 Broader Sectors

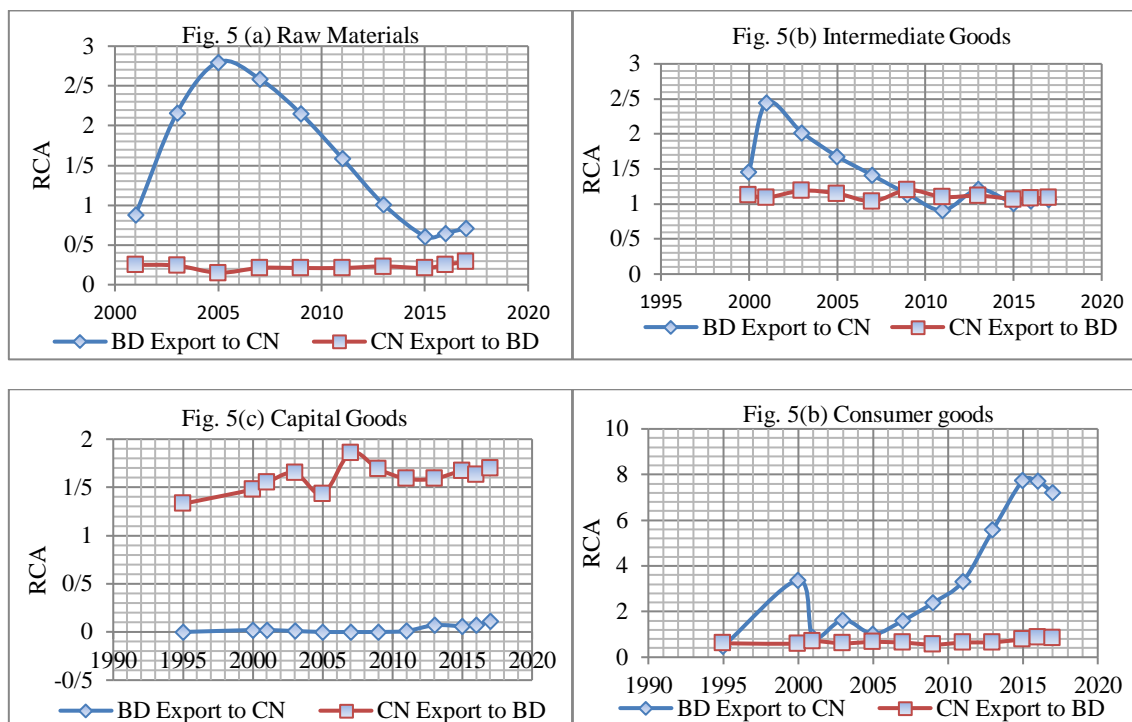


Figure: Figure 5 (a, b, c, d): Revealed Comparative Advantage Analysis of the 4 Broader Sectors Bangladesh's Bilateral Trade with China, 1995-2018

#### Raw materials

The analyzed result of the raw materials sector exhibited a very high level of RCA in 1995 (RCA-2.63) but after 20 years the RCA value dropped to 0.61 in 2018 that indicates that Bangladesh lost its comparative advantage over this sector in its export to China, figure 5(a). While China also possessed a similar scenario of comparative advantage in its export to Bangladesh during this period. 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.

#### Intermediate Goods

Concerning the Intermediate goods, the RCA value of Bangladesh's export to China in 1995 was 1.83 which reveals quite a higher comparative advantage over this sector of

Bangladesh's export to China. During these 20 years, the export in this sector maintained comparative advantage consistently having an RCA value of 1.01 in 2018 (figure 5(b)). While Chinese export of intermediate goods to Bangladesh showed a similar consistency of comparative advantage during this period (figure 5(b)). This sector mostly consists of intermediate products of different manufacturing sectors of the two economies.

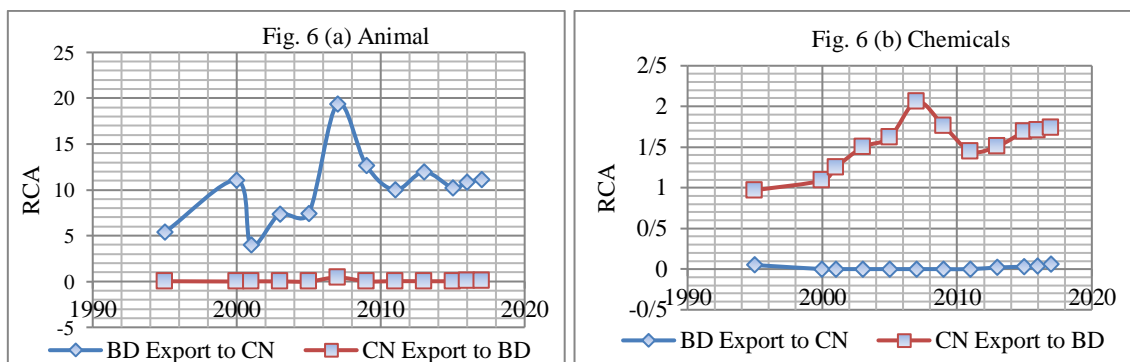
### Capital Goods

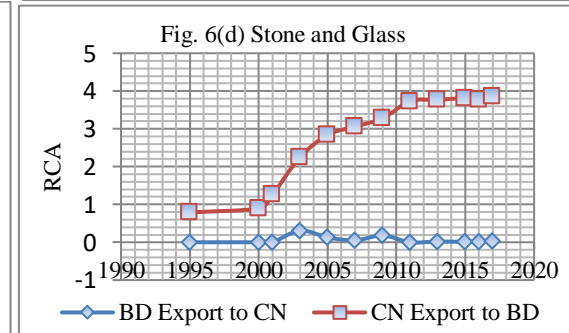
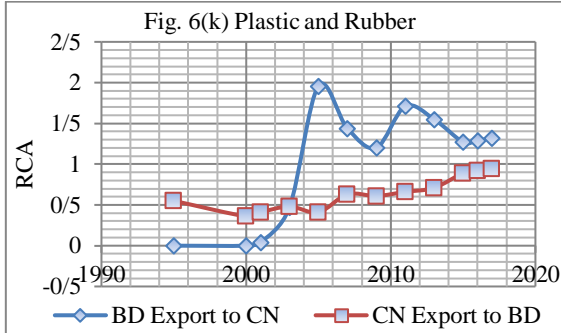
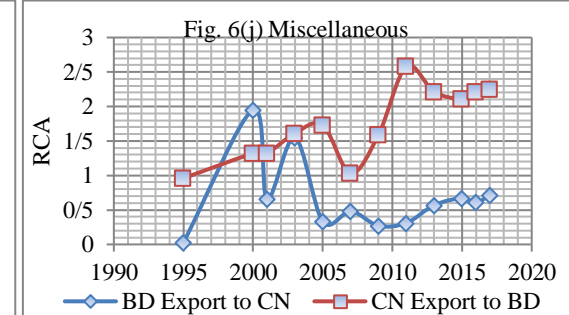
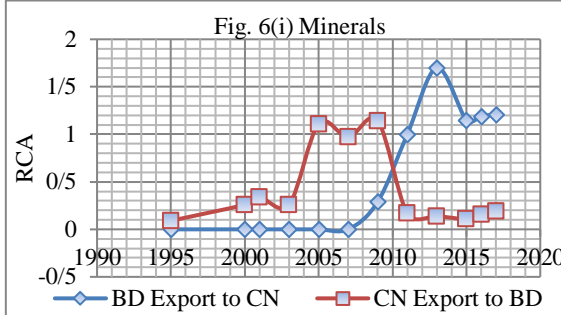
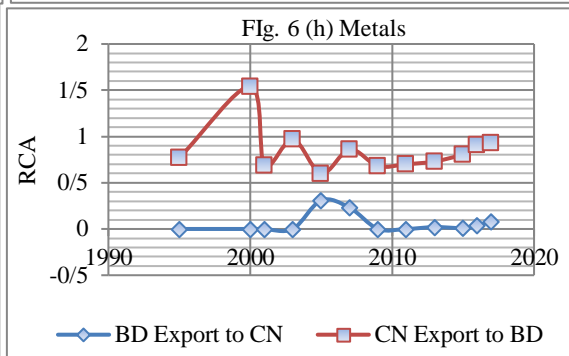
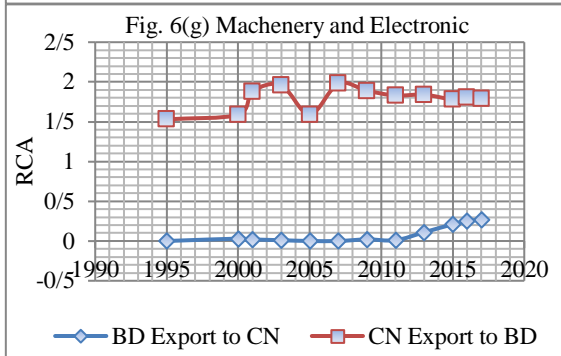
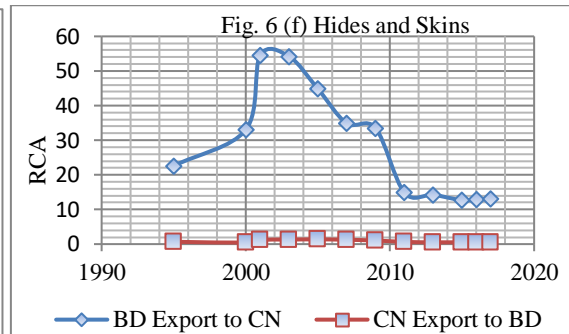
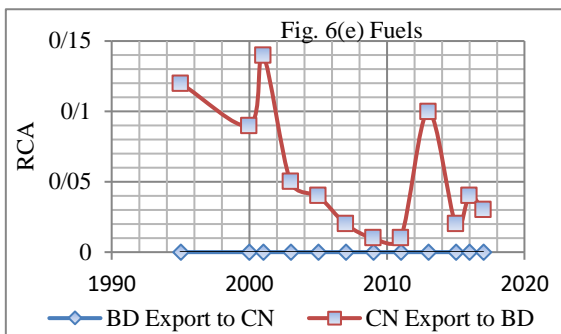
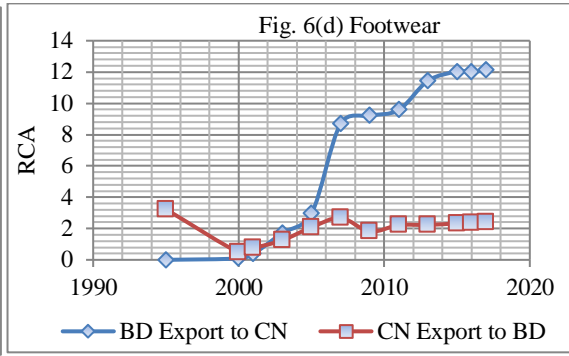
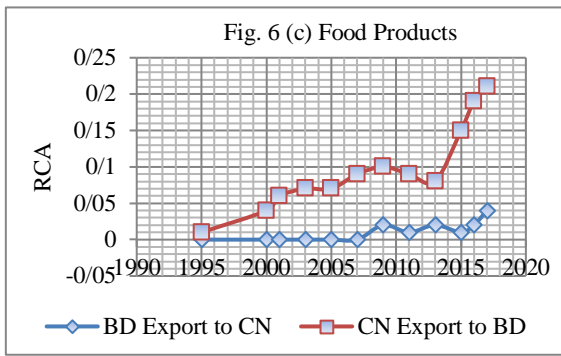
For the capital goods sector, the RCA value of Bangladesh's export to China in 1995 was 0.0 which implies a comparative disadvantage of Bangladesh's export to China (figure 5(c)). During the last 20 years period, Bangladesh didn't show any comparative advantage over this sector because this sector mainly complies with the machinery and other capital goods for Bangladesh's manufacturing industries in different capacities. On the other hand, China possessed quite a high comparative advantage (1.33 in 1995 and 1.67 in 2018) over this sector in the last 20 years (figure 5(c)) of trade between the two economies.

### Consumer Goods

Regarding, consumer goods, the RCA values of Bangladesh's export to China in 1995 showed 0.48 which reveals the comparative disadvantage of the country in its export. Surprisingly, the value has been increasing significantly since 2000 having a score of 3.37 and after a decade and a half the value reached 7.74 in 2018 that indicate a very high level of comparative advantage of Bangladesh for its export of consumer goods to China, figure 5(d). It could be because of the massive economic changes in Bangladesh in the last two decades especially the high growth of the manufacturing sector that created the opportunity to export consumer goods to China. According to our observation and analysis, this sector is a new sector for the export basket of Bangladesh for her export to China. In sum it can be said, the RCA 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. While, China didn't show any comparative advantage over this sector in the last 20 years period, figure 5(d).

### Revealed Comparative Advantage Analysis of the 16 Industry Sectors





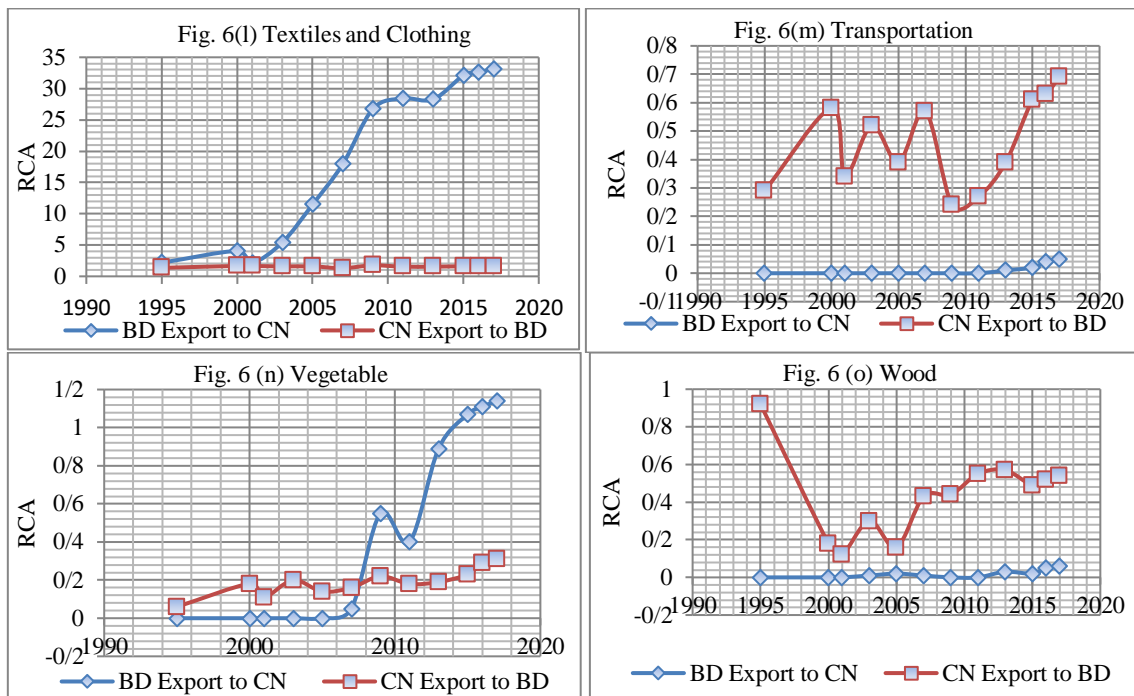


Figure 6. (a, b, c, d, e, f, g, h, I, j, k, l, m, n, o): Revealed Comparative Advantage Analysis of the 16 Industry Sectors Bangladesh’s Bilateral Trade with China, 1995-2018

### *Animal and Animal Products*

According to our analyzed result, the Animal and Animal Products sector revealed one of the highest competitive sectors since 1995 reaching an RCA score of 10.23 in 2018, figure 5(t). This sector includes major export products of the agricultural sector of Bangladesh. In 2014, this sector accounted for 9.6% of the total export share of Bangladesh to China where the Carbs not frozen accounted for 5.3%, and Live fish, Fish News, Frozen fish, frozen, salted, and dried sea fish accounted for 3.0%. In this group, Carbs (not frozen), processed and dried fish are the highest potential products in this sector. According to the trend, this sector showed its future potentiality where Bangladesh’s exporters and policymakers can focus further. China, on the other hand, has not shown any competitive advantage in exporting this sector's goods to Bangladesh over the last 20 years.

### *Chemicals*

For chemical products, Bangladesh didn’t reveal any comparative advantage during the period of our analysis. It could be because the country mostly imports this product group for its industry sector, figure, 5(i). Regarding China, the RCA value from 1995 to 2018 also didn’t exhibit any comparative for the country in its export of Chemical products.

### *Food Products*



For food products, from 1995 to 2018 both China and Bangladesh couldn't gain comparative advantage in this sector to export each other's market figure 5(s).

### *Footwear*

For the footwear sector, the RCA value in 1995 was 0 which means no comparative advantage for this sector of Bangladesh to export to China that year. In 2003 Bangladesh gained a comparative advantage over this sector and the trend continues to upsurge which reached 12.03 in 2018, figure 5(q). The sector reveals very potentially for Bangladesh's export to China. However, China also reveals a comparative advantage over this sector but not as high as Bangladesh.

### *Fuels*

The RCA value for the fuel sector also didn't reveal any comparative advantage for both Bangladesh and China in their exports from 1995 to 2018. During this period both countries revealed an RCA value lower than 1, figure 5(m). The trade structure of Bangladesh and China could explain a little about this sector. Bangladesh mainly imports fuels from its trading partners from Middle Eastern countries. Similarly, China's source of import of this sector is also very same regions. Both countries are imported dependent for this sector of products.

### *Raw Hides, Skins, Leather, & Furs*

However, the RCA value of the Hides and Skins sector revealed quite a high comparative advantage from the beginning of our study period. Despite from 2000, the RCA value has been decreasing, in 2018 the sector revealed RCA 12.67, figure 5(p). On the contrary, China didn't reveal RCA at the beginning of this study in 1995. From 2001 China achieved the comparative advantage in this sector and again lost RAC from 2011 having RCA 0.55 in 2018, figure 5(p).

### *Machinery and Electronic*

The RCA value of machinery and electronic goods reveals no comparative advantage over the 20 years for Bangladesh's export to China, figure 5(d). From literature and reports, it is found that the goods of this sector are one of the main importing products group for Bangladesh from China. Since China is one of the major sources of machinery and electronics product for the manufacturing industry sector as well as in the domestic consumer level, China possessed quite a high comparative advantage (1.53 in 1995 and 1.78 in 2018) over this sector in its export to Bangladesh, figure 5(d). Between 1995 and 2018, China's comparative advantage in this sector resulted in a rise in exports to Bangladesh.

### *Metals*

The revealed comparative advantage of Bangladesh in the Metals sector revealed comparative disadvantage during 1995 to 2018 in its export to China, figure 5(h). Bangladesh mainly depends on importing the products of this sector for its demands in

different industries. The investigation revealed that in Bangladesh the related domestic industry (Iron and Steel) has been developed impressively in the last decade which needed raw and scrap metals. This could be the major cause for this sector to be shrunk down. On the other hand, China exhibited quite a good level of revealed comparative advantage in its export of this sector to Bangladesh, figure 5(h).

### *Mineral Products*

The RCA value of mineral products revealed no comparative advantage for Bangladesh export to China from 1995 to 2010. Later on, the sector gained the RAC in 2011 and the value had been continuing since 2011 and reached 1.15 in 2018 figure 5(r). The sector revealed quite potential for the export of Bangladesh to China. The export value of this sector in 2014 was \$10.1 Million. 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. Furthermore, China didn't show comparative during this period except in 2005 and 2009.

### *Miscellaneous*

The RCA value of miscellaneous exhibited a comparative disadvantage for Bangladesh's export to China from 1995 to 2018. The low RCA value in this sector possessed that sector the export basket of Bangladesh in this sector is not diversified. While China showed quite high and increasing revealed comparative advantage over this period in its export to Bangladesh (0.96 in 1995 to 2.11 in 2018), figure 5(f). According to our observation, because of the massive change in the economic structure in China and their increasing middle class, more demand in 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.

### *Plastic or Rubber Products*

The plastic or Rubber sector's analyzed RCA value reveals that Bangladesh didn't possess any comparative advantage over this sector in 1995. But after a decade, from 2005 the sector gained its comparative advantage (RCA-1.27) in exports to China, figure 5(j). According to the manufacturing industry structure this sector also a potential sector for Bangladesh. In the last two decades, this sector developed quite impressively where the export from this sector is significant to other markets too. If we look at the export value of this sector to China; in 1995 it was \$102K and 0.11% of the total export of Bangladesh to China. On the contrary, in 2014 the export value increased by \$34.4 million and 4.6% of the total export share of Bangladesh to China (MIT 2014). On the other hand, China didn't expose any comparative advantage over the Plastic and rubber sector in its export to Bangladesh.

### *Stone and Glass*

Regarding the Stone and glass sector, Bangladesh didn't expose any comparative advantage in its exports during our study period of 1995 to 2018, figure 5(l). Where China also didn't show any comparative advantage over this sector up to 2000. In 2001 the

country gained a comparative advantage over this sector which continued till 2018 having an RCA value of 3.18, figure 5(l).

### *Textiles and Clothing*

The textiles and clothing sector showed quite a reasonable RCA in 1995 (2.18) and after 201 years the sector revealed one of the highest revealed comparative advantages in its export to China. In 2018 the value of RCA exhibited 32.11, figure 5(g). 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). If we observe the statistics, it shows in 1995 the export of textile and clothing to China accounted for around 21% of her total export share to China where the Jute and textile fibers accounted for 17%, Non-knit men's shirts 1.9%, Non-knit men's suits 1.8%. In 2005 the sector shared around 27% share of total export to China and in 2014 shared a 65% share of the total export of Bangladesh to China. The structure shows that the share of Jute and textile fibers reduced to 2.3% than 1995. On the contrary, the Non-knit men's shirt increased to 2.8%, Non-knit men's suits 8.1% and added some more products group in the export basket; Jute Yearn 11%, Knit T-shirts 9.6%, Non-knit women's suits 6.6%, Knit sweaters 4.6%, Textile scraps 3.9%, Non-knit men's coats 2.7%, Knit women's suits 2%, Non-knit women's coats 1.8% and others 12% in 2014 (Lab, 2017). 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). While China also revealed quite an impressive comparative advantage over this sector having an RCA value of 1.36 in 1995 and 1.61 in 2018, figure 5(g). This sector also one of the major export sectors of China having around 11% shares in the total export of the country in 2018.

### *Transportation*

The trends of RCA value in the transportation sector revealed no comparative advantage for both China and Bangladesh in their exports from 1995 to 2018, figure (5k).

### *Vegetable Products*

Vegetable products are one of the important portions of the agricultural sector of Bangladesh. In our analysis, it's found that this sector did not possess any comparative advantage from 1995 to 2013. From 2014 the sector gained a comparative advantage and in 2018 the RCA value was 1.07, figure 5(n). On the contrary, China didn't reveal any comparative advantage regarding its export to Bangladesh from 1995 to 2018. In our investigation, it is found that in the last decade the agriculture sector of Bangladesh developed very significantly and the country 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 the middle class, demand, and their purchasing power parity (PPP) the future potentiality of this sector is highly expected.

### *Wood and Wood Products*

The RCA value of this sector shows that from 1995 to 2018 both Bangladesh didn't reveal any comparative advantage in terms of its export to China. On the other hand, China showed a comparative advantage from 2000 and the RCA has been increasing from that and reached 1.69 in 2018, figure 5(o).

Table 2: The distribution of Revealed Comparative Advantage According to the Generated Level of RCA of Bangladesh and China from 1995 to 2018

	High Comparative Advantage (RCA>5)	Moderate Comparative Advantage (RCA=1-5)	Comparative Disadvantage (RCA<1)
Bangladesh	Total Sectors- 5	Total Sectors- 4	Total Sectors- 11
	Textiles and Clothing; Animal; Consumer goods; Hides and Skins; Footwear	Intermediate goods; Vegetable; Minerals; Plastic or Rubber	Metals; Miscellaneous; Transportation; Fuels; Wood; Raw materials; Capital goods; Food Products; Stone and Glass; Chemicals; Machinery and Electronics
China	Total Sectors- 0	Total Sectors- 8	Total Sectors- 12
		Mach and Electronic; Intermediate goods; Textiles and Clothing; Miscellaneous; Capital goods; Footwear; Stone and Glass; Chemicals	Transportation; Fuels; Vegetable; Wood; Minerals; Animal; Consumer goods; Raw materials; Hides and Skins; Food Products; Plastic or Rubber; Metals

### Conclusion and summary

This study explored the intensity of trade between Bangladesh as well as analyzed the sector-based comparative advantage of 20 sectors of Bangladesh's export to China well as China's export to Bangladesh in similar sectors. Bangladesh's export intensity value to China reveals that Bangladesh's export level to China is significantly lower than China's global market share. While the import intensity reveals that Bangladesh has not been able to diversify its export basket enough for the Chinese market over the years, and it has been exporting similar products whose demand has been declining over time. This indicates that Bangladesh's export product concentration is higher than its import from China. Bangladesh has a lot of space to expand its trade with China, as evidenced by the trade strength.

Moreover, the revealed comparative advantage analysis of 20 exports sector of Bangladesh and China explore that among those 20 sectors, Bangladesh reveals high comparative advantage over 5 sectors accordingly Textiles and Clothing; Animal; Consumer goods; Hides and Skins and Footwear sector; possess a medium comparative advantage over 4 sectors respectively, Intermediate goods; Vegetable; Minerals; and Plastic or Rubber sector and exhibit no comparative advantage over 11 sectors accordingly, Metals; Miscellaneous; Transportation; Fuels; Wood; Raw materials;

Capital goods; Food Products; Stone and Glass; Chemicals and Machinery and Electronics sector in terms of its export to China during 1995 to 2018.

Regarding the analysis of China's export comparative advantage to Bangladesh reveal that China has a comparative advantage over 8 sectors respectively Mach and Electronic; Intermediate goods; Textiles and Clothing; Miscellaneous; Capital goods; Footwear; Stone and Glass; and Chemicals sector while 12 sectors possess comparative disadvantage accordingly, Transportation; Fuels; Vegetable; Wood; Minerals; Animal; Consumer goods; Raw materials; Hides and Skins; Food Products; Plastic or Rubber; and Metals sector.

However, the overall analysis suggests that Bangladesh should focus on some of its traditional sectors e.g., Hides and skin, textile and apparel sectors, and some emerging sectors e.g., Vegetables, Consumer goods, Animal and footwear sectors to diversify in terms of product diversification to occupy more share in China's consumer market. Furthermore, more Chinese investment in different industry sectors of Bangladesh, particularly some of China's low value-added labor-intensive industries, could relocate to Bangladesh as Bangladesh has a capacity for cheap labor and other infrastructure support. The goods produced in those industries could be exported to China which could contribute to balancing bilateral trade as well as mutual win-win benefits.

Moreover, duty-free access of more Bangladesh products to the Chinese market could improve Bangladesh's export to China to a greater extent. In this regard, a Bangladesh-China FTA may reduce the trade gap and improve the negative trade balance of Bangladesh with China. An especial focus on the textile and apparel sector of Bangladesh could benefit Bangladesh to get more market share in China in this industry Bangladesh has a large capacity of export in this sector.

### **Authors' Contribution**

Dr. Md Ekram Hossain proposed the idea and then selected the theory and model and analysing the data and interpretation of the results.

Prof. Huang Dechun and Prof. Zhang Changzheng encouraged to investigate and supervised the findings of this work.

Prof. Mohammad Ali especially contributed in writing introduction and overall language improvement of the manuscript.

All the authors contributed in different capacities in completing the manuscript on time.

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