

Dynamics of Comparative Advantage and Competitiveness of Textile and Apparel Industry: An Empirical Analysis for China and Bangladesh

ABSTRACT

Aims: The purpose of this paper is to analyze the level of comparative advantage and competitiveness in Textile and Apparel (T&A) industry of Bangladesh and China in the global market. It also tries to link the competitiveness analysis with the trade theories of comparative advantage to synthesize different approaches of comparativeness.

Place and Duration of Study: We used the two digit level of HS Code of 14 main products of Textile and Apparel industry over the period from 2000 to 2015. The existing database of Bangladesh Garment Manufacturers and Exporters Association (BGMEA), database of International Trade Center (ITC), and World Integrated Trade Solution (WITS) of World Bank were used to analyze the results.

Methodology: The proposed approach is based on the Balassa revealed comparative advantage (RCA) and Spearman Rank Correlation coefficient (rs) to examine the comparative advantage and competitiveness for the two digit level of HS Code of 14 main products of Textile and Apparel industry.

Results: The findings show that among the 14 products; Bangladesh improved her comparative advantage over 7 products, lowered over 5 products and remained quite unchanged over 2 products whereas China improved her comparative advantage over 8 products lowered over 2 products and remained quite unchanged over 4 products. According to the Competitiveness analysis of the 14 products; 3 products exist higher competition, 6 products exist modest competition and 5 products exist complementary between Bangladesh and China in global market. As a result, implications were discussed in this paper.

Conclusion: In this paper revealed comparative advantage has been analyzed at the two digit level of HS classification for both Bangladesh and China. One of the main implications are; The three main stakeholders of T&A; the government, suppliers, and buyers—must work together to realize the potential of Bangladesh's Textile and Apparel market. The government's top three priorities should be for investment in infrastructure, education, and trade support.

Keywords: *Comparative Advantage; Competitiveness; Spearman Rank Correlation Coefficient; Textiles and Apparel Industry; Bangladesh; China*

JEL Code: *F12, F13, F14, O24*

1. INTRODUCTION

Textile and Apparel (T&A) industry has long been an important component of international trade and trade in this industry is conducted on an immense scale. Bangladesh's steady growth for the past two decades and the average annual GDP growth more than 6 percent over the last five years and the past decade's boom in exports particularly the T&A sector is very significant to the country's economic growth (BGMEA, 2016; BIDA, 2016; Rahman, 2009; Ramesh Kurpad, 2014). The industry has been contributing to earnings through export, creating employment, alleviating poverty and women empowerment (BGMEA, 2016; Haider, 2007; Ramesh Kurpad, 2014). The T&A industry has also long been a pillar of China's economy for its advantage in factor endowment and market scale (Karaalp & Yilmaz, 2013; Lau, To, Zhang, & Chen, 2009; Marrewijk, 2004; Yilmaz, 2013). The trade volume of the textile and apparel (T&A) sector of China has been growing 14.74% in average in last 15 years (CCCT, 2016; WITS, 2016). In 2015, textile exports took up 11.99% of China's total exports and

31 31.5% of the world's total exports in textile and apparel (CCCT, 2016; ITC, 2016; WITS, 2016). The
32 production and exports of Chinese textile products are the largest in the world.

33 Since the 1990s, Bangladesh and China have both made progresses in their international trade. With
34 the expansion of their trade volumes and global markets, the overlapping parts of their exporting
35 products and markets have been enlarging, which has been bringing competition between the two
36 countries (Ekram, Huang, & Tran, 2013). China's movement towards export oriented development
37 strategy may have altered the picture of comparative advantage for labor intensive manufacturing
38 economies in the global market (Eloot, Huang, & Lehnich, 2013; Lau et al., 2009; Tao & Fu, 2007;
39 Zhang, Kong, & Ramu, 2016). There is an ongoing debate across developing countries and emerging
40 concern about the threat and opportunity in relation to the rise of Chinese economy and the
41 consequent intensification of competition in labor intensive manufacturing countries, especially in T&A
42 industry (Fang, 2012; Rasiah, Kong, & Vinanchiarachi, 2011; Ruan & Zhang, 2014). It is important
43 therefore, to explore the structure of comparative advantage of T&A industry of Bangladesh and
44 China and the extent to which products the two economies compete with each other in the global
45 market of T&A. This paper makes an attempt to develop some insights on the issues for textile and
46 apparel industry.

47 Since comparative advantage has been an important concept in modern economic theory which is a
48 concept of more than 200 years old that are immovable until today and is considered determinant of
49 specialization in the concept of international trade (Do, Levchenko, & Raddatz, 2016; Macleans
50 Mzumara, 2013). Liesner (Liesner, 1958) is the first person who introduced the measurement of
51 reveal comparative advantage (RCA) (Changjun YUE, 2002) and later on developed by Blassa
52 (Balassa, 1965) (Balassa, 1977), (Balassa, 1979) and Bela (Bela, 1986). The classical theory of
53 comparative advantage predicted that gains from exchange maximize welfare and free trade would
54 lead to world economic prosperity. According to a country's relative export performance in individual
55 product categories has been taken to reflect its 'revealed' comparative advantage. Technically, the
56 doctrine of RCA argues that if a country's share in world exports of a particular good is greater than its
57 overall share in total world exports, then the country has a revealed comparative advantage in the
58 export of that good. In other meaning, RCA explains if a country can produce a good at a lower
59 relative cost than other countries in international trade, the concern country should devote more of its
60 scarce resources to the production of the goods (Batra & Khan, 2005; Do et al., 2016; Shafaei, 2009;
61 ShariatUllah & Kazuo, 2012; Utkulu & Seymen, 2004).

62 The concept of RCA is widely used empirically to identify a country's weak and strong export sectors
63 (Marrewijk, 2004). For example, Hubbard (Hubbard, 2002) who analyzed the revealed comparative
64 advantage and competitiveness in Hungarian Agri-food sectors; Khan (Khan, 2005) who analyzed the
65 revealed comparative advantage to assess India and China's trade performances; and Yuan (YUAN,
66 2007) who analyzed the international competitive advantage of China's textile industry. Yilmaz
67 (Yilmaz, 2013) has also analyzed the comparative advantage of textiles and clothing for Bangladesh,
68 China, Germany and Turkey, etc.

69 In this present study, we analyzed RCA and Spearman Rank Correlation coefficient (rs) of Textile and
70 Apparel (T&A) industry of Bangladesh to explore following issues:

71 (1) For Bangladesh and China, which products in the T&A industry have higher revealed comparative
72 advantage in global market?

73 (2) What kind of inter-temporal variation in RCA in the T&A industry took place f from 2000 to 2015 for
74 both Bangladesh and China in the global market?

75 (3) Regarding to the international trade relationship between this two countries in T&A, do they
76 competitive or complementary in global market?

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79 2. LITERATURE REVIEW

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81 2.1 Overview of T&A Industry of Bangladesh and China

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Bangladesh economy which is being integrating with the world economy has left largely unhurt by the recent financial tsunami. Apart from GDP growth, other key economic variables have shown minimum fluctuation in the recent years (Haque, 2011; Ramesh Kurpad, 2014). Being the pillar industry, Bangladesh's T&A is a very dynamic sector has become the main source of direct and indirect employment, foreign exchange earnings, which in turn helped finance a growing share of imports of vitally important capital goods and essential inputs. The export-oriented T&A sector, with about 5600 firms and a workforce of directly 4.0 million and more than one million indirectly is a critical and important segment of the economy of Bangladesh (Ahmed, Greenleaf, & Sacks, 2014; BGMEA, 2016; BKMEA, 2016a). At present, it contributes 40 per cent value addition to the manufacturing sector (Ekram et al., 2013), (Joarder, 2010). T&A sector which constitutes 79.63% in the total export basket (BIDA, 2016) is expected that within 2030 T&A sector would be able to earn more than US \$ 50 billion if the infrastructural facility like electricity and gas as well port facility is provided. Bangladesh is now the 3rd largest exporter of T&A products as a single country in the world market (Islam, Khan, & Islam, 2013; Mohan Kathuria, 2013; Rahaman, 2008).

Among all industries in China, T&A industry is among the earliest sectors to begin the marketization, with strongest international competitiveness, fastest growth and most attention. At present, China has more than 100,000 manufacturers, and over 10 million people working in T&A industry, among which more than 70% are skilled and technical workers and supports, directly or indirectly, around another 90 million people through its various backward and forward linkages (CCCT, 2016), (Eloot et al., 2013; Gelb, 2005).

The increasing consumption demand on apparel fuels the development of China's T&A industry. Qualified labor power, the world's 30% raw materials, complete industry chain, favorable investment environment and continuous reform on related policies and facilities are the preconditions of the development of Chinese T&A industry. Market-oriented reform has brought unprecedented vitality to Chinese T&A industry and China has 723 rapidly become the world's most dynamic apparel market. (Ekram et al., 2013; YUAN, 2007). China's entry into the WTO in 2001 provided easier access to international market. Moreover 2005's phasing out of quotas led to the rapid strengthening of the market share of the Chinese textile and clothing industries in the global market (Batra & Khan, 2005; Lau et al., 2009; Yilmaz, 2013).

Table 1 Export of T&A and its share in total export for Bangladesh and China during 2000-2015

Year	Export of T&A (Billion US\$)		Share in Total Exports (%)	
	Bangladesh	China	Bangladesh	China
2000	4.9	49.4	75.14	19.8
2001	4.6	49.8	76.57	18.7
2002	4.9	57.8	75.01	17.8
2003	5.7	78.9	74.79	18.0
2004	6.4	95.1	74.15	16.0
2005	7.9	115.0	75.06	15.1
2006	0.2	144.0	75.64	14.9
2007	10.7	171.2	75.83	13.6
2008	12.3	185.2	79.33	13.0
2009	12.5	167.1	77.12	13.9
2010	17.9	206.5	78.15	13.1
2011	19.1	248.0	78.55	13.1
2012	21.5	255.0	79.61	12.4
2013	24.5	274.1	81.13	12.4
2014	25.5	287.7	81.68	12.3
2015	28.1	273.7	75.14	11.9

Source: Bangladesh Garment Manufacturers and Exporters Association (BGMEA) and database of International Trade Center (ITC), and World Integrated Trade Solution (WITS) of World Bank compiled by the authors in November 2016

Table 1 shows the trend of export of T&A products and share in total export of Bangladesh and China in 16 years period, where Bangladesh's export in T&A become sevenfold and Chinese one become more than fivefold within the period of time. But in terms of share in total export, Bangladesh's share stayed stable whereas Chinese share reduced significantly. This is because of the recent policy reform of Chinese T&A, moving from labor intensive readymade garments to high technology based production(Dunford, Dunford, Barbu, & Liu, 2013; Elout et al., 2013; Lau et al., 2009).

2.3. MAJOR EXPORT DESTINATIONS OF T&A OF BANGLADESH AND CHINA

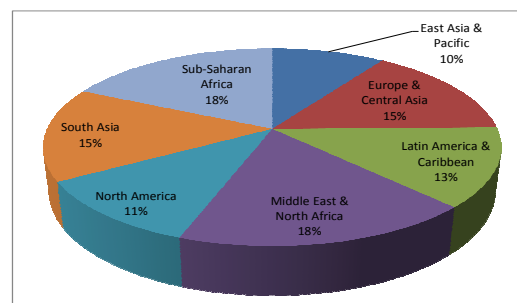


Figure 1 Chinese T&A export to different by region of the world in 2015

Source: World Integrated Trade Solution (WITS) database, compiled by the authors in November 2016

show the export destinations of Chinese T&A where Asian countries are the largest destination of export. Besides Asia, North American countries and European countries are the second largest export destination of Chinese T&A. On the contrary European countries are the largest destination for Bangladesh's export of T&A (Figure 1) where the competition between two countries is immense. In the same, in North American countries are also the second largest export destination for Bangladesh's T&A and there also exist higher competition between two nations. Recent years Bangladesh could find some new non-traditional market for her export of T&A. In this regard, Australia, Brazil, Chile, China, India, Japan, Korea Rep., Mexico, Russia, South Africa and Turkey are the recent new potential markets for Bangladesh's T&A where the growth of export is quite significant (BGMEA, 2016; BIDA, 2016).

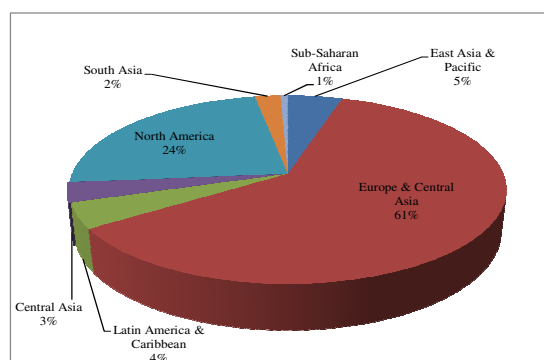
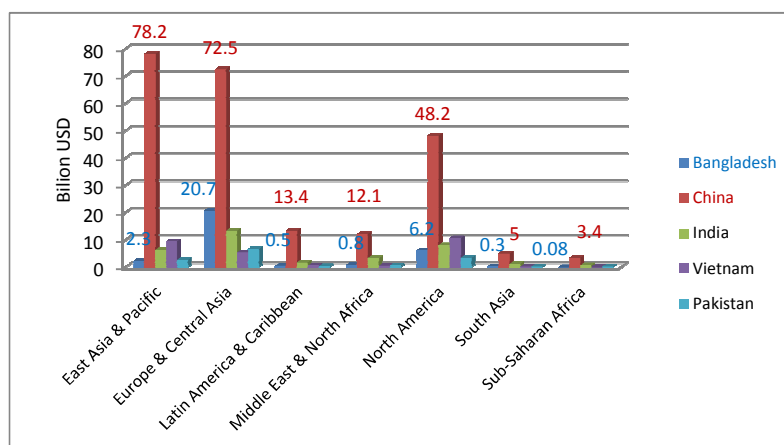


Figure 1 Bangladesh's Textile and Apparel exports by region in 2015

Source: Bangladesh Garment Manufacturers and Exporters Association (BGMEA) and database of International Trade Center (ITC), compiled by the authors in November 2016

146 According to the statistics provided by the World Integrated Trade Solution (WITS, 2016) and ITP
 147 (ITP, 2016), in terms of US import share (%) of T&A products from the world, China is the major
 148 player. On the contrary Bangladesh competes in US as the second largest supplier of T&A after
 149 China and it shows a strong competition between the two countries to grab the US market. Export
 150 earnings from USA, the largest market for Bangladeshi T&A goods as a single country (WITS, 2016).
 151 From the same source of statistics also shows the strong competition of Bangladeshi T&A export to
 152 Canadian market with China. In Canada also Bangladesh is the second largest country after China for
 153 Canadian import of T&A goods (WITS-Canada).



154 **Figure 3 Export of T&A to global markets by the major exporters in 2015**

155 Source: Database of World Integrated Trade Solution WITS and (Comtrade, 2016) (compiled by the
 156 authors in November 2016
 157

158 Besides North America, Europe and Central Asian market is a very crucial market for Bangladesh
 159 T&A industry as more than 60 % of total export of T&A is to the EU market (Figure 1) and Bangladesh
 160 enjoys some quota to export in EU market. According to the statistics provided by the US Department
 161 of Commerce (USDC, 2016), in EU Market China is also the major exporter, where Bangladesh is the
 162 second major exporter in EU Central Asian and it also shows a strong competition between the two
 163 countries to grab the EU and Central Asian market. In East Asia and Pacific market, China is also the
 164 major player where Bangladesh positions 5th largest exporter (**Error! Reference source not found.**).
 165 In Latin American and Caribbean market also China is the largest exporter. For Bangladesh it's a
 166 potential non-traditional and emerging market for her export of T&A (**Error! Reference source not
 167 found.**). Middle East and North Africa is another potential emerging market for Bangladesh's T&A
 168 export. Here also China is the major player where Bangladesh is the 4th largest exporter (**Error!
 169 Reference source not found.**). In South Asian market and Sub Saharan Markets also China is the
 170 largest exporter and Bangladesh playing as the third and fourth consequently (**Error! Reference
 171 source not found.**). All these markets are non-traditional and emerging markets for the world textile
 172 and apparel export as well as for Bangladesh. (Berg, Hedrich, Kempf, & Tochtermann, 2011;
 173 BKMEA, 2016b; Malouche, 2015; Mirdha, 2013; Sattar, 2015).
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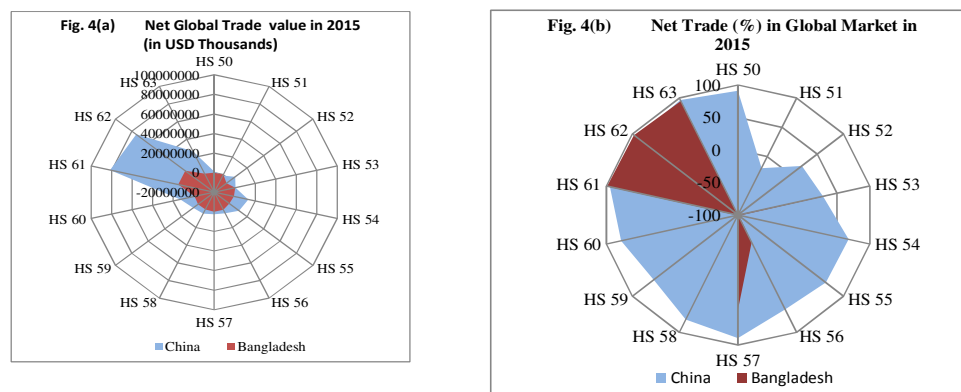


Figure 2 (a) Net Global Trade Value and 4(b) Net Trade % for T&A Industry in 2015

Source: Database of International Trade Center (ITC) and (Comtrade, 2016), compiled by the authors in November 2016

In terms of global trade in the 14 products of Textile and apparel, China is the Major market player comparing to Bangladesh. Figure 4 (a) shows the difference in net trade values between China and Bangladesh in 2015. Where the HS 61: Articles of apparel, accessories, knit or crochet, HS 62: Articles of apparel, accessories, not knit or crochet and HS 63: Other made textile articles, sets, worn clothing etc. are the most valued products in trade for both countries. In terms of net global trade (%) for Bangladesh shows figure 4 (b) that HS 57: Carpets and other textile floor coverings, the HS 61: Articles of apparel, accessories, knit or crochet, HS 62: Articles of apparel, accessories, not knit or crochet and HS 63: Other made textile articles, sets, worn clothing etc. are the main products in this industry occupying the larger share. On the other hand for China, HS 54 to HS 63; all those 10 products occupied the larger net trade (%) in the global export.

3. THE METHODOLOGY AND MODEL

3.1. Data

The analysis is based on the annual time series data of textile and apparel exports, obtained from Bangladesh Garments Manufacturing and Exporters Association (BGMEA, 2016), China Textile Import and Export Chamber of Commerce (CCCT, 2016) International Trade Centre (ITC, 2016) and World Integrated Trade Solution (WITS, 2016) UN Comtrade (Comtrade, 2016) database over the period of 2000 to 2015. The data is used in the form of 2-digit HS (Harmonized System) Code listing of 14 products of textile and apparel industry of Bangladesh and China. MS Excel and SPSS statistical tools have been used to analyse the data.

3.2. Revealed Comparative Advantage

Revealed comparative advantage indices (RCA) use the trade pattern to identify the sectors in which an economy has a comparative advantage, by comparing the country of interests' trade profile with the world average. In other words, it is the ratio of the exports of the commodity from the source to total exports from the source, over the same ratio for the world (Hubbard, 2002). In this paper we used Balassa's (Balassa, 1965) RCA model to measure the relative export performance by country and industry/commodity, defined as a country's share of world exports of a commodity divided by its share of total world exports. The index for country i commodity j is calculated as follows:

$$RCA_{ij} = \frac{\frac{X_{ij}}{X_t}}{\frac{X_{wj}}{W_t}} \dots \dots \dots (1)$$

i=1, 2 ,....., n , j=1, 2,....., m

209 Where RCA_{ij} is revealed comparative advantage of country i for Product j,
 210 X_{ij} denotes export by country i of Product j ,
 211 X_{wj} denotes total amount of global exports of Product j
 212 X_i denotes total global exports of country i
 213 X_w denotes total amount of global exports.

214 **Range of values:**

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

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

220 The advantage of using the comparative advantage index is that it considers the intrinsic advantage
 221 of a particular export commodity and is consistent with changes in an economy's relative factor
 222 endowment and productivity. The disadvantage is that it cannot distinguish improvements in factor
 223 endowments and pursuit of appropriate trade policies by a country.

224 **3.3. Spearman Rank Correlation Coefficient (r_s)**

225 With the RCA, the Spearman's Rank Correlation Coefficient (r_s) can be calculated to explain the
 226 thorough competitiveness or complementariness between the studied countries (Gauthier, 2001),
 227 (Zar, 1972).

$$228 \quad r_s = 1 - 6 \sum_{i=1}^n \frac{d_i^2}{n(n^2 - 1)} \dots\dots\dots(2)$$

229 Where $d_i^2 = [RCA (BD)_i - RCA (CN)_i]^2$
 230 RCA (BD) and RCA (CN) are respectively Bangladesh's and China's RCA.
 231 n= total selected years

232 Range of values: The value of r_s is ranged from -1 to +1.

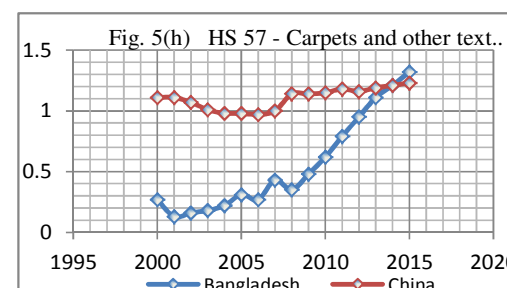
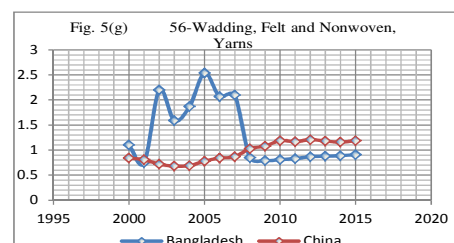
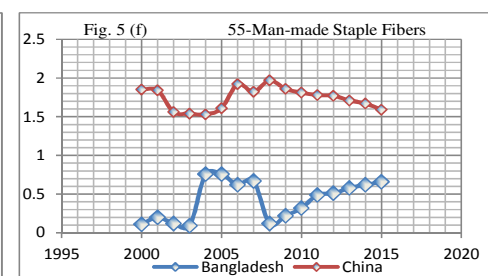
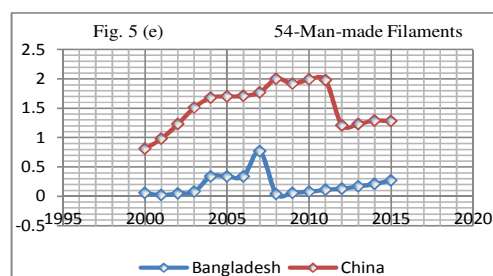
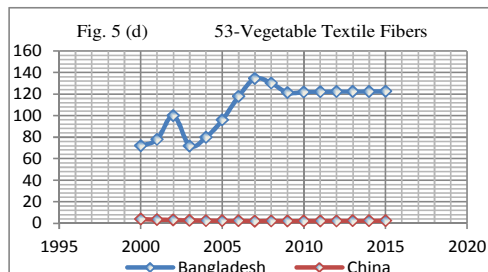
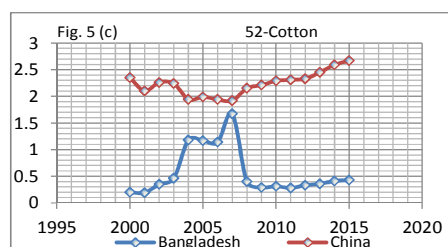
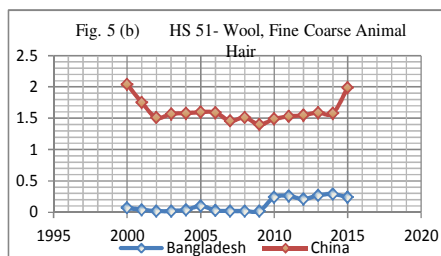
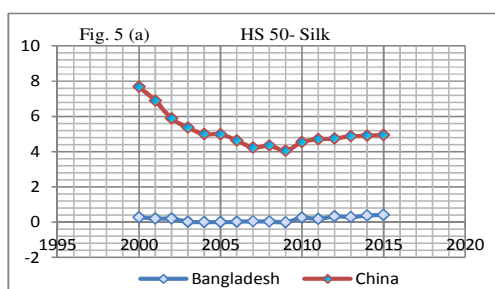
233 The positive mark shows that competition exists between the two nations and its degree increases
 234 with the increment of the value; while the negative one proves the complementariness relations and
 235 its degree rises with the elevation of the absolute value.

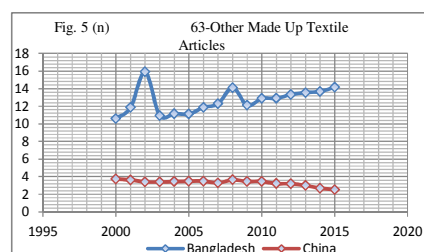
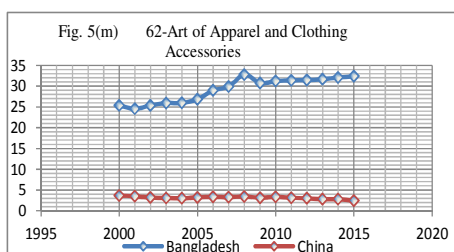
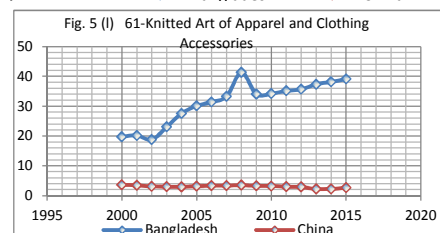
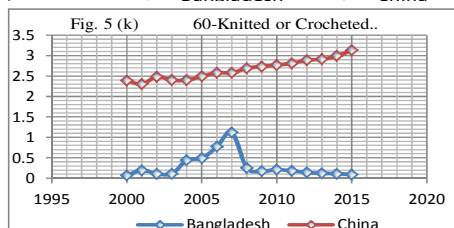
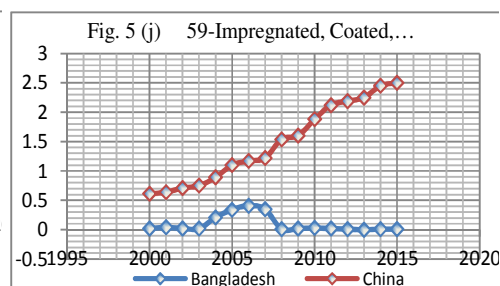
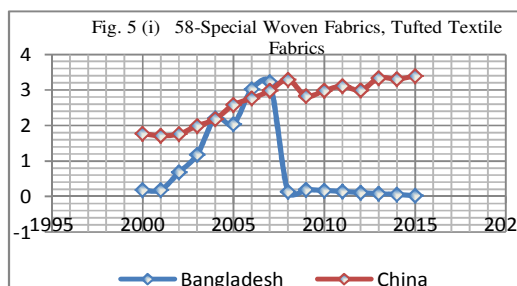
237 **4. RESULT ANALYSIS AND DISCUSSIONS**

239 **4.1. Comparative Analysis of RCA Of 14 Products T&A For Bangladesh And China**

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Figure 5(a)-5(n): The Analysed Values of RCA





■ HS 50-Silk

The RCA value of HS 50-Silk for Bangladesh was 0.28 in the year of 2000 where its value decreased to 0.41 in 2015 fig. 5(a) and the value interprets that Bangladesh has no significant comparative advantage in her export of HS 50-Silk in global market. In terms of inter-temporal movements of RCA of HS 50 during 2000-2015 it shows Bangladesh's comparative advantage over HS 50-Silk is very insignificant, rather Bangladesh imports HS 50-Silk from other countries e.g. China and India (ITC). On the contrary, the RCA value of HS 50 for China was 7.68 in 2000 fig. 5 (a) which indicates China's strong comparative advantage over HS 50 in global market. But according to the inter-temporal movements of RCA over the period of 16 years during 2000-2015 China has been losing gradually her comparative advantage which decreased to 4.95 in 2009 fig. 5(a). In overall comparative analysis of RCA it shows that for the product HS 50, China placed more advantageously than Bangladesh in global market.

■ HS 51-Wool, Fine Coarse Animal Hair and Horsehair

The RCA value of HS 51-Wool, Fine Coarse Animal Hair and Horsehair for Bangladesh was 0.07 in the year of 2000 where its value remained insignificant to 0.24 in 2015 Fig. 5(b) and it also interprets that Bangladesh has no comparative advantage in her export of HS 51 in global market. In terms of inter-temporal movement of RCA of HS 51 during 2000-2015 it shows Bangladesh has insignificant comparative advantage on HS 51- Wool, Fine Coarse Animal Hair and Horsehair, rather Bangladesh depends importing HS 51 from other countries e.g. China, India and central Asian countries. On the contrary, the RCA value of HS 51 for China was 2.04 in 2000 Fig. 5(b) which indicates China's strong comparative advantage over HS 51 in global trade. But according to the inter-temporal movements of RCA over the period of 16 years during 2000-2015 China has been losing her comparative advantage which decreased to 1.99 in 2015 Fig. 5(b). In overall comparative analysis of RCA it shows that for the product HS 51, China placed more advantageously than Bangladesh in global market and China still the top exporter of HS 51-Wool, Fine Coarse Animal Hair and Horsehair in 2015 (ITC).

■ HS 52-Cotton

The RCA value of HS 52-Cotton for Bangladesh was 0.20 in the year of 2000 where its value increased to 1.21 in 2015 Fig. 5(c). But from 2004 to 2007 the RCA value was greater than 1 which means Bangladesh gained her comparative advantage on HS52 over the period but Bangladesh again lost her comparative advantage after 2007. Being high demand of HS52 and decreasing local production of cotton Bangladesh lost her comparative advantage in exporting of HS52 in global market. In order to keep the comparative advantage on HS 52, Bangladesh government should put more initiative in growing more cotton to meet up the increasing demand in her local market as well as to export. In terms of inter-temporal movements of RCA of HS52 during 2000-2015 it shows Bangladesh yet has no comparative advantage on HS 52, rather Bangladesh depends on importing HS52 from other countries e.g. China, Pakistan, India and central Asian countries. On the contrary, the RCA value of HS 52 for China was 2.35 in 2000 Fig. 5(c) which indicates China's quite strong comparative advantage over HS52 in global market. But according to the inter-temporal movements of RCA over the period of 16 years, China gained a little comparative advantage which decreased to 2.57 in 2009 Fig. 5(c). In overall comparative analysis of RCA it shows that for the product HS 52, China placed more advantageously than Bangladesh in global market.

▪ HS 53-Textile Fibers

The RCA value of HS 53-Vegetable Textile Fibers for Bangladesh was 71.90 in the year of 2000 where its value increased to 122.49 in 2015 Fig. 5(d). That interprets the very high comparative advantage for Bangladesh in global market. In terms of inter-temporal movements of RCA of HS 53 during 2000-2015 it shows that the comparative advantage decreased during 2003 to 2005 but it again increased from 2006 and it has been increasing sharply after 2007. On the contrary, the RCA value of HS 53 for China was 3.84 in 2000 Fig. 5(d) which indicates China's quite strong comparative advantage over HS 53- Vegetable Textile Fibers in global market. But according to the inter-temporal movements of RCA over the period of 16 years, China has been losing her comparative advantage which decreased to 2.39 in 2015 Fig. 5(d). In overall comparative analysis of RCA it shows that for the product HS 53, Bangladesh placed more advantageously than China in global market. Bangladesh also the second largest exporter of HS 53 after China in 2015 (ITC)

▪ HS 54-Man-made Filaments

The RCA value of HS 54-Man-made Filaments for Bangladesh was 0.06 in the year of 2000 where its value remained same to 0.27 in 2015 Fig. 5(e) and it also interprets no comparative advantage for Bangladesh in global market. In terms of inter-temporal movements of RCA of HS54 during 2000-2015 it shows that the comparative advantage increased during 2004 to 2007 but it again decreased from 2008 and remained insignificant. On the contrary, the RCA value of HS54 for China was 0.81 in 2000 Fig. 5(e). which indicates China had no comparative advantage over HS 53 in global market but gradually the RCA of China increased sharply from 2002 and it reached 1.28 in 2015 that interprets China gained her comparative advantage over HS 54-Man-made Filaments. In terms of inter-temporal movements of RCA of HS54 for China during 2000-2015 it shows that the comparative advantage increased during 2002 to 2011 and again decreasing from 2012 to 2015. In overall comparative analysis of RCA it shows that for the product HS 54, China placed more advantageously than Bangladesh in global market.

▪ HS 55-Man-made Staple Fibers

The RCA value of HS 55-Man-made Staple Fibers for Bangladesh was 0.11 in the year of 2000 where its value increased a little to 0.66 in 2015 Fig. 5(f) and it also interprets no comparative advantage for Bangladesh in global market. In terms of inter-temporal movements of RCA of HS 55 during 2000-2015 it shows that the comparative advantage increased during 2004 to 2007 but it again decreased from 2008 and remained 0.66 in 2015. On the contrary, the RCA value of HS 55 for China was 1.85 in 2000 Fig. 5(f) which indicates China had quite high comparative advantage over HS 53- Vegetable Textile Fibers in global market. In term of inter-temporal movements of RCA of China, the analysis shows that the RCA decreased a little from 2002 to 2005 and it again increased from 2006 reached 1.59 in 2015 Fig. 5(f). In overall comparative analysis of RCA it shows that for the product HS 55, China placed more advantageously than Bangladesh in global market.

▪ HS 56-Wadding Felt and Non-woven Yarns

The RCA value of HS 56-Wadding Felt and Non-woven Yarns for Bangladesh was 1.10 in the year of 2000 where its value decreased to 0.89 in 2015 Fig. 5(g)) and it also interprets for Bangladesh lost her comparative advantage in global market. In terms of inter-temporal movements of RCA of HS 56 during 2000-2015 it shows that the comparative advantage increased during 2002 to 2007 but it again decreased from 2008. On the contrary, the RCA value of HS 56 for China was 0.84 in 2000 Fig. 5(g) which indicates China had no comparative advantage over HS56 in global market up to 2007. In terms of inter-temporal movements of RCA of China, the analysis shows that China gained her comparative advantage from 2008 and its value reached 1.16 in 2015 Fig. 5(g). In overall comparative analysis of RCA, it shows that for the product HS 56, China placed more advantageously than Bangladesh in global market.

▪ **HS 57-Carpets and other Textile Floor Covering**

The RCA value of HS 57-Carpets and other Textile Floor Covering for Bangladesh was 0.27 in the year of 2000 where its value increased to 1.32 in 2015 Fig. 5(h) and it also interprets for Bangladesh's gaining comparative advantage in global market. In term of inter-temporal movements of RCA of HS 57 during 2000-2015 it shows that the comparative advantage has been increasing from 2007 to 1.32 in 2015. On the contrary, the RCA value of HS 57 for China was 1.11 in 2000 and increased to 1.23 in 2015 Fig. 5(h) which indicates China has been maintaining her comparative advantage over HS 57 in global market. In term of inter-temporal movements of RCA between China and Bangladesh in the mentioned 16 years period; Bangladesh dramatically gained her comparative advantage over HS 57 from 2013. In overall comparative analysis of RCA it shows that for the product HS 57, Bangladesh placed more advantageously than China in the global market.

▪ **HS 58-Special Woven Fabrics, Tufted Textile Fibers**

The RCA value of HS 58-Special Woven Fabrics, Tufted Textile Fibers for Bangladesh was 0.18 in the year of 2000 where its value decreased to 0.02 in 2015 Fig. 5(i) and it also interprets for Bangladesh having no comparative advantage in global market. In term of inter-temporal movements of RCA of HS 58 during 2000-2015 it shows that the comparative advantage increased dramatically from 2003 to 2007 but its value again decreased from 2008 and it continued. On the contrary, the RCA value of HS 58 for China was 1.77 in 2000 Fig. 5(i) which indicates China had quite good comparative advantage over HS 58 in global market and it had been increasing sharply reached 3.39 in 2009 Fig. 5(i). In overall comparative analysis of RCA it shows that for the product HS 58, China placed more advantageously than Bangladesh in global export.

▪ **HS 59-Impregnated Coated, Covered Laminated Textile**

The RCA value of HS 59-Impregnated Coated, Covered Laminated Textile for Bangladesh was 0.02 in the year of 2000 where its value didn't change significantly Fig. 5(j) and it also interprets for Bangladesh having no comparative advantage in global market. In terms of inter-temporal movements of RCA of HS 59 during 2000-2015 it shows that Bangladesh didn't get comparative advantage over HS 59 over the mentioned 16 years period.. On the contrary, the RCA value of HS 59 for China was 0.61 in 2000 Fig. 5(j) which indicates China had no comparative advantage over HS59 in global market in 2002 but gradually the RCA value increased sharply and reached 2.50 in 2015 Fig. 5(j) that means China gained her comparative advantage over HS 59 from 2005. In overall comparative analysis of RCA it shows that for the product HS 59, China placed more advantageously than Bangladesh in global market.

▪ **HS 60-Knitted or Crocheted fabrics**

The RCA value of HS 60-Knitted or Crocheted fabrics for Bangladesh was 0.07 in the year of 2000 where its value remained very similar to 0.09 in 2009 Fig. 5(k) and it also interprets for Bangladesh having no comparative advantage in global market. In terms of inter-temporal movements of RCA of HS 60 during 2000-2015 it shows that the RCA value advantage increased a little from 2004 and Bangladesh gained comparative in 2007 but its value again decreasing from 2008. On the contrary, the RCA value of HS 60 for China was 2.39 in 2000 Fig. 5(k) which indicates China had good comparative advantage over HS 60 in global market in 2002 and its value smoothly increased a little to 3.13 in 2015 Fig. 5(k). In overall comparative analysis of RCA, it shows that for the product HS 60, China placed more advantageously than Bangladesh in global market.

HS 61-Knitted art of Apparel and Clothing Accessories

The RCA value of HS61-Knitted or Crocheted fabrics for Bangladesh was 19.75 in the year of 2000 where its value increased sharply to 39.1 in 2015 Fig 5(l) and it also interprets for Bangladesh having quite high comparative advantage in global market. In terms of inter-temporal movements of RCA of HS 61 during 2000-2015, it shows that the comparative advantage increased sharply from 2002 up to 2015 and its value decreased a little in 2009 Fig. 5(l). On the contrary, the RCA value of HS 61 for China was 3.57 in 2000 Fig. 5(l) which indicates China also had good comparative advantage over HS 61 in global market in 2002 and its value decreased significantly to 2.68 in 2015 Fig. 5(l). It's because of the relocation of Chinese clothing firms to abroad due to her economic shifting and labour cost (Zhang et al., 2016). In overall comparative analysis of RCA it shows that for the product HS 61, Bangladesh and China both placed equally advantageous in global market. But Bangladesh's performance of export is comparatively favourable position than China. In the terms export value in global market Bangladesh placed in the second position after China in 2015 (ITC).

HS 62-Art of Apparel Clothing Accessories

The RCA value of HS 62-Art of Apparel Clothing Accessories for Bangladesh was 25.33 in the year of 2000 where its value increased sharply to 32.35 in 2015 Fig. 5 (m) and it also interprets for Bangladesh having quite high comparative advantage in global market. In terms of inter-temporal movements of RCA of HS 62 during 2000-2015 it shows that the comparative advantage increased sharply from 2005 up to 2008 and its value decreased a little in 2009 Fig. 5 (m). On the contrary, the RCA value of HS 62 for China was 3.66 in 2000 Fig. 5 (m) which indicates China also had good comparative advantage over HS 62 in global market in 2002 and its value decreased significantly to 2.41 in 2015 Fig. 5 (m). In overall comparative analysis of RCA it shows that for the product HS 62, Bangladesh and China both placed equally advantageous in global market. For HS 62 also Bangladesh's performance of export is comparatively favourable position than China and in the terms export value in global market Bangladesh placed in the second position after China in 2015 (ITC).

HS 63-Made up Textile articles

The RCA value of HS 63-Made up Textile articles for Bangladesh was 10.59 in the year of 2000 where its value increased to 12.11 in 2009 Fig. 5(n) and it also interprets for Bangladesh having quite high comparative advantage in global market. In terms of inter-temporal movements of RCA of HS 63 during 2000-2015 it shows that the comparative advantage increased smoothly to 14.15 in 2015 Fig. 5(n). On the contrary, the RCA value of HS 63 for China was 3.72 in 2000 Fig. 5(n) which indicates China also had good comparative advantage over HS63 in global market in 2002 and its value decreased significantly to 2.51 in 2015 Fig. 5(n). In overall comparative analysis of RCA it shows that for the product HS 63 that Bangladesh and China both placed equally advantageous in the global market.

4.2. Analysis Of Competitiveness of 14 Products Of T&A For Bangladesh And China

Table 2 The Analysed Result of Spearman's Rank Correlation Coefficient (rs) of 14 products of T&A industry between Bangladesh and China according to their values

HS	Name of Product	Value of rs
Higher value of $r_s = (0.50-1)$; Exist Higher Competition between Bangladesh and China		
57	Carpets and other textile floor covering	0.879
62	Art of Apparel Clothing Accessories	0.655
61	Knitted art of Apparel and Clothing Accessories	0.530
Modest value of $r_s = (0.01-0.49)$; Exist Modest Competition between Bangladesh and China		
63	Made up Textile articles	0.315
53	Vegetable Textile Fibers	0.297
56	Wadding Felt and Non-woven Yearns	0.157
60	Knitted or Crocheted Fabrics	0.139
58	Special Woven Fabrics, Tufted Textile Fibers	0.127
59	Impregnated Coated, Covered Laminated Textile	0.109
Lower value of $r_s < -1$, Exist complementary between Bangladesh and China		
51	Wool, fine coarse animal hair, horsehair	-0.145

54	Man-made Filaments	-0.176
50	Silk	-0.239
55	Man-made Staple Fibers	-0.373
52	Cotton	-0.730

The degree and nature of competition between Bangladesh and China in the world market over 2000-2015 have been evaluated by calculating the (SRC) Spearman's Rank Correlation (rs) coefficients for RCA indices for Bangladesh and China in the world market for the products of Textile and Apparel. The aim is to identify, the products where Bangladesh and China compete/complement in the world market.

The value of r_s is ranged from -1 to +1. A higher and positive value of the coefficient reflecting the fact that both the countries are contesting for a share in the world market is indicative of a competitive relationship between the two countries in the export market. A high negative coefficient in a similar fashion is indicative of complementarity in export specialization in the concern product between the two economies. A value of zero for the spearman correlation coefficient implies no relationship.

The SRC coefficient analysis has been calculated for Bangladesh and China for the T&A sector of 14 products. The analyzed result of SRC (Table 2) shows that; higher competition exist in 3 products out of the 14 products including HS 57, HS 62, and HS 61 that also interprets highest competitiveness between two countries among those goods in the global market.

On the other hand, modest competition exist in 6 products respectively; HS 63, HS 53, HS 56, HS 60, HS 58 and HS 59 out of the 14 products between China and Bangladesh which also means medium level of competitiveness between the two economies. The products are categorized according to their value of r_s showed in the (Table 2).

On the contrary, there exists complementariness in five remaining products; respectively HS 51, HS 54, HS 50, HS 5, and HS 52 between Bangladesh and China in global market. Among them, HS52, HS56, and HS63 were the three top ones with the highest level of complementariness, especially the product of HS 52.

5. CONCLUSIONS AND RECOMMENDATIONS

In this paper revealed comparative advantage has been analyzed at the two digit level of HS classification for both Bangladesh and China. Our analysis reveals that among the selected 14 products; Bangladesh placed more advantageously than China over 5 products respectively; HS 57, HS 62, HS 61 HS 63 and HS 53. On the other hand China placed more advantageously than Bangladesh over 9 products respectively; HS 50, HS 51, HS 52, HS 54, HS 55, HS 56, HS 58, HS 59 and HS 60 in global market; Bangladesh and China both countries equally placed advantageous over 3 products respectively; HS61, HS62 and HS63 in global market.

According to the inter-temporal variation of RCA in the mentioned period; Bangladesh improved her comparative advantage over 5 products respectively; HS 53, HS 57, HS 61, HS 62 and HS 63, lowered over 7 products respectively; HS 52, HS 54, HS 55, HS 56 HS, HS 58, 59 and HS 60; remained quite unchanged over 2 products respectively; HS 50 and HS 51 whereas China improved her comparative advantage over 10 products respectively HS 50, HS 51, HS 52, HS 53, HS 54, HS 55, HS 56, HS 58, HS 59 and HS 60; lowered over 4 products respectively HS 57, and HS 60, HS 61, HS 62 and HS 63. From the results it reveals that the T&A Sector in Bangladesh is mostly dominated by the Ready Made Garments industries which are mainly the final products of this industry. Besides according to the recent report of Mckinsey (McKinley, 2012), The three main stakeholders of T&A; the government, suppliers, and buyers—must work together to realize the potential of Bangladesh's ready-made-garment market. The government's top three priorities should be for investment in infrastructure, education, and trade support.

According to the competitiveness analysis of the 14 products; 3 products (Table 2) exist higher competition. The concern authority of Bangladesh should take strong steps to keep the strength to compete with her counterpart in global market. 6 products (Table 2) exist modest competition. The concern authority of Bangladesh should also focus on these products to improve their competitiveness than China. The rest of the 5 products (Table 2) exist complementary between two nations and they are mutually benefited by exporting and importing these products among the industry. According to the recent report of some international organization and research articles, Bangladesh should establish a healthier labor market adjusting with higher wages labor rights and

better training. These initiatives would help the T&A sector become more productive over the longer term to be compete in global markets and competitors. Besides, increasing the number of skilled workers capable of handling more complex procedures and making sophisticated items could move Bangladesh's T&A sector toward higher-value manufacturing to continue her export growth. According to the suggestion of Sanchita Banerjee and Zhang in their research revealed that it is crucial for Bangladesh's T&A sector's competitiveness to continue investment in infrastructure to improve lead times and facilitate trade. Besides, developing and implementing supportive policies, and improving governance at the national and factory levels are crucial measures to be implemented to keep the competitiveness of the industry.,(Zhang et al., 2016)(Saxena & Salze-Lozac'h, 2010)

LIMITATIONS

The limitation of the current study is availability of export data for Bangladesh side in latest couple of years. At last it could be managed from the Ministry of Commerce of Bangladesh.

REFERENCES

- Ahmed, F. Z., Greenleaf, A., & Sacks, A. (2014). The paradox of export growth in areas of weak governance: The case of the ready made garment sector in Bangladesh. *World Development*, 56, 258-271.
- Balassa, B. (1965). Trade Liberalization and "Revealed" Comparative Advantage. *The Manchester School*, 33(2), 99-123.
- Balassa, B. (1977). Revealed Comparative Advantage Revisited: An Analysis of Relative Export Shares of the Industrial Countries, 1953-1971. *The Manchester School of Economic & Social Studies*, 45(4), 327-344.
- Balassa, B. (1979). The changing pattern of comparative advantage in manufactured goods. *The Review of Economics and Statistics*, 259-266.
- Batra, A., & Khan, Z. (2005). Revealed comparative advantage: An analysis for India and China. *Indian Council for Research on International Economic Relations*, 168, 1-85.
- Bela, B. (1986). Comparative Advantage in Manufactured Goods: A Reappraisal. *The Review of Economics and Statistics*, 68(2), 315-319.
- Berg, A., Hedrich, S., Kempf, S., & Tochtermann, T. (2011). Bangladesh's ready-made garments landscape: The challenge of growth. November. McKinsey & Company. http://www.mckinsey.de/sites/mck_files/files/2011_McKinsey_Bangladesh.pdf. Bernhardt.
- BGMEA. (2016). About Garment Industry of Bangladesh. Dhaka, Bangladesh: The Bangladesh Garment Manufacturers and Exporters Association.
- BIDA. (2016). Key Statistics of RMG Sector. Dhaka, Bangladesh: Bangladesh Investment Development Authority (BIDA).
- BKMEA. (2016a). *Export Performance of RMG of Bangladesh*. Dhaka, Bangladesh: Bangladesh Knitwear Manufacturers & Exporters Association, BKMEA Retrieved from <http://www.bkmea.com/facts-figures.html>.
- BKMEA. (2016b). Market Research Analysis of Potential Market for Bangladesh's Textile and Apparel. Dhaka, Bangladesh: Bangladesh Knitwear Manufacturers & Exporters Association, BKMEA.
- CCCT. (2016). China Textile & Clothing Trade by Country/Region. Beijing, China: China Chamber of Commerce for Import and Export of Textile and Apparel (CCCT).
- Changjun YUE, P. H. (2002). Does comparative advantage explains export patterns in China? *China Economic Review*, 13(2002), 276-296.
- Comtrade, U. (2016). *UN Comtrade Database: HS Classification by Scetion*. Retrieved from: <http://unstats.un.org/unsd/tradekb/>
- Do, Q.-T., Levchenko, A. A., & Raddatz, C. (2016). Comparative advantage, international trade, and fertility. *Journal of Development Economics*, 119, 48-66.
- Dunford, M., Dunford, R., Barbu, M., & Liu, W. (2013). Globalisation, cost competitiveness and international trade: The evolution of the Italian textile and clothing industries and the growth of trade with China. *European Urban and Regional Studies*, 0969776413498763.
- Ekram, H. M., Huang, D., & Tran, Q. (2013). *Competitiveness of Textile and Apparel Industry of Bangladesh with China in International Trade*. Paper presented at the International Conference on Information, Business and Education Technology (ICIBIT), Beijing, China.
- Eloot, K., Huang, A., & Lehnich, M. (2013). A new era for manufacturing in China. *McKinsey Quarterly*, 1.

- 536 Fang, C. (2012). Analysis of the International Trade Competitiveness of China's Textile and Apparel
537 Industries in Post-Quota Era—An Empirical Analysis Based on the Intra-industry Trade.
538 *Journal of Chongqing Technology and Business University (Social Science Edition)*, 6, 004.
- 539 Gauthier, T. D. (2001). Detecting trends using Spearman's rank correlation coefficient. *Environmental*
540 *forensics*, 2(4), 359-362.
- 541 Gelb, B. A. (2005). Textile and Apparel Quota Phase-out: Some Economic Implications *CRS Report*
542 *for Congress* (Vol. Order Code RS20889).
- 543 Haider, M. Z. (2007). Competitiveness of the Bangladesh Ready-made Garment Industry in Major
544 International Markets. *Asia-Pacific Trade and Investment Review*, 3(1).
- 545 Haque, A. (2011). *Bangladesh as an Emerging Economy and Lessons from East Asian Miracles*.
546 Paper presented at the APEA Conference 2011, South Korea.
- 547 Hubbard, I. (2002). Revealed comparative advantage and competitiveness in Hungarian Agri-food
548 sectors. In I. o. E. H. a. o. sciences (Ed.), *Discussion papers new series*. Budapest, .
549 Budapest, Hungary: Institute of Economics Hungarian academy of sciences.
- 550 Islam, M. M., Khan, A. M., & Islam, M. M. (2013). Textile industries in Bangladesh and challenges of
551 growth. *Research Journal of Engineering Sciences*
552 *ISSN*, 2278, 9472.
- 553 ITC. (2016). *Trade Performences HS by Country*. Retrieved from:
554 http://tradecompetitivenessmap.intracen.org/RS_TP_CI.aspx?RP=004&YR=2015
- 555 ITP. (2016). Trade Statistics of Indian Apparel and Textile Trade: Indian Trade portal.
- 556 Joarder, M. A. M. (2010). Post-MFA Performance of Bangladesh Apparel Sector. *Post-MFA*
557 *Performance of Bangladesh Apparel Sector*, 6(4), 134 - 144.
- 558 Karaalp, H. S., & Yilmaz, N. D. (2013). Comparative advantage of textiles and clothing: evidence for
559 Bangladesh, China, Germany and Turkey. *FIBRES & TEXTILES in Eastern Europe*.
- 560 Khan, A. B. a. Z. (2005). Revealed Comparative Advantage: An Analysis For India And China. New
561 Delhi, India: Indian Council For Research On International Economic Relations.
- 562 Lau, C. K., To, K. M., Zhang, Z., & Chen, J. (2009). Determinants of competitiveness: Observations in
563 China's textile and apparel industries. *China & World Economy*, 17(2), 45-64.
- 564 Liesner, H. H. (1958). The European common market and British industry. *The Economic Journal*,
565 68(270), 302-316.
- 566 Macleans Mzumara, A. C. a. R. K. (2013). An Analysis Of The Revealed Comparative Advantage In
567 Southern African Development Community Member States. *Journal of Sustainable*
568 *Development in Africa*, 15(4).
- 569 Malouche, S. K. a. M. (2015). *Toward New Sources of Competitiveness in Bangladesh: Key Insights*
570 *of the Diagnostic Trade Integration Study* (978-1-4648-0647-6). Washington DC, USA: World
571 Bank Retrieved from http://elibrary.worldbank.org/doi/abs/10.1596/978-1-4648-0647-6_ch2.
- 572 Marrewijk, J. H. a. C. v. (2004). Dynamics of Chinese Comparative Advantage *Tinbergen Institute*
573 *Discussion Paper* (Vol. TI 2004-034): Tinbergen Institute.
- 574 McKinley, C. E. (2012). *Indigo : in search of the colour that seduced the world*. London: Bloomsbury.
- 575 Mirdha, R. U. (2013, March 26, 2013). Export diversification: A way to sustainable overseas trade.
576 *The Daily Star, March 26, 2013*.
- 577 Mohan Kathuria, L. (2013). Analyzing competitiveness of clothing export sector of India and
578 Bangladesh: Dynamic revealed comparative advantage approach. *Competitiveness Review:*
579 *An International Business Journal*, 23(2), 131-157.
- 580 Rahaman, M. A. (2008). *Bangladesh Economy and Trade: Way Forward*. Paper presented at the
581 DCCI Conference on Bangladesh, Dhaka, Bangladesh.
- 582 Rahman, D. L. A. A. a. M. M. (2009). The Competitiveness and Future Challenges of Bangladesh in
583 International Trade. In W. R. Centre (Ed.). Tokyo, Japan: Aoyama Gakuin University
- 584 Ramesh Kurpad, M. (2014). Made in Bangladesh: challenges to the ready-made garment industry.
585 *Journal of International Trade Law and Policy*, 13(1), 80-96.
- 586 Rasiaah, R., Kong, X.-X., & Vinanchiarachi, J. (2011). Moving up in the global value chain in button
587 manufacturing in China. *Asia Pacific Business Review*, 17(02), 161-174.
- 588 Ruan, J., & Zhang, X. (2014). "Flying geese" in China: The textile and apparel industry's pattern of
589 migration. *Journal of Asian Economics*, 34, 79-91.
- 590 Sattar, Z. (2015). Strategy for Export Diversification 2015-2020 *Seventh Five Year Plan for*
591 *Bangladesh Planning Commission* (Vol. January 2015). Dhaka, Bangladesh: Policy Research
592 Institute of Bangladesh.
- 593 Saxena, S. B., & Salze-Lozac'h, V. (2010). Competitiveness in the Garment and Textiles Industry:
594 Creating a supportive environment. *A Case Study of Bangladesh*.

- 595 Shafaei, R. (2009). An analytical approach to assessing the competitiveness in the textile industry.
596 *Journal of Fashion Marketing and Management: An International Journal*, 13(1), 20-36.
- 597 ShariatUllah, M., & Kazuo, I. (2012). Dynamics of comparative advantage and export potentials in
598 Bangladesh.
- 599 Tao, Y., & Fu, X. (2007). China's textile industry international competitive advantage and policy
600 suggestion. *Business and Public Administration Studies*, 2(1), 84.
- 601 USDC. (2016). US Department of Commerce.
- 602 Utkulu, U., & Seymen, D. (2004). *Revealed Comparative Advantage and Competitiveness: Evidence*
603 *for Turkey vis-à-vis the EU/15*. Paper presented at the European trade study group 6th annual
604 conference, ETSG.
- 605 WITS. (2016). *World Integrated Trade Solution (WITS); Textiles and Clothing Exports By Country and*
606 *Region* [Trade Data]. Retrieved from:
607 [http://wits.worldbank.org/CountryProfile/en/Country/BGD/Year/2011/TradeFlow/Export/Partne](http://wits.worldbank.org/CountryProfile/en/Country/BGD/Year/2011/TradeFlow/Export/Partner/CHN/Product/all-groups)
608 [r/CHN/Product/all-groups](http://wits.worldbank.org/CountryProfile/en/Country/BGD/Year/2011/TradeFlow/Export/Partner/CHN/Product/all-groups)
- 609 Yilmaz, H. S. (2013). FIBRES & TEXTILES in Eastern Europe. *FIBRES & TEXTILES in Eastern*
610 *Europe*
611 21(1), 97.
- 612 YUAN, T. X., Fu. (2007). China's Textile Industry International Competitive Advantage and Policy
613 Suggestion. *Journal of the Washington Institute of China Studies*, 2(1), 84-97.
- 614 Zar, J. H. (1972). Significance testing of the Spearman rank correlation coefficient. *Journal of the*
615 *American Statistical Association*, 67(339), 578-580.
- 616 Zhang, M., Kong, X. X., & Ramu, S. C. (2016). The transformation of the clothing industry in China.
617 *Asia Pacific Business Review*, 22(1), 86-109.
- 618