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Growth and Pattern of Intra-Industry Trade between India and Bangladesh: 1975—2010

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ANNOTATION. The present study investigates the intra-industry trade between India and Bangladesh over the period of 1975 to 2010. GL index is used to calculate intra-industry trade at the three-digit level of SITC. The study also calculated the trade complementarity index, and revealed comparative index. The extent of intra-industry trade is high in sectors like crude materials, inedible, except fuels, food and live animals. The study also reveals mismatch between Indian imports and Bangladesh exports. The present study indicates positive effect on consumer surplus and trade using SMART model. Finally, the paper suggests that Bangladesh should diversify his export structure to reduce the bilateral trade deficit on the basis of comparative advantage.

KEYWORDS. Grubel Lloyd index, trade complementarity index, SMART model, economic regionalism

1. Introduction

Bangladesh got independence with the active support of India on 6 December 1971. Since 1971 India has a good economic and political relation with Bangladesh. Bilateral trade between India and Bangladesh is conducted under the provision of the prevailing India-Bangladesh trade agreement which signed on march 28, 1972 under the said trade agreement both countries provide most favoured nation treatment to each other.

Among India's neighbours, Bangladesh occupies a special position — not only because of India's role in its independence but because geographically, too, it surrounds Bangladesh from three sides. Both countries offer natural markets for each other's export products. Transaction cost of mutual trade can be minimal as result of geographical proximity, common language and a heritage of common physical infrastructures.

India's trade with Bangladesh has increased substantially from US\$1.65 billion in 2005–06 to US\$ 4.06 billion in 2011–12. The two way trade in 2012–13 was US\$ 5.34 billion, of which

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India's exports to Bangladesh accounts for US\$ 4.77 billion and imports for US\$ 0.56 billion. At present, India granted duty free access to Bangladesh for all items except 25 items. India is Bangladesh's fourth important trading partner, next to European Union, United States of America, and China, accounting for 9.1 per cent of Bangladesh's global trade in 2010. Despite huge sensitive list of Bangladesh, India's share in the total imports of Bangladesh was 3.6 per cent in 1980, which raised to 9.37 per cent in 1995 and to 15.30 per cent in 2008².

Despite India's unilateral concession to Bangladesh and the existence of a large land border between two countries, Bangladesh exports to India is not growing at considerable pace and causing trade deficit in Bangladesh balance of payment in bilateral trade. Hossein & Rashid³ highlight the economic as well as political nature of the bilateral trade deficit problem while Zaki⁴ consider trade deficit in the context of trade between a small country and a large neighbour and Rahman⁵ in the favour of trade deficit from the view point of regional integration of South Asian countries. Bakha⁶, Chaudhari⁷, Taneja & Pohit⁸, Taneja⁹ has considered the composition of cross-border illegal trade for trade deficit. De et al¹⁰ argued that Bangladesh and India would both gain by opening up their markets to each other.

This paper extends the existing studies in two important ways. First, to the best of our knowledge this is the first study that analyse the Intra Industry trade for the period of 1975–2010. Second, it will also help us to understand the potential of industrial value chain between India and Bangladesh and possible trade cooperation. The rest of the paper addresses the following aspects of India – Bangladesh trade relations:

A) the pattern of comparative advantage of India and Bangladesh and its implications;

² World Bank. (2010). South Asia Economic Update 2010 : Moving up Looking East, World Bank, Washington, D.C.

³ Hossain, A & Rashid, S. (1999). The political economy of Bangladesh's large and growing trade deficits with India, Pakistan Development Review, pp 25–68.

⁴ Zaki, Eusufzai. (2000). Liberalisation in the Shadow of a Large Neighbour: A Case of Bangladesh-India Economic Relation. Dhaka University Press.

⁵ Rahman M.M. (2005). Bangladesh-India Bilateral Trade Improvement: Causes of Imbalance and Measure (Australia Univeristy of Sydeny).

⁶ Bakhat, Zaid. (1994). BIDS study on illegal International trade in Bangladesh, 1990: An Update, Bangladesh Institute of Develoipment Studies, Dhaka.

⁷ Chaudhari, S. K. (1995). Cross Border Trade between India and Bangladesh, NCAER, Working Paper 58. New Delhi.

⁸ Taneja, N. & Pohit, S. (2000). India's Informal Trade with Bangladesh and Nepal : A Qualitative Assessment (SANEI Paper).

⁹ Taneja, N. (2001). Informal trade in SAARC region, Economic and Political Weekly, March 17.

¹⁰ De Prabir, Raihan Selim, K. Sanjay. (2012). Unlocking Bangladesh-India Trade emerging potential and the way forward. Working paper 6155. World Bank.

B) the complementarity in the trade pattern of the two countries;

C) role of Intra-Industry trade in bilateral trade relation;

D) impact of Bangladesh's sensitive list under SAFTA (with India);

The second section of the paper analyses the theoretical review of Intra-Industry trade; third section discusses about data coverage and methods; fourth section discusses the empirical result and last section of the paper presents concluding remarks and flags issues for further investigation.

2. Theoretical Review of Intra-Industry trade

Interest in the intra-industry phenomenon was largely emerged from the works done by researchers in 1960s on the impact of formation of the EEC (European Economic Community) on trade flows within the member countries. The original study was that of Verdoorn on the changes in the pattern of trade of the Benelux's countries following their union¹¹. He found that specialization and trade between the member countries had taken place within the similar product categories rather than between different product categories. Balassa,¹² in an analysis of the product composition of trade between each pair of the original EEC member over the periods 1958–63 and 1963–70, found that trade was increasingly an exchange of similar goods. Grubal and Lloyd¹³ subsequently estimated that 71 percent of increase in trade between the EEC countries from 1959 to 1967 was the result of Intra-Industry trade (IIT).

The first surveys, which tried to explain a nature of IIT, were conducted by Krugman¹⁴ Lancaster¹⁵ and Helpman¹⁶. They contributed to the theoretical foundations of IIT by binding this phenomenon with imperfect competition and product differentiation. Horizontal IIT is explained by economies of scale in the presence of product differentiation and imperfect competition. On the other hand, the explanations for vertical IIT are

¹¹ *Verdoorn (1960)*. The Intra-Bloc Trade of Benelux. In Robinson (ed).

¹² *Balassa, B. (1975)* European Economic Integration (Amsterdam, North-Holland).

¹³ *Grubel, Herbert G., Peter J. Lloyd. (1975)*. Intra-Industry Trade: The Theory and Measurement of International Trade in Differentiated Products. London.

¹⁴ *Krugman, P.R (1979)*. Increasing Returns, Monopolistic Competition, and International Trade. *Journal of International Economic*, 9, 469–79.

¹⁵ *Lancaster, K. J. (1980)*. Intra-Industry Trade Under Perfect Monopolistic Competition. *Journal of International Economics*, 98, 63–83.

¹⁶ *Helpman, E. (1981)*. International trade in the presence of product differentiation, economies of scale and monopolistic competition. *Journal of International Economics*, 11(3), 305–340.

sought without recourse to economies of scale by Falvey¹⁷, Falvey and Kierzkowski¹⁸, and Falm and Helpman¹⁹. In general, these models predict the pattern of IIT along the lines similar to the pattern of inter-industry trade predicted in the conventional trade model, according to the central role of factor endowment differences.

In analysing trade in differentiated products, Linder²⁰ advanced the proposition that the more similar the demand structures of two countries, the more intensive, potentially are the trade between these two countries. He further argued that while 'a wholly array of forces influences the demand structure of a country. The level of average income is the most important single factor and that it has'. The existence of a common border will also contribute to information flows as Grubel and Llod suggested, in countries sharing a common border, intra-industry trade may occur in products which are functionally homogeneous but differentiated by location. Thus it may be hypothesised that the extent of intra-industry trade will be higher between countries that share a common border (as India-Bangladesh) than between countries which do not have common borders.

3. Data Coverage and Methods

The study covers the period from 1975–76 to 2010–11.²¹ Trade statistics used in this paper are taken from the world integrated trade solution (WITS) database, jointly developed by the World Bank and UNCTAD, World Development Indicator which is an online database, Direction of Trade Statistics Yearbook September 2012, International Monetary Fund and Reserve Bank of India. The underlying information source is the United Nations Statistical Division's Commodity Trade database (COMTRADE). The years of coverage included in the analysis are determined by the availability of data. The paper is based on SITC Revision 1 version of the UN's Standard International Trade Classification (SITC). Revision 1 has the advantage of offering maximum comparability over the sample period, as trade statistics have been recorded according to this classification since the 1960s.

¹⁷ Falvey, R. E. (1981). Commercial policy and International Trade, *Journal of International Economics*, 11, 495–511.

¹⁸ Falvey, R. E. and Kierzkowski, H. (1987). Product Quality, Intra-Industry Trade and Imperfect Competition. In Kierzkowski (ed.).

¹⁹ Flam, H. and E. Helpman (1987). Vertical product Differentiation and North-South Trade. *American Economic Review*. Vol. 77, pp. 810–22.

²⁰ Linder, S. B. (1961). *An essay on trade and transformation*. New York, John Wiley Sons.

²¹ The choice of the particular years is related to the availability of data.

Most of our calculations are performed at the 1-digit, 2-digit and 3-digit level of the SITC classification, Grubel and Lloyd (1975) who provided the definitive empirical study on the importance of intra-industry trade and how to measure it. This measure, now known as the Grubel–Lloyd index, is calculated as shown below:

$$Bi = \frac{(X_i + M_i) - |X_i - M_i|}{X_i + M_i} \times 100 \quad (1)$$

Where:

Bi = Index of intra-industry trade of the i^{th} industry.

X_i = Export of the i^{th} industry,

M_i = Imports of the i^{th} industry

The value of Bi ranges from 0 to 100. If there is no IIT (i.e., one of $(X_i$ or $M_i)$ is zero) an index value of ‘zero’ would indicate complete inter-industry trade. In this case, either the value of exports or imports would be zero. Bi takes the value 0. If all trade is IIT (i.e., $X_i = M_i$), Bi takes the value of 100. Higher index values are associated with greater intra-industry trade as a proportion of total trade, with an index value of ‘100’ indicating equality between exports and imports.

Early empirical investigation of IIT had been confined to “static” indicators such as the standard GL index, which measure IIT for one year. However, a paper by Hamilton and Kniest²² has revealed a new and potentially challenging dimension to the empirical analysis of IIT by suggesting a measure of marginal intra-industry trade (MIIT). Three methods have been proposed to date for the ‘dynamic’ analysis of IIT; namely, the Hamilton-Kniest index, the Greenaway et al. index²³ and the Grubel-Lloyd²⁴ style measure of MIIT. Among the different versions of the MIIT index, the most widely used index has been the one developed by Brülhart²⁵. The Brülhart index of MIIT is the following:

$$B = \frac{\sum[(|\Delta X_i| + |\Delta M_i|) - |\Delta X_i - \Delta M_i|]}{(|\Delta X_i| + |\Delta M_i|)} \times 100 \quad (2)$$

²² Hamilton, Clive, Paul Kniest (1991). Trade Liberalization, Structural Adjustment and Intra-Industry Trade: A Note. *Weltwirtschaftliches Archiv*, Vol. 127, pp. 356-367.

²³ Greenaway, David, Robert C. Hine, Chris Milner, Robert Elliott. (1993). Adjustment and the Measurement of Marginal Intra-Industry Trade. SPES Working Paper no. 8.

²⁴ Grubel, Herbert G., Peter J. Lloyd. (1975). *Intra-Industry Trade: The Theory and Measurement of International Trade in Differentiated Products*. London.

²⁵ Brülhart, Marius (1994). Marginal Intra-Industry Trade: Measurement and Relevance for the Pattern of Industrial Adjustment. *Weltwirtschaftliches Archiv*, vol. 130, pp. 600–613.

Where, ΔX_i refers to the change in quantity of exports from a country in a particular product category from period t_1 to t_2 and ΔM_i refers to the change in quantity of imports to that country in the same product category from period t_1 to t_2 . The Brulhart index of MIIT takes on values between 0 and 100; with 0 representing the scenario where new trade flows over a period of time are entirely due to inter industry trade, and 100 indicates a situation where new trade flows over a period of time are purely because of intra industry trade.

Average Compound Growth Rate

This indicator is used to compare rates of growth of exports and imports of broad classes of goods in one country with those for world trade or the trade of its competitors, including the major products in exports and imports. The annual compound growth rate (G) over the period can be calculated as:

$$G_i = (Xt^2 / Xt^1)^{1/n-1} \times 100 \quad (3)$$

Where Xt^1 and Xt^2 are trade values of product I in the beginning period and the end period respectively and n is the numbers of years.

The Trade Complementarity Index (TCI)

TCI can provide useful information on prospects for intraregional trade. It shows how well the structures of a country's imports and exports match. Michaely²⁶ used the index to assess prospects for Latin American trade arrangements, Yeats²⁷ for Sub-Saharan African countries and Nag et al²⁸ for the South Asia region to analysis the compatibility. It also has the attraction that its values for countries considering the formation of a regional trade agreement can be compared with others that have formed or tried to form similar arrangements. The trade complementarity (TC) index²⁹ between countries k and j is defined as: (India and Bangladesh)

$$TC_{kj} = 100(1 - \text{sum}(|m_{ik} - x_{ij}|/2)) \quad (4)$$

Where x_{ij} is the share of good i in global exports of country j and m_{ik} is the share of good i in all imports of country k . The index is zero when no goods are exported by one country or imported by the other and 100 when the export and import shares exactly match.

²⁶ Michaely, M. (1994). Trade Preferential Agreements in Latin America: An Ex-Ante Assessment. World Bank policy research working paper 1583, The World Bank, Washington, D.C.

²⁷ Yeats. (1998). Just How Big is Global Production Sharing, World Bank, Policy Research Working Paper 1871, The World Bank, Washington, D.C.

²⁸ Ng, Francis and Yeats, Alexander. (2003). Major trade trends in East Asia: what are their implication for regional cooperation and growth? Policy Research working Paper series 3084. The World Bank.

²⁹ Trade Complementarity Index is aggregate (SITC 2 digit level)

4. India and Bangladesh Trade Relations

Bangladesh's trade with world increased at a compounded annual growth rate of 12.8 percent during 2001–2012. Total trade has increased from 14.85 billion in 2001 to 55.91 billion in 2012. Incidentally, the exports and imports have grown over the period at almost similar rates³⁰. Exports have grown at a CAGR of 12.7 percent, while imports have grown at a CAGR 12.9 percent during the same period. Bangladesh's major exports destinations were the European Union and the United States. 78 percent of its exports, largely dominated by readymade garments, went to European and North American markets. Bangladesh's exports are highly concentrated both in terms of the destinations and the product mix. Textile sector accounts for 87 percent of all the commodities exported. Many countries give free access to Bangladesh such as European Union, Canada, Australia, Japan, Norway and China as least developed country category.

India has also allowed for duty free access to 10 million pieces in the readymade garments sector and also preferential access is available under the SAFTA regime. Bangladesh mainly sources its imports from China and India. In striking contrast to its direction to exports, most of the imports are sourced from Asia. The majority of imports of around 47 percent are dominated by consumer and intermediate goods. Much of the inputs of the burgeoning textile sector is imported, and forma major part of Bangladesh's imports.

Bilateral trade between India and Bangladesh is conducted under the provision of the prevailing India-Bangladesh trade agreement which was signed on March 28, 1972. Both countries provided most favoured nation treatment to each other. As a result, India's trade with Bangladesh has witnessed rapid growth in recent years. Currently, China is the largest trading partner of Bangladesh. However, India is likely to emerge as the largest trading partner in the coming years.

India's trade with Bangladesh in 1980 was US\$ 117.87 million, consisting of US\$ 105.52 million exports and US\$ 12.35 million imports. In 2011, total trade was US\$ 4660.36, consisting of US\$ 4062.38 million exports and US\$ 597.98 million imports. It is true Bangladesh has witnessed a widening of trade deficit with India which increased from US\$ 1.5 billion in 2004-05 to US\$ 3.4 billion in 2010-11(see table 1).

³⁰ Acharya, L., Marwaha A. (2012). Status Paper on India-Bangladesh Economic Relations. Federation of Indian Chambers of Commerce and Industry (FICCI).

Table 1 India-Bangladesh Bilateral Trade (US\$ million)

Year	India to (from) Bangladesh		
	Export (A)	Import (B)	(A-B)
1980	105.52	12.35	93.17
1985	104.19	28.90	75.29
1990	297.11	15.26	281.85
1995	959.62	78.82	880.80
2000	860.33	79.85	780.48
2005	1656.05	110.11	1545.94
2011	4062.38	597.98	3464.40

Sources: WITS, which is online trade data base (access date 12/07/2014)

Bangladesh's imports from India are concentrated in HS chapter 10, 52, 27, 87, 84, 72, 17, 23, 39 and 29, which includes commodities like – cereals (17.22 %), cotton (14.77 %), mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes (8.02 %), vehicles other than railway or tramway rolling stock, and parts and accessories thereof (6.49 %), nuclear reactors, boilers, machinery and mechanical appliances; parts thereof (5.97 %), iron and steel (4.63 %), sugars and sugar confectionery (4.58 %), residues and waste from the food industries; prepared animal feed (3.98 %), plastics and articles thereof (3 %) and organic chemicals (3 %).

It is seen that knitwear and woven garments have consistently comprised approximately 80 percent of the total export and are followed by frozen foods, jute goods, leather and chemical products on the list of Bangladesh's export. The nature of the two economies and the pattern of Bangladesh's exports, the only way to reduce the trade deficit between the two countries would be to explore and exploit untapped potential in their bilateral trade relations. India's energy demands are only rising and Bangladesh can take this opportunity to step in and supply energy to its neighbour, ensuring that the trade deficit would be reduced substantially³¹. For improvement in the trade deficit for Bangladesh, India announced duty free access to 46 textile commodities from Bangladesh in September 2011 and removed all sensitive list under SAFTA except 25 items³².

³¹ *Singh Pratima. (2012). Freeing Trade in South Asia : India's Tariff withdrawal for Pakistan and Bangladesh. Foreign Trade Review. Vol. xlvii, No. 2, pp. 81—97.*

³² SAARC Secretariat (<http://saarc-sec.org/SAARC-Secretariat/18/>).

4. Empirical Results

In the present study, different trade related indices have been used to analyse the bilateral trade relations. In order to study the potentiality of trade between Bangladesh and India, Revealed Comparative Advantage (RCA) indices of latest year 2012 at HS 6 digit level, Intra-Industry trade index, Trade Complementarity Index and Marginal Intra-Industry Trade Index has been calculated.

4.1 Intra-Industry Trade Index

There is a high potential of intra-industry trade in Bangladesh-India trade relations, as there is a common border between the two countries on both sides of Bangladesh³³. Dayal, et.al³⁴ pointed out that increased bilateral intra-industry trade in agriculture raw material in both countries. With a view to studying the Intra industry trade, the Grubel Lloyd indices at SITC 3 digit level have been computed. The study shows that there has been a marked increase over time in the number of commodities during 1975 to 2010 for which GL- index indicate rising opportunities for intra-industry trade (see table 2).

*Table 2 Intra-Industry Trade between India and Bangladesh
1975 to 2010 (SITC one digit)*

Sector (one digit)	1975 - 1979	1980 - 1985	1986 - 1990	1991 1995	1996- 2000	2001- 2005	2006- 2010	Growth of Export (1975-2010)	Share of Ex- port in Total % (1975)	Share of Ex- port in Total % (2010)
Food and live animals	14.52	0.05	0.22	6.40	8.64	3.52	9.29	25.00	3.62	24.49
Beverages and to- bacco				6.20	0.13	12.31	59.56	-5.30	0.34	0.02
Crude materials, inedible, except fuels	29.09	20.68	68.20	58.69	71.38	63.26	45.76	13.50	4.57	14.05
Mineral fuels, lu- bricants and re- lated materials	18.03	58.06	0.50	11.61	51.20	16.21	27.18	18.90	20.02	3.66
Animal and vege- table oils and fats		11.71			0.34	0.15	2.45	28.20	0.13	5.79

³³ Basu, Suparna, Datta, Debabrata. (2007). India-Bangladesh Trade Relations : Problem of Bilateral Deficit. Indian Economic Review. Vol. 42, No.1, pp. 111—129.

³⁴ Dayal, et.al. (2008). Quantification of Benefits from Regional Cooperation in South Asia. New Delhi: Macmillan India, Ltd.

Sector (one digit)	1975 - 1979	1980 - 1985	1986 - 1990	1991 - 1995	1996- 2000	2001- 2005	2006- 2010	Growth of Export (1975-2010)	Share of Ex- port in Total % (1975)	Share of Ex- port in Total % (2010)
Chemicals	1.53	22.22	20.19	40.77	50.11	32.78	38.72	14.40	6.47	9.87
Manufacture goods classified chiefly by material	14.65	32.58	13.42	1.40	8.37	6.08	21.04	12.60	29.77	31.66
Machinery and transport equip- ment	0.38	0.12	0.02	2.55	1.86	1.18	8.59	9.60	25.73	1.73
Miscellaneous manufactured arti- cles	0.40	1.06	1.20	1.96	4.77	11.62	11.06	14.90	2.18	7.93
Commodity. & transacts. Not class. Accord. To kind	31.43	9.01	70.72	24.59	20.21	28.86	42.63	16.00	0.18	0.11

Source: Author's calculation based on data from UN COMTRADE.

Table 2 shows Intra-industry trade at SITC one digit level trade data between India and Bangladesh. The results show the extent of intra-industry trade between India and Bangladesh during 1975 to 2010 was high in sectors like, crude materials, inedible, except fuels, food and live animals. It is discernible from the results that India's IIT with Bangladesh declined from 14.52 in 1975–1979 to 9.29 in 2006–10. IIT index for most of the industries experienced a deceleration over time. Results also reveals potential for trade between India and Bangladesh in the beverages and tobacco, crude materials, inedible, except fuels, chemicals and commodity and transacts not class accord to kind. The export share of some industries to total export has increased during 1975 to 2010, namely food and live animals, crude materials, inedible, except fuels, chemicals, manufacture goods classified chiefly by material and miscellaneous manufactured articles. The industries whose export share to total export has declined during 1975 to 2010 are beverages and tobacco mineral fuels, lubricants and related materials, machinery and transport equipment and commodity transacts not class accord to kind. Results reveal industries having high growth rate of exports between India and Bangladesh during 1975 2010 are animal and vegetable oils and fats, food and live animals, mineral fuels, lubricants and related materials and commodity and transacts not class accord to kind.

**Table 3 Intra-Industry Trade between India and Bangladesh
1975 to 2010 (SITC two digit)**

Sector (Two digit)	1975 - 1979	1980 - 1985	1986- 1990	1991- 1995	1996- 2000	2001- 2005	2006- 2010	Growth of Export (1975-2010)	Share of Export in Total % (1975)	Share of Export in Total % (2010)
Textile fibers, not manufactured, and waste	0.01	26.77	46.23	72.32	39.12	47.10	50.02	22.50	0.00	11.80
Metallic ferrous ores and metal scrap				45.40	46.36	16.99	67.71	37.50	0.04	0.07
Chemical ele- ments and com- pounds	7.39	37.86	22.93	29.70	85.74	78.50	59.37	16.00	1.47	3.62
Leather, lather. Manufactures., nes & dressed fur skins		32.82	9.92	26.53	44.12	59.74	61.91	17.70	6.04	0.01
Paper, paper- board and manu- factures thereof	63.21	16.14	31.66	43.86	5.55	0.19	1.11	17.90	1.33	0.38
Textile yarn, fab- rics, made up ar- ticles, etc.	24.22	3.33	0.11	0.13	11.46	8.65	24.31	19.00	5.84	11.80
Machinery, other than electric	0.08	25.13	0.06	34.68	12.47	35.39	4.08	13.00	13.78	0.00
Electrical ma- chinery, appara- tus and appli- ances	2.55	3.18	0.16	0.07	3.54	3.09	21.18	15.60	2.11	1.78
Transport equip- ment	3.18	0.16		35.32	14.26	5.68	31.28	2.50	12.93	0.01
Clothing				4.14	51.36	42.34	28.54	45.80	0.20	7.93
Miscellaneous manufactured ar- ticles, nes	0.16	1.48	1.98	2.74	2.28	10.27	15.52	10.70	1.35	0.83
Special transact. Not class. Ac- cording to kind	40.20	9.70	71.45	24.60	20.21	28.86	40.45	18.20	0.18	1.26

Source: Author's calculation based on data from UN COMTRADE.

Table 3 shows the main product categories/industries at SITC two digit level which recorded high intra-industry trade during 1980–2010. These are tobacco and tobacco manufactures, metallic ferrous ores and metal scrap, coal, coke and briquettes,

chemical elements and compounds, leather, leather manufacturing, dressed fur skins, non-metallic mineral manufactures, transport equipment, textile fibres, not manufactured, and waste and special transaction class, according to kind. The study indicates moderate level of IIT in sectors like coal, coke and briquettes, dyeing, tanning and colouring materials, perfume materials, toilet & cleansing preparations, textile yarn, fabrics, made up articles, etc., electrical machinery, apparatus and appliances, electrical machinery, apparatus and appliances, and clothing.

At SITC 2 digit level, result re-established the potential for trade between India and Bangladesh in the tobacco and tobacco manufactures, crude fertilizers and crude minerals, non-metallic ferrous ores and metal scrap, coal, coke and briquettes, Perfume materials, toilet and cleansing preparations, leather, leather manufacturing's, dressed fur skins, textile yarn, fabrics, made up articles, etc., non-metallic mineral manufactures, electrical machinery, apparatus and appliances, and miscellaneous manufactured articles. Among these, there are few product categories in which the relative significance of intra industry trade has increased which includes: rubber tyres; paper and paper board and articles; tulles, lace, and embroidery; and electric power machinery and parts. The export share of some industries to total export has decreased during 1980 to 2010. Some of these industries are metallic ferrous ores and metal scrap, crude animal and vegetable materials, petroleum and petroleum products, dyeing, tanning and colouring materials, perfume materials, toilet and cleansing preparations, non-metallic mineral manufactures, iron and steel, non-ferrous metals, machinery, other than electric, electrical machinery, apparatus and appliances, transport equipment, sanitary, plumbing, heating and lighting fixtures, and clothing. Industries with high growth rate of exports between India and Bangladesh during the time 1980 to 2010 were oil seeds, oil nuts and oil kernels, textile fibres, not manufactured, and waste, medicinal and pharmaceutical products, plastic materials, etc, chemical materials and products, leather, leather manufacturing, dressed fur skins, paper, paperboard and manufactures thereof, textile yarn, fabrics, made up articles, iron and steel, manufactures of metal, sanitary, plumbing, heating and lighting fixtures and clothing.

**Table 4 Intra-Industry Trade between India and Bangladesh
1975 to 2010 (SITC three digit)**

Sector (Three digit)	1975 - 1979	1980 - 1985	1986- 1990	1991- 1995	1996- 2000	2001- 2005	2006- 2010	Growth of Export (1975-2010)	Share of Export in Total % (1975)	Share of Export in Total % (2010)
Cotton					33.61	16.20	6.35	-10.50	0.21	11.07
Jute			13.41	0.00	0.25	0.20	1.48	2.60	0.19	0.01
Stone, sand and gravel				1.26	0.00	3.47	42.55	52.20	0.89	0.60
Organic chemicals	66.13	47.18	62.41	8.58	3.01	1.23	1.40	26.80	0.11	1.92
Medicinal & pharmaceutical products	42.32	2.59	0.00	0.17	0.22	0.31	0.97	31.70	0.25	1.80
Soaps, cleansing & polishing preparations					46.91	62.75	73.80	37.40	0.00	0.12
Leather		16.27	17.57	24.78	28.76	48.39	45.04	27.80	0.05	0.10
Manufacture of leather or of artif. or reconst. leather			4.62	7.69	9.93	45.94	34.96	63.80	0.00	0.02
Textile yarn and thread	50.68	12.79	0.00	0.03	0.18	1.73	8.77	27.88	0.17	18.40
Text fabrics woven ex narrow, spec, not cotton		2.44	1.55	0.19	3.41	30.43	33.19	9.00	0.37	2.78
Made up articles, wholly or chiefly of text.mat.	32.95	23.49	0.00	1.15	33.13	34.33	11.54	12.20	0.30	0.06
Machinery and appliances non electrical parts		0.06	0.00	0.14	7.47	1.67	5.80	11.30	6.99	1.43
Telecommunications apparatus	6.79	0.00	0.00	0.00	0.73	1.29	15.62	21.80	0.42	0.28
Other electrical machinery and apparatus	9.89	0.00	0.00	0.00	14.58	10.84	54.17	20.00	0.51	0.96
Clothing except fur clothing				3.17	33.55	49.21	63.80	21.50	0.27	0.58
Special transactions not classd. accord. to kind	40.20	9.70	71.45	24.60	20.21	28.86	40.45	18.20	0.18	1.26

Source: Author's calculation based on data from UN COMTRADE.

At SITC 3-digit level, the GL index of IIT between India and Bangladesh, there are only few in which the relative significance of intra-industry trade (as indicated by the value of the intra-industry index indices) seems to have increased during 1975 to 2010. These product categories include: men/boys' woven textile fabrics; special yarns and fabrics; leather; and soaps, cleansing and polishing preparations.

4.2 Marginal Intra Industry trade

The GL index refers to the pattern of trade in one year and in that sense it is static measure. This is appropriate if one seeks to quantify international specialisation patterns a particular in time. In the context of structural adjustment, however it is the structure of change in trade patterns. Hamilton and Kniest³⁵ first made this distinction by pointing out that the observation of a high proportion of IIT in one particular time does not justify the likely pattern change in trade pattern (see table 5 MIT between India and Bangladesh).

Table 5 Marginal IIT across Sections India and Bangladesh at (SITC one digit)

Sections (One Digit)	1980 (over 1975)	1990 (over 1980)	2000 (over 1990)	2009 (over 2000)
Food and live animals	0.00	0.08	6.92	16.20
Crude materials, inedible, except fuels	0.00	47.48	62.95	23.90
Mineral fuels, lubricants and related materials	0.00	0.00	50.76	52.54
Animal and vegetable oils and fats	0.00	0.03	0.32	2.19
Chemicals	2.04	4.47	65.71	3.88
Manufacture goods classified chiefly by material	65.33	0.15	23.31	20.94
Machinery and transport equipment	0.00	0.08	3.05	0.00
Miscellaneous manufactured articles	1.14	0.66	16.24	15.29
Commodity. & transacts. Not class. Accord. To kind	0.00	4.21	55.82	45.49

Source: Author's calculation based on data from UN COMTRADE. (2012)

³⁵ *Hamilton, Clive, Paul Kniest (1991). Trade Liberalization, Structural Adjustment and Intra-Industry Trade : A Note. Weltwirtschaftliches Archiv, Vol. 127, pp. 356—367.*

Table 5 shows among that there are only few product categories product categories in which the relative significance of intra industry trade (as indicated by the value of the Brulhart indices) seems to have increased during 1980 to 2010. These product categories include: crude materials, inedible, except fuels commodity & transacts not class accord to kind. The index takes on a much lower value for all other product categories, indicating a greater role of inter industry trade in the new trade created during the same period.

However, the relative significance of intra-industry trade during 1980 to 2010 does not appear to have increased in any of the product categories mentioned above. Rather there are few other product categories in which the relative importance of intra-industry trade has increased over the time period. These include: mineral fuels, lubricants and related materials. There is only one product category, viz mineral fuels, lubricants and related materials in which intra-industry trade seems to have contributed a significant share of the new trade between Bangladesh and India over the last decade.

Table 6 Marginal IIT across Sections India and Bangladesh at (SITC two digit)

Sections (Double Digit)	Commodity Code	1990 (over 1980)	2000 (over 1990)	2010 (over 2000)
Textile fibers, not manufactured, and waste	26	0.00	0.00	13.78
Crude fertilizers and crude minerals, nes	27	1.69	10.72	61.47
Chemical elements and compounds	51	15.10	69.28	0.00
Medicinal and pharmaceutical products	54	0.95	0.00	0.04
Leather, lthr. Manufacture., nes & dressed fur skins	61	0.00	86.13	59.48
Textile yarn, fabrics, made up articles, etc.	65	0.00	50.80	47.15
Non metallic mineral manufactures, nes	66	0.00	17.51	0.00
Manufactures of metal, nes	69	0.10	0.17	0.00
Machinery, other than electric	71	33.28	2.75	0.00
Electrical machinery, apparatus and appliances	72	7.89	7.57	12.11
Clothing	84	0.00	72.01	11.23
Miscellaneous manufactured articles, nes	89	1.29	4.80	25.17
Special transact. Not class. According to kind	93	4.19	55.82	0.00

Source: Author's calculation based on data from UN COMTRADE. (2012)

Table 6 shows the Marginal Intra Industry trade at SITC two digit level. Among these product categories, there are many in which the relative significance of intra industry trade seems to have increased during 1990 (over 1980). These product categories include: beverages, crude fertilizers and crude minerals, nes, coal, coke and briquettes, the index takes on a much lower value for all other product categories, indicating a greater role of inter industry trade in the new trade created during the same period. There are a few other product categories in which the relative importance of intra-industry trade has increased over the time period (2010 over 2000); these include: crude fertilizers, metallic ferrous ores and metal scrap, coal, coke and briquettes.

Table 7 Marginal IIT across Sections India and Bangladesh at (SITC three digit)

Sections (Three Digit)	Commodity Code	2000 (over 1990)	2010 (over 2000)
Organic chemicals	512	0.18	0.00
Inorganic chemicals elems., oxides, halogen salts	513	21.36	0.00
Other inorganic chemicals	514		47.04
Medicinal & pharmaceutical products	541	0.14	0.04
Soaps, cleansing & polishing preparations	554		60.14
Fertilizers manufactured	561	91.60	0.00
Leather	611	30.38	0.00
Textile yarn and thread	651	0.79	7.79
Cotton fabrics, woven ex. narrow or spec. Fabrics	652	1.62	55.66
Text fabrics woven ex narrow, spec, not cotton	653	0.23	21.83
Tulle, lace, embroidery, ribbons, trimmings	654	3.66	28.42
Special textile fabrics and related products	655	28.63	31.63
Metal containers for storage and transport	692	66.25	2.63
Electric power machinery and switchgear	722	0.15	1.20
Other electrical machinery and apparatus	729	1.33	67.86
Road motor vehicles	732	0.12	0.00
Scientific, medical, optical, meas./contr. instrum	861	2.81	0.15
Printed matter	892	4.78	0.00

Source: Author's calculation based on data from UN COMTRADE. (2012)

At more disaggregate level intra-industry trade (see table 7) over the time period (2000 over 1990) increased fertilizer manufactured, metal containers for storage and transport but during (2010 over 2000) more industry include in nature of intra industry trade these are inorganic chemical, soap cleaning & polishing preparation, cotton fabrics, woven ex narrow, spec, of cotton, other electrical machinery and apparent and textile fabrics.

4.3 Trade Complementarity Index (TCI)

The trade complementarity index tries to measure how well the export profile of one country, or group of countries, matches the import profiles of others. In addition, changes in the value of the trade complementarity index over time can help to determine whether the trade profiles of the countries under consideration are growing more or less compatible, Ng and Yeats³⁶.

Table 8 Trade Complementary Index of India and Bangladesh, 2000–2011

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
India	Bangladesh	54.24	58.19	57.27	57.62	53.43	54.24	51.54	50.23	52.95	54.59	55.14	53.80
Bangladesh	India	10.45	9.16	11.17	9.32	12.16	13.13	9.71	13.20	NA	NA	NA	NA

Source: Author's Calculation, Data from **World Integrated Trade Solution (WITS)** WITS which is online Database, Access date (10/02/2013)

Table 8 presents the Trade Complementary Index (TCI) of India and Bangladesh from 2000 to 2011. The TCI of India to Bangladesh in 2000 was 54.24 and it was 53.58. No major change in the basket of export and import is visible. The (TCI) of Bangladesh to India was 10.45 in 2000 and 13.20 in 2007, it seems trade complementarities of India and Bangladesh has increased over time.

The critical value of trade complementarity index is 40, i.e., TCI greater than 40 indicates that the economies are highly complementaryⁱ. The trade complementarity index for India and Bangladesh has been constructed for each year since 2000 to 2011 by using the bilateral trade data of both countries disaggregated at SITC 3-digit. As evident from table 8, India has clear export complementarity with Bangladesh since 2000. This result is quite expected because India is major trading partner of Bangladesh.

4.4 SMART Simulation Outcomes

On the basis of Kumar and Ahmed³⁷, an attempt has been made to explore trade potential between India-Bangladesh using SMART model. India has reduced its sensitive list for Bangladesh

³⁶ Ng, F. and A. Yeats (2003). Major trade trends in East Asia: What are their implications for regional cooperation and growth? Policy Research Working Paper No. 3084, World Bank, Washington, D.C.

³⁷ Kumar, Sushil and Ahmed, Shahid. (2014). Impact of Sensitive Lists under SAFTA: Quantitative Assessment Using a Partial Equilibrium Modeling. European Journal of Globalization and Development Research, Vol. 10, No. 1.

from 480 items to 25³⁸ items and granted zero basic customs duty access on all other items while Bangladesh has maintained the 993 product under the sensitive list against India. So it is interesting to analyse the Bangladesh's sensitive list (if reduced to 0 tariffs) and its impact on Bangladesh trade flow from India.

The results of the simulated scenarios pertain to the effect on trade, welfare and revenue between India and Bangladesh. The trade effect is the impact on the flow of imports. The welfare effect is the variation in the consumer surplus, given the increased quantities of goods consumed, and the revenue effect is the reduction in revenue collected from import tariffs. The trade effect is the combined result of trade creation and trade diversion. Trade creation stems from the direct increase in imports resulting from the reduction in tariffs on imports from India to Bangladesh.

The table 9 shows the effect of Bangladesh tariff reduction on sensitive list under SAFTA. Total trade effect is US\$ 336.39 million out of this trade creation is US\$ 248.17 million and total trade diversion effect is equal to US\$ 88.22 million. If we see the product wise trade gains, results indicate gains at HS 6 digit level, namely 350691 (adhesives based on polymers of headings 39.01 to 39.13 or on rubber), 871120 (motorcycles, side-cars, reciprocating engine with reciprocating internal combustion piston engine of a cylinder capacity exceeding 50 cc but not exceeding 250 cc), 870422 (motor vehicles for the transport of goods gvw exceeding 5 metric tons but not exceeding 20 metric tons), 271019 (other), 401120 (new pneumatic tyres of rubber, of a kind used on buses or lorries), 852872 (other colour) and 841810 (combined refrigerator-freezers, fitted with separate external doors).

It is clear from the table 9 that India has major export interest in Bangladesh. The value of export in Bangladesh market is US\$ 190.04 million. The study has taken only top 25 first products for this analysis. The first 25 product contributed approximately about 77 percent in total export of India to Bangladesh. SMART results predict consumer surplus gains for Bangladesh as a result of tariff reduction. The total consumers gain is US\$ 28.83 million. Revenue loss is US\$ -177.62 million with India due to tariff elimination by Bangladesh on import from India which might enhance trade deficit of Bangladesh. Maximum revenue loss is expected to be in products such as 871120 (motorcycles, side-cars, reciprocating engine with reciprocating internal combustion piston engine of a cylinder capacity exceeding 50 cc but not exceeding 250 cc),

³⁸ Effective from 1 January 2012.

870422 (motor vehicles for the transport of goods gvw exceeding 5 metric tons but not exceeding 20 metric tons), 870390 (other vehicles), 401120 (new pneumatic tyres of rubber, of a kind used on buses or lorries), and 870600 (chassis fitted with engines, for the motor vehicles of headings 8701 to 8705 for the vehicles of subheading 870120 or heading 8702 or 8704).

Table 9 SMART Simulation Outcomes

India's Export Interest in Bangladesh				India's Export as Result of Bangladesh's Tariff Reduction				HS Code	Revenue Effect of Bangladesh with India (\$'000')
Tariff Line Code	Exports	Exports	Exports	HS Code	Trade Total Effect (\$000) TTE	Trade Creation Effect (\$000)	Trade Diversion Effect (\$000)		
	Before (\$ '000')	After (\$ '000')	Change in Export Revenue (\$ '000')						
350691	1340.04	50954.77	49614.73	Total	336399.15	248175.79	88223.33	Total	-177627.25
871120	78446.55	96763.56	18317.01	350691	49614.73	49339.91	274.82	871120	-20732.18
870422	42244.48	56149.55	13905.07	871120	18317.01	13834.83	4482.18	870422	-7983.42
271019	7572.00	12466.26	4894.26	870422	13905.07	13490.05	415.02	870390	-5193.82
401120	31787.48	36045.06	4257.57	271019	4894.26	3423.26	1471.00	401120	-4047.36
852872	10849.26	15103.67	4254.41	401120	4257.57	2317.03	1940.54	870600	-3105.90
841810	7363.47	11575.81	4212.33	852872	4254.41	3286.45	967.96	852872	-2954.31
40210	10844.47	14909.95	4065.48	841810	4212.33	2249.92	1962.42	480257	-2930.64
870600	17736.56	21734.96	3998.40	40210	4065.48	1561.94	2503.54	90930	-2853.39
340211	16771.80	20557.76	3785.96	870600	3998.40	3536.32	462.08	40210	-2469.38
870390	26987.27	30620.71	3633.43	340211	3785.96	3128.05	657.92	841810	-2331.47
481092	4328.88	7506.74	3177.86	870390	3633.43	2993.99	639.44	340211	-2091.57
480257	10997.24	13890.45	2893.21	481092	3177.86	2077.67	1100.19	190190	-2019.46
90930	10797.25	13508.45	2711.20	480257	2893.21	2167.90	725.31	210690	-2006.85
540761	2025.44	4709.04	2683.59	90930	2711.20	2094.89	616.31	321519	-1986.46
720839	15609.82	17844.34	2234.52	540761	2683.59	2120.49	563.10	190110	-1825.93
730820	4298.90	6492.05	2193.14	720839	2234.52	414.71	1819.81	720839	-1655.82
870410	837.92	3004.25	2166.33	730820	2193.14	1214.03	979.12	271019	-1537.31
210690	8518.00	10683.23	2165.23	870410	2166.33	2123.94	42.39	481092	-1357.27
190110	6695.81	8797.55	2101.73	210690	2165.23	972.68	1192.55	730820	-1319.51
540772	1204.73	3189.65	1984.92	190110	2101.73	1493.82	607.92	392062	-1122.95
190190	7199.52	9164.16	1964.64	540772	1984.92	1972.20	12.72	151319	-1120.87
850720	2952.28	4708.14	1755.86	190190	1964.64	1086.33	878.31	330290	-1107.81
330290	3545.51	5240.53	1695.03	850720	1755.86	1182.00	573.86	80610	-1093.47
151319	3797.12	5482.18	1685.05	330290	1695.03	809.29	885.74	850432	-1016.82
Change in Export Revenue in First 25 Tariff lines			146350.97	151319	1685.05	998.71	686.35	850433	-974.25
Total			190048.17						
% of total			77.00						

Source: WITS which is online data base (09/09/2014)

4.5 Revealed comparative Advantage (RCA)

The analysis of RCA has been carried out for latest year 2012. Theoretically, if the value of RCA is greater than one, the product of the export country is considered to be competitive, basically RCA value gives only an indicative view, since competitiveness of a particular product depends on a number of other factors, including unit price of product, shipment cost, etc.³⁹.

The use of RCA here captures competitiveness of a country's export products via each other in international market. This is very much in line with the Ricardian concept of comparative advantage which proposes that by producing the good in which it is relatively efficient and importing the other good, each country can gain.

International trade theory postulates that countries with different comparative advantages have great opportunities for trade in comparison with those that share a high degree of similarity in factor endowments. Country with diverse RCA profile would have more opportunities to trade with one another than those with similar RCA profile. The table 10 shows that India-Bangladesh has diverse RCA, implying more opportunities of Intra-regional trade. Bangladesh has exhibited a comparative advantage in HS 530710 (yarn of jute or other textile bast fibres, single yarn), 530310 (jute and other textile bast fibres, raw or retted), 610899 (women's negligees, bathrobes, of manmade fibres, knitted or crocheted), 610899 women's or girls' negligees, bathrobes, of other textile materials), 560710 (wine, cordage, rope and cables of jute or other textile bast fibres, 580219 (unbleached terry towelling and similar woven terry fabrics, of cotton), 580219 other terry towelling and similar woven terry fabrics, of cotton) etc, while India has exhibited comparative advantage in different products category. Some of these products at HS 6 digit are 290343 (trichlorotrifluoroethanes), 290344 (dichlorotetrafluoroethane and chlorpentafluoroethane), 291230 (aldehydes-alcohols), 130211 (opium) etc.

³⁹ Moazzem KG, KK Basak .(2013). Pruning the SAFTA Sensitive List of Bangladesh Its Scope, Methods and Selection of Products, South Asia Economic Journal 14(2), pp. 231—260.

Table 10 Revealed Comparative Advantages of India and Bangladesh

Bangladesh		India	
Product Code	Revealed Comparative Advantage	Product Code	Revealed Comparative Advantage
530710	964.25	290343	58.55
530310	922.48	290344	58.55
610899	830.23	291230	58.55
560710	671.72	130211	57.16
580219	550.16	580134	54.48
630510	496.24	293354	53.51
530390	424.05	820120	53.36
530720	371.57	130232	50.96
531010	354.3	900820	50.79
531090	343.98	531010	50.6
630229	325.28	151530	49.98
620590	240.35	293943	48.61
620620	220.72	291421	48.31
611090	183.64	570220	48.3
60499	157.32	252530	47.53
620341	144.17	90930	47.46
610339	142.39	530720	47.19
610312	133.6	630691	46.39
620349	132.89	294200	45.91
610311	131.94	91030	44.86

Source: Author calculation data from WITS (Access date 13/01/2014).

5. Concluding Remarks

The present study put forward the case for deeper trade integration and potential for intra industry trade between India and Bangladesh. It is expected that trade integration process will enhance growth rate by efficient utilisation of resources and trade induced learning and spillovers as indicated by Chuang⁴⁰ and Ismail⁴¹. In this context, the study identified main sectors for trade (export and import) possibilities between the two countries such as textiles, agriculture, engineering, chemicals, electronics and metals and minerals. The study revealed the extent of intra-industry trade between India and Bangladesh and its changing dimensions overtime during 1975 to 2010.

The study identified the industries with high growth rate of exports between India and Bangladesh during 1975–2010. These were the animals and vegetable oils and fats, food and live animals,

⁴⁰ Chuang, Y. (2002). The Trade-Induced Learning Effect on Growth: Cross-Country Evidence, *Journal of Development Studies*, 39:137–154.

⁴¹ Ismail, Saba. (2012). Trade Induced Technology Spillover and Economic Growth: An Econometric Analysis, in Shahid Ahmed and Shahid Ashraf (Eds), *International Trade in Emerging Economies*, New Delhi: Bloomsbury.

mineral fuels, lubricants and related materials and commodity & transact not class accord to kind. Bangladesh has exhibited a comparative advantage in yarn of jute or other textile bast fibres, single yarn, jute and other textile bast fibres, raw or retted, women's negligees, bathrobes, of manmade fibres, knitted or crocheted, women's or girls' negligees, bathrobes, of other textile materials, wine, cordage, rope and cables of jute or other textile bast fibres, unbleached terry towelling and similar woven terry fabrics, of cotton, other terry towelling and similar woven terry fabrics, of cotton etc. India has exhibited comparative advantage in trichlorotrifluoroethanes, dichlorotetrafluoroethane and chlorpentafluoroethane, aldehyd-alcohols, etc. The results of SMART simulation highlighted trade potential between India Bangladesh which will be having positive effect on consumer surplus.

No doubt, India enjoys advantage of its size, having diverse and scale efficient structure than that of Bangladesh. It is important to recognise that mutual trade may not be the gain at other's cost. Ahmed⁴² concluded that increased market access for the least-developed countries' exports does not affect negatively neither developing countries and nor developed countries. In this perspective, India as an emerging developing economy should take lead role and capitalise the trade gains with Bangladesh, a least developed country in its neighbourhood. The study also suggests that Bangladesh should diversify his export structure to reduce the bilateral trade deficit on the basis of comparative advantage.

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⁴² Ahmed, Shahid (2008), Potential for Trade between Developing and Least Developed Countries: A CGE Analysis Trade and Development Review, Vol. 1, No. 2, pp. 122—143

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