

GRAVITY MATTERS: INTERNATIONAL TRADE OF BANGLADESH

Jinhwan Oh

Graduate School of International Studies, Ewha Womans University, Seoul, Korea

Rashedur Rahman Sardar

Finance Division, Ministry of Finance, Bangladesh Secretariat, Dhaka, Bangladesh

Using a gravity approach, this study primarily explores Bangladesh's trade pattern. It is found that Bangladesh's trade patterns are basically consistent with the prediction of the gravity model across decades. Additionally, the comparison between actual and predicted trade volumes indicates that Bangladesh's exports are heavily dependent on the US market. Policy implications follow.

1. Introduction

After initiating market liberalization in the 1980s, Bangladesh's trade has been expanding rapidly; its trade-to-gross domestic product (GDP) ratio was 49.09% in 2008, whereas in 1985, this figure was only 18.78% (World Bank, 2013). More specifically, as shown in Table 1, the average export growth rate was 7% in 1981–1985 but increased to 17.7% during the 2006–2008 period. In the case of imports, except for the early 1980s, the average growth was 7.3% in 1986–1990 but soared to 15.7% in 2006–2008 (Ministry of Finance of Bangladesh, see Table 1 for more information).

Against this backdrop, Bangladesh has become a member of various economic organizations such as the South Asian Association of Regional Cooperation (SAARC),¹ the World Trade Organization (WTO), and the Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC).² In particular, the trade liberalization process and WTO membership since its establishment in 1995 have offered Bangladesh new opportunities for growth in manufacturing sectors, and have led to a marked rise in the

¹ SAARC is a regional organization of South Asian countries whose members include Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka.

² BIMSTEC is a regional organization aiming for economic cooperation among its members: Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka, and Thailand. It is newly established and so yet to make a significant contribution. For this reason, it is not considered in this study.

Table 1. Average Growth of Exports and Imports (Unit: Percent)

	1981–1985	1986–1990	1991–1995	1996–2000	2001–2005	2006–2008
Export	7.0	10.2	17.9	10.6	8.5	17.7
Import	— [†]	7.3	9.2	7.5	9.4	15.7

Source: Finance Division, Ministry of Finance, Bangladesh.

[†]The import growth for the period 1981–1985 is negative.

employment rate in this sector. Furthermore, as a WTO member, Bangladesh has made considerable efforts to simplify and rationalize its tariff structure. More specifically, it has reduced the number of tariff bands³ from 15 in 1992–1993 to five in 1999–2000, and lowered the maximum tariff rate from 300% to 37.5% during the same periods. Moreover, nominally applied Most Favored Nation (MFN) tariffs⁴ have fallen by more than half, from an average of 58% in 1992–1993 to 22% in 1999–2000.

In spite of the growing importance of international trade in Bangladesh's economy, however, not many studies have empirically examined the country's trade patterns. Hassan's (2001) study tests whether SAARC is a viable trading block, and therefore confines the dataset to include only SAARC members. Rahman's (2003) approach is similar to the current study, but the latter benefits from a more recent and comprehensive dataset, covering 102 countries between 1980 and 2009. Additionally, this paper adopts Montenegro and Soto's (1996) technique by comparing the actual trade flows with the estimated trade flows to examine any distortion or trade barriers.

This paper is divided into six sections. Section 2 presents an overview of the goods and the partners of Bangladesh's trade. Section 3 discusses the gravity model, data, and methodology. Section 4 presents the econometric estimation, and section 5 provides the analysis on predicted trade volume based on the gravity model. Finally, section 6 concludes the paper.

2. Bangladesh's Trade: Goods and Partners

For the past few decades, there has been a shift in Bangladesh's major exports and imports from primary to manufacturing goods. The percentage of manufacturing goods⁵ in total exports has been increasing, while the share of primary goods has been decreasing (see Appendices 3 and 4 for relevant information). In the 1980s, Bangladesh exported agricultural products such as jute goods and frozen foods. However, in the 1990s it started to export labor-intensive manufactured goods such as woven garments and knitwear. According to the data from Bangladesh's Export Promotion Bureau, from 1981–1982, 46.5% of export earnings were from jute goods, and 16.3% were from raw jute. As the shifting of export items continued, from 1990–1991, woven garments constituted 42.8% of the country's exports, and 16.9% of export earnings came from jute goods. Furthermore, in 2006 and 2007, 38.25% of export earnings

³ A range of tariff rates is called a tariff band, and is usually used for tariff cut negotiations among partner countries. The larger number of tariff bands the higher the tariff rate.

⁴ An MFN tariff is a normal non-discriminatory tariff charged on imports.

⁵ For example, jute goods, leather, naphtha, furnace oil, bitumen, readymade garments (RMG), knitwear, chemical products, shoes, handicrafts, and engineering products.

Table 2. Bangladesh's Exports by Major Products (Unit: Percent)

1981–1982	1990–1991	2006–2007
Jute goods (46.5)	Woven garments (42.8)	Woven garments (38.25)
Raw jute (16.3)	Jute goods (16.9)	Knitwear (37.39)
Leather (10.1)	Frozen foods (8.3)	Frozen foods (4.23)
Frozen foods (8.5)	Leather (7.8)	Jute goods (2.63)
Tea (6.1)	Knitwear (7.6)	Leather (2.18)
Woven garments (1.1)	Raw jute (6.1)	Chemical products (1.77)
Chemical products (1.1)	Chemical products (2.6)	Raw jute (1.21)
Others (10.4)	Tea (2.5)	Tea (0.06)
	Others (5.4)	Others (12.28)
Total (100)	Total (100)	Total (100)

Source: Bangladesh Export Statistics (2006–2007), Export Promotion Bureau (EPB), Bangladesh.

were derived from woven garments and 37.39% from knitwear. It is interesting to note that the share of export earnings from jute goods had dropped to 2.63% in 2006–2007.

After the 1980s, the garment sector flourished rapidly; in 1983–1984, there were only 134 garment factories in Bangladesh but in 2008–2009 this number rose to 4,825. Last, but not least, the RMG sector has been playing a crucial role in Bangladesh's economy; garment exports exceed two-thirds of the country's total exports, and this sector has also created employment opportunities for more than three million unskilled and semi-skilled people (see Table 2).

Unlike the exporting sectors, trends in the importing sectors are not stereotypical. There has been a decrease in the importation of primary goods (e.g., rice, wheat, oil seeds, crude petroleum, and cotton). And the percentage of capital machinery decreased sharply in the 2000s, while that of industrial goods (e.g., edible oil, petroleum products, fertilizer, clinker, staple fiber, and cotton yarn) has remained steady over the decades.

With regard to Bangladesh's trading partners, Asian countries were major export partners in the early 1980s, but EU countries were ranked as the leading partners in the 1990s and 2000s (Table 3).

In terms of a single country, the USA, on average, has consistently been Bangladesh's top export partner for the last three decades, followed by Germany. There were five EU countries among Bangladesh's top-20 export partners in the 1980s, and this number rose to 10 in 2000.

The rise of China and India has been remarkable. China was ranked eighth and India 11th among Bangladesh's importing partners in the 1980s, but these two countries have soared to the top of the list in the last two decades (Table 4).⁶

3. Model, Data, and Methodology

The basic gravity model of trade states that the trade flow between two countries is proportional to each country's GDP but inversely proportional to the distance between them. The formulation is represented as follows:

$$X_{ij} \text{ or } M_{ij} = \frac{KY_i^\alpha Y_j^\beta}{D_{ij}^\gamma} \quad (1)$$

⁶ As exporting partners of Bangladesh, however, these two countries are not very significant.

Table 3. Relative Position of Different Regions in Terms of Bangladesh's Export Partnership (Unit: Percent)

1981–1982	1990–1991	2006–2007
Asia (28.4)	EU (39.1)	EU (52.62)
Africa (17.9)	America (32.7)	America (32.86)
EU (17.4)	Asia (13.3)	Asian (8.56)
Middle East (10.5)	Middle East (4.4)	Middle East (1.37)
East Europe (10.1)	African (3.7)	East Europe (3.1)
America (9.1)	East Europe (3.1)	Africa (0.66)
Oceania (4.0)	Oceania (1.5)	Oceania (0.26)
Other Countries (2.6)	Other Countries (2.3)	Other Countries (1.98)

Source: Bangladesh Export Statistics (2006–2007), Export Promotion Bureau (EPB), Bangladesh.

where X_{ij} is the flow of exports into country j from country i , M_{ij} is the flow of imports into country i from country j , Y_i and Y_j are country i and country j 's GDPs, and D_{ij} is the geographical distance between the two countries.⁷ This study extends equation (1) with a natural log form as illustrated below.

$$\begin{aligned} \ln X_{ijt} \text{ or } \ln M_{ijt} = & B_0 + B_1 \ln \text{GDP}_{jt} + B_2 \ln \text{PCGDP}_{jt} + B_3 \ln \text{DISTANCE}_{ij} \\ & + B_4 \text{LINDER}_{ijt} + B_5 \text{LANDLOCKED}_j + B_6 \text{BORDER}_j + B_7 \text{SAARC}_j \end{aligned} \quad (2)$$

where i denotes Bangladesh, j denotes its partner countries, t denotes time. The variables are defined as follows:

- X_{ijt} and M_{ijt} are exports and imports, respectively, between Bangladesh and its partners in a certain year;
- GDP_{jt} is the GDPs of Bangladesh's trading partners;
- PCGDP_{jt} is the per capita GDPs of Bangladesh's trading partners;
- Distance_{ij} is the distance between Bangladesh and its trading partners;
- Linder_{ijt} is the Linder variable, which is the absolute difference of per capita GDP between Bangladesh and its trading partners. This measures whether Bangladesh's trade is based on the Heckscher-Ohlin type of comparative advantage or on the Krugman type of differentiated goods;
- Landlocked_j is a dummy variable, which is 1 if a partner country is landlocked, and 0 otherwise;
- Border_j is a dummy variable, which is 1 if a partner country shares a border with Bangladesh (India and Myanmar), and 0 otherwise;
- SAARC_{jt} is a dummy variable, which takes a value of 1 if Bangladesh's partners joined SAARC and 0 otherwise.

⁷ The distances between Bangladesh and its partner countries have been measured as the aerial distance between Dhaka, the capital of Bangladesh, and the capital of the partner country using the following link: <http://www.distancefromto.net>.

Table 4. Relative Position of Countries with Respect to Average Export and Import with Bangladesh in Different Decades

Rank	1980s		1990s		2000s	
	Export	Import	Export	Import	Export	Import
1	USA (188.48)	Japan (326.21)	USA (943.05)	India (650.11)	USA (2170.38)	India (1943.23)
2	Japan (55.38)	US (237.64)	Germany (273.40)	Japan (486.94)	Germany (1170.84)	China (1889.66)
3	Italy (55.16)	Singapore (155.82)	UK (263.78)	China (393.41)	UK (833.34)	Singapore (1069.07)
4	UK (52.98)	S. Arabia (149.93)	France (173.91)	Hong Kong (346.42)	France (546.94)	Japan (730.50)
5	Singapore (44.44)	UAE (103.81)	Italy (161.01)	Singapore (337.40)	Netherlands (371.56)	Kuwait (711.13)
6	Iran (42.9)	UK (103.81)	Netherlands (119.06)	Korea (293.69)	Italy (355.82)	Hong Kong (598.88)
7	Pakistan (41.6)	Canada (96.25)	Belgium (108.03)	USA (262.61)	Belgium (292.39)	Korea (499.03)
8	Russian Fed (35.37)	China (95.9)	Japan (72.65)	UK (174.13)	Spain (279.84)	Malaysia (348.20)
9	Belgium (33.43)	Germany (90.94)	Hong Kong (66.89)	Germany (152.87)	Canada (272.43)	US (328.27)
10	Germany (27.34)	Netherlands (79.66)	Canada (52.46)	Australia (107.36)	Sweden (140.37)	Thailand (323.17)
11	Sudan (22.88)	India (66.81)	Iran (39.08)	Indonesia (90.17)	India (137.87)	Indonesia (305.51)
12	China (22.33)	Australia (56.40)	Spain (33.17)	S. Arabia (89.89)	Turkey (114.77)	UAE (291.99)
13	Australia (21.43)	Korea (54.47)	Pakistan (29.43)	Canada (89.56)	Hong Kong (106.02)	S. Arabia (290.54)
14	Mozambique (19.09)	Hong Kong (53.17)	Denmark (29.22)	Netherlands (89.14)	Denmark (93.28)	Australia (286.35)
15	Switzerland (18.66)	Russian Fed. (51.3)	Singapore (29.03)	Pakistan (87.07)	Japan (77.94)	Germany (283.83)
16	Netherlands (16.51)	Thailand (49.05)	India (28.41)	Malaysia (80.96)	Pakistan (50.88)	UK (268.45)
17	Egypt (15.94)	Malaysia (37.15)	Sweden (24.66)	UAE (72.00)	Ireland (49.32)	Uzbekistan (177.93)
18	Bulgaria (15.42)	Denmark (35.86)	China (21.25)	Thailand (68.21)	China (47.82)	Switzerland (172.33)
19	Iraq (15.27)	Indonesia (35.59)	Russian Fed. (20.92)	France (67.61)	Singapore (44.21)	Pakistan (154.57)
20	India (15.15)	France (35.29)	Syria (19.78)	Russian Fed. (60.11)	Iran (42.18)	Italy (151.71)

Note: The values inside parentheses are the average exports and imports in million USD in decades from the 1980s to the 2000s.

Source: Direction of Trade Statistics, International Monetary Fund.

The GDP measures a partner country's economic size. Strictly speaking, when the equation is log-transformed from (1) to (2), we have a summation of GDPs. In fact, the product of GDPs was employed in several gravity papers, including Rose (2004) and Sohn (2005). However, Bangladesh's GDP is not large by world standards, and may not significantly affect the result. For this reason, we use the GDPs of partner countries only.⁸ We expect β_1 to be positive and the export or import tends to increase proportionately with the increase in economic size.

The per capita GDP measures income levels. This is complementary to GDP, which focuses more on economic size than income level. Bangladesh's per capita GDP is not used in this study, as this value may not significantly affect the result.

Additionally, distances between Bangladesh and its partner countries are measured in kilometers. Coefficients of this variable are expected to be negative as distance can be regarded as transportation costs.

Linder is the absolute difference of per capita GDP between Bangladesh and its partner countries. The logic of this variable is that countries with similar per capita income produce and consume similar goods, and so trade with each other more than with those of a different size and structure. This variable was previously used by Montenegro and Soto (1996). Last, but not least, SAARC is a dummy variable that measures whether this regional cooperation is solid or not.

This paper deals with a substantially large dataset relating to the past 30 years, covering 102 countries (see Country Sample in Appendices). This is more comprehensive than any other dataset in similar studies. For example, Hassan's (2001) study of SAARC countries covers only two years (1996 and 1997), and Rahman's (2003) dataset includes Bangladesh's 35 trading partners for 28 years up until 1999. The current study collects data for the most recent available years and includes as many countries as possible. This large dataset may include countries with no trade relations with Bangladesh for several years, which raises concerns about dealing with zero values.

In order to tackle this concern, this paper uses Tobit instead of the conventional ordinary least squares (OLS) technique, and treats zero as a random variable that has a lower limit. Tobit has appeared in many studies that deal with datasets containing abundant zeros (see Montenegro & Soto 1997; Alesina & Dollar 2000; Berthelemy & Tichit 2004).

Data relating to exports and imports are obtained from the International Monetary Fund's (IMF) Direction of Trade Statistics (DOTS). Sometimes, two countries are combined into one, and one country is broken down into several. This dataset records each case separately; for example, West Germany, East Germany, and Germany appear separately, and the Soviet Union and Russia are recorded in different rows. Where there is unification, only the current country's statistics are calculated and the sum of former divided countries' exports and imports are regarded as a current country's old data. For example, missing values for Germany in the 1980s are replaced by the sum of exports and imports of West and East Germany. The other case is a bit more complicated. When there is a leading country after a split, the leading country is assumed to be a substitute. For example, the Soviet Union's data were taken as Russia's 1980s data. However, when Czechoslovakia was split into the Czech Republic and Slovakia, and when Yugoslavia was split into several countries, it was not clear which of the former country should be regarded as a leader. In this case, the former countries' data were removed and only current countries' data were considered. Additionally, this dataset did not provide data on Cuba and North Korea due to lack of access.

⁸ We conducted regression analyses using Bangladesh's GDP, and, indeed, the results are similar to those without it.

Data on GDP and per capita GDP are from the World Bank's World Development Indicator. GDP and per capita GDP of Russia in the 1980s, which was then the Soviet Union, were obtained from ERS Macroeconomic Dataset (USDA). The distance is the great-circle distance between Dhaka and the capital cities of its trading partners.

4. Results

In the first part of the analyses, regressions are conducted for the entire period (1980–2008), as well as the 1980s, the 1990s, and the 2000s separately to examine whether each decade shows any significantly different trade pattern. Basic models are presented in the beginning with GDP, per capita GDP, and distance as independent variables, followed by full models including Linder and dummy variables.

According to Table 5, the regression results of the first two columns for the entire dataset, denoted by *ex_all* and *im_all*, generally follow the prediction of the basic gravity model. This shows that the size of the economy measured by GDP has a positive effect, and the distance between Bangladesh and its partner countries, which indicates the transportation costs, has a negative effect on the volume of trade. The signs for per capita GDP are tricky, as basic models show mostly positive signs but full models show mostly negative signs. In fact, some of the gravity literature indicates that coefficients of this variable do not show consistent results: sometimes they are positive and sometimes they are negative, with a weak significance level. Multicollinearity between this variable and GDP might be one reason for this.

Additionally, in full models, the land-locked dummy provides negative coefficients. Another dummy, SAARC, also shows a negative relationship, implying that this organization is not as active as the Association of Southeast Asian Nations (ASEAN) or the EU even though SAARC is the only representative organization for regional cooperation in South Asia.

In the second part of the regressions, this study divides the data into several regional blocs and country groups. Tables 6 and 7 provide results for exports and imports respectively. Regarding exports, both EU and OECD countries show similar patterns in terms of signs and significances. As expected, the sign of GDP is positive and that of distance is negative. Per capita GDP and LINDER show negative and positive results respectively. The regression results for ASEAN countries in terms of the per capita GDP and LINDER are opposite to both EU and OECD countries, implying that economic structures of ASEAN members are different from those of the EU and the OECD. Regarding Bangladesh's export to SAARC countries, the sign of DISTANCE is, in fact, positive. This is caused by biased samples as all of the SAARC countries are located near Bangladesh.

5. Predicted versus Actual Trade Flows

This section calculates the estimated trade flows derived from the previous section, particularly from basic models in Table 5, and compares them with actual trade flows. This enables us to recognize the degree of trade distortion; the large gap between the estimated and the real flows is an indication of distortion. This approach was applied by Montenegro and Soto (1996) for Cuba and Sohn (2005) for Korea.

The predicted values are obtained as follows. We first calculate the five-year average of the actual values of explanatory variables of Bangladesh's trading partners in log form. Then they are plugged into equations derived from the estimated results. When five-year averages of

Table 5. Bangladesh's Trade by Different Decades: Basic and Full Models

	ex_all	im_all	ex_80s	im_80s	ex_90s	im_90s	ex_00s	im_00s
Basic models								
Log_GDP	0.43*** (0.04)	0.47*** (0.06)	0.63*** (0.07)	0.41*** (0.11)	0.31*** (0.06)	0.83*** (0.12)	0.39*** (0.07)	0.26** (0.11)
Log_per capita GDP	0.31*** (0.09)	1.35*** (0.14)	-0.38* (0.19)	1.49*** (0.28)	0.39 (0.13)	1.30*** (0.22)	0.62*** (0.13)	1.16*** (0.23)
Log_DISTANCE	-1.06*** (0.17)	-4.74*** (0.27)	-0.65* (0.35)	-4.17*** (0.51)	-0.80*** (0.25)	-5.22*** (0.45)	-1.51*** (0.26)	-4.81*** (0.44)
Full models								
Log_GDP	0.47*** (0.04)	0.56*** (0.07)	0.71*** (0.08)	0.47*** (0.11)	0.22*** (0.07)	0.84*** (0.13)	0.39*** (0.07)	0.38*** (0.13)
Log_per capita GDP	-0.67*** (0.19)	-0.63** (0.32)	-1.70*** (0.32)	-0.43 (0.46)	0.49 (0.36)	-0.55 (0.68)	-0.15 (0.44)	-1.12 (0.79)
Log_DISTANCE	-1.51*** (0.19)	-5.16*** (0.31)	-1.27*** (0.39)	-5.0*** (0.55)	-1.19*** (0.29)	-5.47*** (0.54)	-2.08*** (0.31)	-5.07*** (0.53)
Log_LINDER	0.66*** (0.13)	1.50*** (0.23)	0.90*** (0.20)	1.40*** (0.29)	-0.19 (0.27)	1.41*** (0.52)	0.49 (0.34)	1.79*** (0.61)
Landlocked	-4.08*** (0.30)	-3.80*** (0.50)	-4.39*** (0.64)	-7.72*** (0.98)	-4.64*** (0.45)	-3.63*** (0.84)	-3.83*** (0.48)	-1.19 (0.82)
BORDER	-1.36 (0.86)	-0.08 (1.37)	-2.93 (1.79)	0.59 (2.45)	-0.31 (1.28)	-0.71 (2.25)	-0.82 (1.39)	0.01 (2.36)
SAARC	-0.08 (0.56)	-0.86 (0.90)	-0.37 (1.41)	-3.54* (2.01)	0.07 (0.81)	0.11 (1.44)	-1.06 (0.84)	-1.53 (1.43)

Note: ***, **, and * denote significant test statistics at 1%, 5%, and 10%, respectively. Inside brackets refer to standard errors.

ex_all and im_all denote Bangladeshi exports (imports) from 1980 to 2009; ex_80s and im_80s denote Bangladeshi exports (imports) from 1980 to 1989.

ex_90s and im_90s denote Bangladeshi exports (imports) from 1990 to 1999; ex_00s and im_00s denote Bangladeshi exports (imports) from 2000 to 2009.

explanatory variables are plugged into this equation, the predicted export flow is derived in natural log form. Finally, by transforming this flow into exponential values, Bangladesh's gravity-based predicted export flow is derived. The same logic is applied to import flows.

Table 8 presents four results: (1) all three decades; (2) the 1980s; (3) the 1990s; and (4) the 2000s. Two findings are meaningful here. First, Bangladesh's exports are biased toward the EU and the USA, and in particular toward the USA. Around 30% of Bangladesh's export flows are moving toward the USA, while theoretically predicted export flows are significantly lower than that level. In the same direction, export to the EU is quite high, and it has been increasing (26% in the 1980s, 44% in the 1990s, and 55% in the 2000s). On the other hand, Bangladesh's actual export flows toward ASEAN countries, the Middle East and North Africa (MENA), China, Japan, and India are less than the predicted ones. Second, Bangladesh's import flows are mostly from India, China, ASEAN countries, and the EU. In particular, its imports from India increased from 2.9% in the 1980s to 15.7% in the 2000s. Unlike export flows, import flows from the USA are not very significant.

6. Summary and Conclusions

Bangladesh's trade pattern is basically consistent with the prediction of the gravity model. However, a detailed analysis reveals that its export flows are biased toward Western countries

Table 6. Bangladesh's Exports to Different Regions/Countries

Explanatory variables	EU	OECD	ASEAN	SAARC	MENA	SSAFRI	LAC
Log_GDP	1.32*** (0.15)	1.08*** (0.07)	0.26*** (0.10)	0.38*** (0.13)	0.40*** (0.06)	0.79*** (0.11)	1.73*** (0.22)
Log_per capita GDP	-53.20*** (5.96)	-54.08*** (4.94)	1.09 (0.67)	-1.59* (0.94)	0.15 (0.62)	-2.07*** (0.48)	-8.42 (7.63)
Log_DISTANCE	-3.81* (2.12)	-1.20*** (0.37)	-0.36 (0.42)	4.02*** (0.67)	-2.92*** (0.69)	0.65 (1.49)	-6.94*** (1.08)
Log_LINDER	50.58*** (5.69)	52.23*** (4.80)	-0.06 (0.53)	0.74 (0.62)	-0.68 (0.54)	-0.46 (0.28)	8.36 (6.99)
Landlocked	-3.55*** (0.55)	0.17 (0.33)		1.77* (0.94)		-1.68*** (0.57)	
BORDER			0.62 (1.16)	1.75** (0.88)			
SAARC				3.05*** (0.65)			

Note: ***, **, and * denote significant test statistics at 1%, 5%, and 10%, respectively.

EU, European Union; OECD, Organization for Economic Cooperation and Development; ASEAN, Association of South East Asian Nations; SAARC, South Asian Association for Regional Cooperation; MENA, Middle East and North Africa; SSAFRI, Sub Saharan Africa; LAC, Latin American Countries.

Inside brackets refer to standard errors.

such as the USA and the EU, and import flows are mainly from Asian nations such as India, China, and ASEAN countries.

The small number of exports to India and China compared with the large number of imports from these countries is the main reason for Bangladesh's chronic trade deficit. This country may need to diversify its trade partners and take advantage of the booming economies of its neighbors.

The fact that Bangladesh's main export markets are the USA and the EU implies that its major exports are low-tech labor-intensive products. Given that the spillover effects of

Table 7. Bangladesh's Imports From Different Regions/Countries

Explanatory variables	EU	OECD	ASEAN	SAARC	MENA	SSAFRI	LAC
Log_GDP	1.95*** (0.18)	1.81*** (0.09)	0.48*** (0.13)	0.11 (0.20)	0.70*** (0.16)	-0.40 (0.32)	5.02*** (0.42)
Log_per capita GDP	-71.22*** (7.16)	-115.06*** (6.98)	0.36 (0.90)	0.25 (1.49)	4.04*** (1.49)	0.002 (1.47)	57.03*** (13.81)
Log_DISTANCE	-3.68 (2.54)	-4.75*** (0.52)	-5.31*** (0.56)	1.91* (1.07)	-19.40*** (1.88)	-0.73 (4.41)	-0.14 (1.94)
Log_LINDER	66.73*** (6.83)	111.10*** (6.79)	0.73 (0.70)	0.23 (0.99)	-4.73*** (1.30)	0.89 (0.88)	-53.51*** (12.68)
Landlocked	-3.16*** (0.66)	2.20*** (0.46)		-2.30 (1.50)		-2.92* (1.67)	
BORDER			-5.40*** (1.55)	3.53** (1.38)			
SAARC				4.42*** (1.02)			

Note: ***, **, and * denote significant test statistics at 1%, 5%, and 10% respectively.

Inside brackets refer to standard errors.

Table 8. Actual Versus Predicted Trade Share of Bangladesh by Regions and Countries (%)

	Predicted	Actual	Predicted	Actual
	Exports (1980–2009)		Imports (1980–2009)	
EU	30.15	49.82	1.94	12.34
ASEAN	10.47	2.10	14.20	15.34
MENA	11.32	3.08	3.72	10.15
CHINA	4.56	0.79	1.76	12.18
JAPAN	8.05	1.78	3.80	7.90
INDIA	3.54	1.57	1.95	13.62
USA	3.92	28.59	0.05	4.24
REST OF THE WORLD	27.98	12.26	72.59	24.21
	Exports (1980–1989)		Imports (1980–1989)	
EU	17.80	25.94	6.02	19.94
ASEAN	13.46	6.44	15.50	12.73
MENA	8.44	11.18	18.75	15.30
CHINA	11.31	2.38	0.44	4.23
JAPAN	4.44	5.89	8.61	14.40
INDIA	11.79	1.61	1.95	2.95
USA	3.68	20.05	0.23	10.49
REST OF THE WORLD	29.08	26.51	48.49	19.96
	Exports (1990–1999)		Imports (1990–1999)	
EU	34.62	44.21	3.10	15.32
ASEAN	8.95	2.43	25.49	12.92
MENA	11.61	3.62	1.60	4.80
CHINA	1.89	0.76	2.85	8.68
JAPAN	7.66	2.60	20.88	10.74
INDIA	1.65	1.02	4.38	14.34
USA	3.76	33.77	0.13	5.79
REST OF THE WORLD	29.85	11.60	41.57	27.41
	Exports (2000–2009)		Imports (2000–2009)	
EU	30.42	54.70	0.26	10.17
ASEAN	10.94	1.47	4.61	17.11
MENA	12.81	1.92	0.87	11.43
CHINA	4.42	0.61	0.61	15.24
JAPAN	8.53	1.00	0.24	5.89
INDIA	2.52	1.77	0.63	15.67
USA	2.99	17.88	0.01	2.65
REST OF THE WORLD	27.36	10.64	92.77	21.83

high-tech capital-intensive products are much larger, Bangladesh may try to invest in producing those goods. Like Bangladesh, South Korea used to be a typical labor abundant country in the 1950s and 1960s with concentration on exporting labor-intensive goods, and the USA and European countries used to be its major export partners. Its attempt to switch industrial structures has been a success, and the country is now exporting capital-intensive products that require high levels of technology, which creates increasing returns to scale in many sectors. Currently, its major export markets are neighboring Asian countries, not faraway Western countries. How South Korea switched its industrial structure and successfully developed its economy should be the topic for another study, but Bangladesh can learn from South Korea if it wants to transform itself into a capital abundant country, exporting more to its neighboring Asian countries that have huge growth potential.

Bangladesh is currently in a “fragile state” (DFID 2012) and it has set the goal to achieve middle-income country status by 2021. Active participation in international trade and reinforcing its industrial structure would be one way to discard its classification as a fragile state and achieve the middle-income status within the time frame.

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Send correspondence to Jinhwan Oh: joh@ewha.ac.kr

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Appendix I

Country Sample: The econometric section of this study uses trade data of 102 countries with which Bangladesh has trade relationship. The trade data for some countries such as Germany and Russian Federation do not reflect the real data in this study because, in the late 1980s, West Germany and East Germany were unified, and in the early 1990s, the USSR was separated into some countries. The trade data of Germany from 1980 to 1989 is considered as the trade data of West Germany, and the trade data of Russian Federation from 1980 to 1991 is considered as the trade data of the unified USSR. Some socialist countries (e.g., North Korea

and Cuba) have not been included in this study because of the unavailability of sufficient data. However, the complete list of countries used in this study is as follows:

Afghanistan, Algeria, Argentina, Australia, Austria, Bahrain, Belgium, Bhutan, Brazil, Bulgaria, Cameroon, Canada, Chile, China, Cote d'Ivoire, Cyprus, Denmark, Dominican Republic, Arab Rep. of Egypt, Ethiopia, Finland, France, Germany, Ghana, Greece, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iran, Iraq, Ireland, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Rep. of Korea, Kuwait, Lebanon, Liberia, Libya, Madagascar, Malaysia, Maldives, Mali, Malta, Mauritius, Mexico, Mongolia, Morocco, Mozambique, Myanmar, Namibia, Nepal, Netherlands, New Zealand, Niger, Nigeria, Norway, Oman, Pakistan, Panama, Papua New Guinea, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russian Federation, Saudi Arabia, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sri Lanka, Sudan, Swaziland, Sweden, Switzerland, Syria, Tajikistan, Thailand, Tunisia, Turkey, Turkmenistan, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay, Uzbekistan, Vietnam, Zambia, Zimbabwe.

Appendix II. Bangladesh's Total Imports, Exports, and Trade Deficit in Various Years (Million USD)

Year	Imports	Exports	Trade Deficit
1980	2610.56	790.22	1820.34
1981	2651.37	791.37	1860.00
1982	2418.49	768.09	1650.40
1983	2291.08	724.53	1566.55
1984	2692.81	931.58	1761.23
1985	2526.17	999.02	1527.15
1986	2550.35	888.91	1661.44
1987	2730.31	1076.80	1653.51
1988	3034.05	1291.13	1742.92
1989	3617.64	1304.86	2312.78
1990	3656.09	1670.50	1985.59
1991	3421.02	1687.51	1733.51
1992	3730.84	2037.47	1693.37
1993	4014.53	2277.31	1737.22
1994	4583.96	2649.75	1934.21
1995	6496.05	3129.20	3366.85
1996	6934.93	3297.16	3637.77
1997	7129.61	3627.56	3502.05
1998	7370.70	3821.91	3548.79
1999	8352.44	4520.11	3832.33
2000	9000.78	5589.58	3411.20
2001	9012.42	5735.61	3276.81
2002	7847.78	5443.26	2404.52
2003	9997.56	6229.39	3768.17
2004	11590.00	7585.60	4004.40
2005	13850.90	8494.40	5356.50
2006	16095.60	11622.00	4473.60
2007	18476.30	12683.10	5793.20
2008	23820.60	13627.60	10193.00
2009	21802.70	14377.50	7425.20

Source: International Monetary Fund (IMF), The Direction of Trade Statistics, 2010.

Appendix III. Share of Major Components in Bangladesh's Exports (Percent)

	1981	1982	1983	1984	1985	1986	1987	1988	1989
Primary Commodities	16.2	14.4	34.8	34.0	36.5	27.7	23.2	23.3	21.2
Manufactured Goods	33.6	27.6	65.2	66.0	63.5	72.3	76.8	76.7	78.8
	1990	1991	1992	1993	1994	1995	1996	1997	1998
Primary Commodities	17.9	13.4	13.2	13.7	13.0	12.3	11.9	9.7	7.9
Manufactured Goods	82.1	86.6	86.8	86.3	87.0	87.7	88.1	90.3	92.1
	1999	2000	2001	2002	2003	2004	2005	2006	2007
Primary Commodities	8.2	7.5	6.5	7.1	7.3	7.5	7.3	6.8	7.0
Manufactured Goods	91.8	92.5	93.5	92.9	92.7	92.5	92.7	93.2	93

Appendix IV. Share of Major Components in Bangladesh's Imports (Percent)

	1983	1984	1985	1986	1987	1988	1989		
Major Primary Goods	32.21	31.58	18.86	17.89	25.18	18.07	15.56		
Major Industrial Goods	15.68	16.36	22.39	13.62	15.94	16.68	15.08		
Capital Machinery	26.18	26.11	42.13	32.66	36.50	31.70	34.48		
Other Products	25.92	25.95	16.63	35.83	22.37	33.54	34.88		
	1990	1991	1992	1993	1994	1995	1996	1997	1998
Major Primary Goods	18.35	14.71	11.42	11.00	14.88	14.77	8.59	10.75	18.09
Major Industrial Goods	19.87	21.54	15.67	17.01	15.84	15.49	18.19	15.23	12.95
Capital Machinery	35.46	35.65	33.06	31.02	28.93	28.33	27.05	27.54	3.67
Other Products	26.32	28.10	39.84	40.97	40.35	41.41	46.17	46.48	65.29
	1999	2000	2001	2002	2003	2004	2005	2006	2007
Major Primary Goods	11.70	11.21	9.51	11.73	12.28	12.75	12.57	12.25	16.72
Major Industrial Goods	14.38	14.78	15.35	16.03	17.52	20.25	20.36	19.13	19.48
Capital Machinery	3.75	5.16	6.49	5.67	6.69	8.48	10.44	9.67	6.95
Other Products	70.17	64.56	68.65	66.57	63.51	58.52	56.63	58.94	56.85

Note: Every year represents a financial year which starts from July 1 of a year and ends on June 30 of the subsequent year. Here, for example, Year 1981 means a financial year which starts from July 1, 1981 and ends on June 30, 1982, and so on.

Source: Bangladesh Bank and Finance Division, Ministry of Finance, Bangladesh, 2010.