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Free Falling Terms of Trade Despite Industrialization: The Case of Bangladesh

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Free Falling Terms of Trade Despite Industrialization: The Case of Bangladesh

Bernhard G. Gunter and Valeria Vargas Sejas[*]

Abstract

Considering Bangladesh's successful industrialization, Bangladesh's sharply deteriorating terms of trade (ToT) are a puzzle for the original Prebisch-Singer hypothesis. The Prebisch-Singer hypothesis suggested that countries exporting primary products will experience deteriorating ToT, while countries exporting manufacturing goods will experience ToT improvements. This paper provides an empirical review of Bangladesh's ToT from 1980 to 2013. It reviews the theoretical literature explaining the Prebisch-Singer hypothesis and uses econometric analyses to determine some of the key factors for Bangladesh's ToT deterioration. It shows that exchange rate devaluations and increases in export quantity have a negative impact on the ToT, while improvements in export quality have some positive impact on the ToT. In the case of Bangladesh, the problem however is that export quality has been decreasing, contributing to sharply falling ToT. The key policy implication is that export promotion policies need to be refined, focusing also on export quality, not only export quantity.

I.   Introduction

The nature and patterns of trade between developing and industrialized countries have changed substantially over the last 50 years. However, many developing countries continue to experience declining terms of trade (ToT). The ToT, i.e., the price of exports relative to the price of imports, have a direct impact on the trade balance, but more broadly also on long-term growth and development, as decreasing ToT imply that a country has to export more and more for any given level of imports.

Some 65 years ago, two eminent development economists, Raul Prebisch (1950) and Hans Singer (1950), proposed independently that developing countries should diversify their exports as exporting primary goods had been associated with long-term decreasing ToT, which is now commonly known as the Prebisch-Singer hypothesis. Despite the agreements between Prebisch and Singer that developing countries a) were expected to experience declining ToT in the future and b) should diversify their exports, Singer's and Prebisch's explanations for the declining ToT are very different.

Singer provides a demand side theory explanation, arguing that manufactured goods (which were the main exports of industrialized countries) have a higher income elasticity of demand than agricultural products (which were the main exports of developing countries). This then implies that with rising world income, the demand for manufactured goods will increase more than the demand for agricultural products, causing the difference in price trends.

Prebisch provides a supply side explanation, arguing that strong labor unions in industrialized countries cause manufacturing wages to ratchet upwards, while weak labor unions in developing countries fail to prevent agricultural wages from falling. This then implies that the costs of agricultural products increase by less than manufactures during upswings and decrease by more during downswings, which ultimately cause deteriorating terms of trade of developing countries in the long-term.[1]

The aim of this paper is not to re-examine the Singer-Prebisch hypothesis, but to empirically estimate some of the key determinants for the sharp deterioration in developing countries' ToT, focusing on the experience of Bangladesh from 1980-2013. Bangladesh, which has over the last three decades drastically shifted its exports from agricultural products (jute) to manufactured products, especially ready-made garments (RMG), should have experienced improving ToT. However, as will be shown in more details below, Bangladesh's ToT have continuously declined since 1980.

Following this introduction, the next section provides some empirical background on the ToT of developing countries, especially Bangladesh, from 1980 to 2013. The third section provides a brief literature review, focusing first on the theoretical foundations of the Prebisch-Singer hypothesis, and second, the empirical literature examining the validity of the Prebisch-Singer hypothesis. The fourth section presents the model specification of our econometric analysis, focusing on export quality, export quantity, the exchange rate, world trade policy changes and political instability as key exogenous variables. The regression results and some robustness checks are provided in the fifth section, while conclusions and recommendations are presented in the last section.

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[1] See Cuddington et al. (2002) for further details.

II.   Empirical Background

As detailed, for example, in Gunter et al. (2017), Bangladesh's economy has undergone an impressive sectoral transformation from being an agriculture-based economy to being now the world's largest exporter of garments after China. As shown in Figure 1, the share of jute and jute goods exports in total exports has decreased from about 50 percent in the early 1980s to about 3 percent in the 2000s, while the share of RMG exports in total exports has increased from close to zero percent in the early 1980s to slightly more than 80 percent in 2013.

Figure 1: Share of Jute and RMG in Bangladesh's Total Exports, 1980-2013
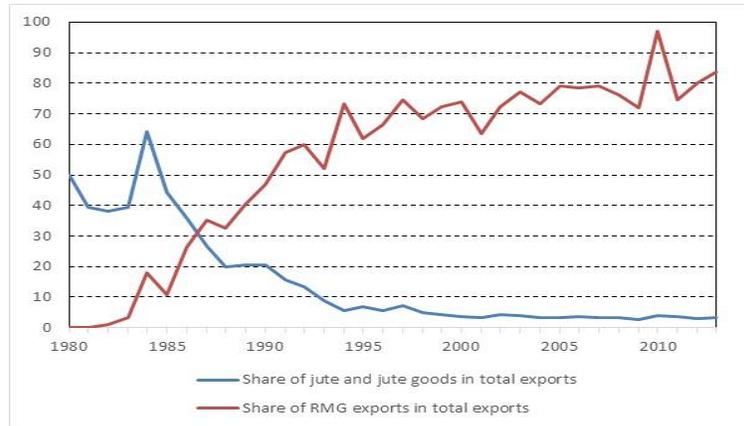
Source: Created by the authors based on data from Bangladesh's Export Promotion Bureau and FAO Statistics.

However, as Figure 2 shows, excluding the temporary spike of 1985, Bangladesh's ToT have been declining more or less continuously since 1980 (which is the first year for which the World Bank's World Development Indicators (WDI) database has such data for any country).

Figure 2: Bangladesh's ToT, 1980-2013
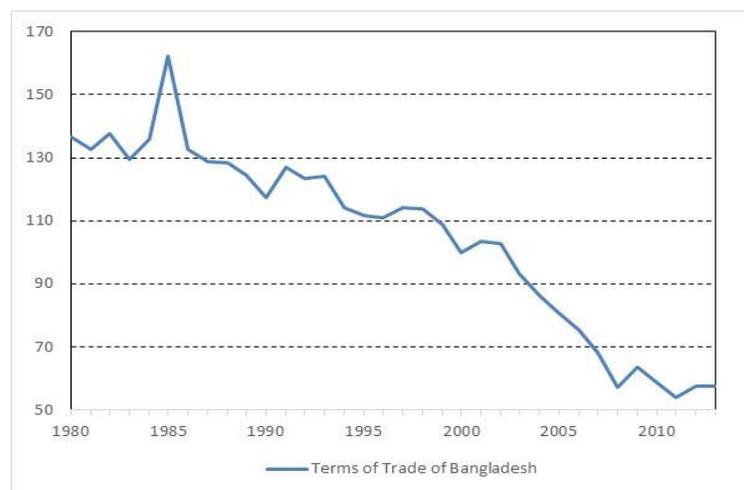
Source: Created by the authors based on World Bank (2015).

Figure 3 shows the evolution of the ToT for all four South Asian countries for which there is data from 1980 to 2013, while Figure 4 shows the evolution of the ToT of Bangladesh and three South Asian countries for which such data is available only since 2000. Both figures show that Bangladesh's ToT deterioration has been the worst among South Asian economies, followed closely by Pakistan (which did marginally better). With the exceptions of Bhutan and especially India, all South Asian countries experienced ToT deteriorations.

Figure 3: ToT of all South Asian countries with data from 1980-2013
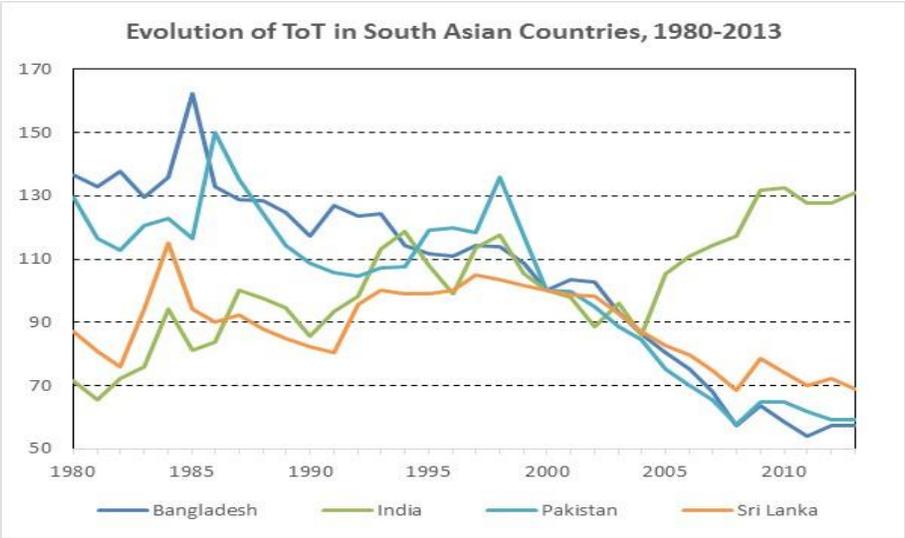
Source: Created by the authors based on World Bank (2015).

Figure 4: ToT of Bangladesh, Bhutan, the Maldives and Nepal, 2000-2013
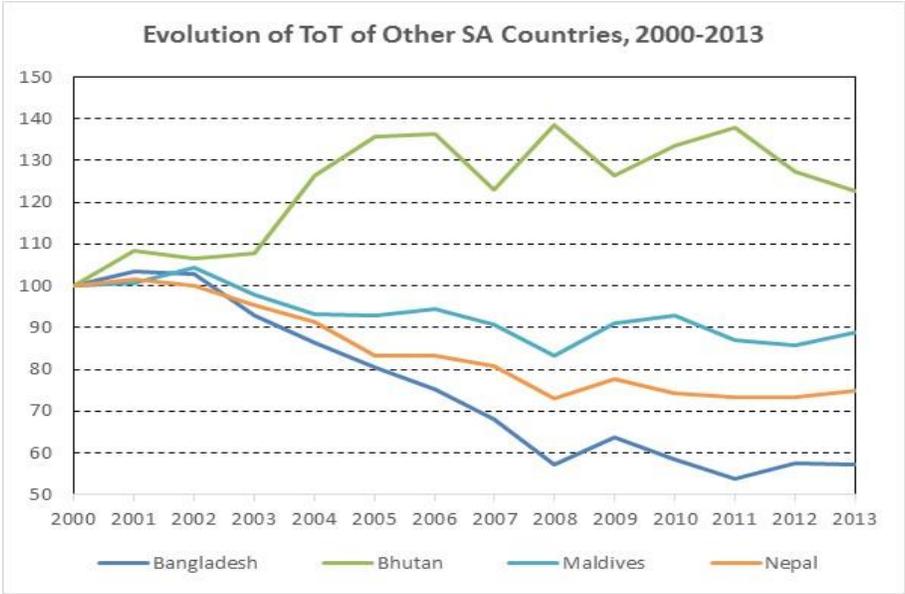
Source: Created by the authors based on World Bank (2015).

The evolution of the ToT of all 66 developing countries (excluding tiny island countries) for which such data is available from 1980 to 2013 is plotted as a frequency distribution in Figure 5.[2] It shows that there are seven developing countries (the Central African Republic, Gabon, Haiti, Malawi, Mexico, Mozambique, and Togo) that experienced worse ToT deteriorations than Bangladesh, while 58 developing countries fared better than Bangladesh. Though the majority (58 percent) of developing countries experienced deteriorations in their ToT from 1980-2013, a total of 28 developing countries (42 percent) experienced an overall improvement in their ToT from 1980-2013. Not only is the number of developing countries experiencing ToT improvements much smaller than the number of developing countries experiencing ToT deteriorations, the magnitude of improvements is also far less than the magnitude of deteriorations.

Figure 5: ToT Evolution of all 66 Developing Countries with Data for 1980-2013
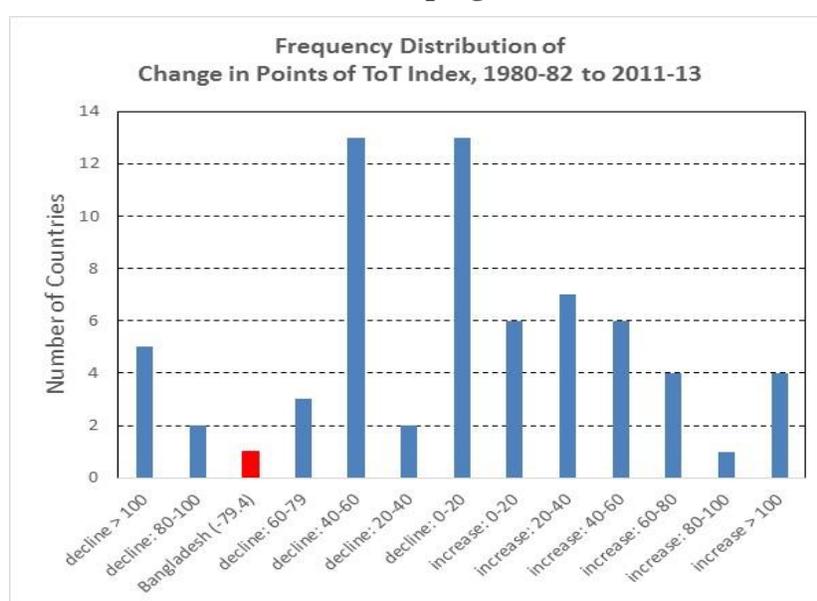
Source: Created by the authors based on World Bank (2015).

III. Brief Literature Review

Given the distributional implications of the Prebisch-Singer hypothesis between developing and industrialized countries,[3] the Prebisch-Singer hypothesis has been fiercely debated as soon as it

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[2] To reduce the impact of short-term volatility, we averaged the ToT for the 1980-1982 period as the starting point, as well as for the 2011-2013 period as the ending point.

[3] As Findlay (1980, p. 291) has put it: "Ever since the work of Raul Prebisch and Hans Singer (...), the movement of the terms of trade between the advanced and the less developed regions of the world economy (…) has been regarded as a key index of the distribution of the benefits from the international division of labor and the development prospects of the South."

was proposed.[4] There are two main distributional implications of the Prebisch Singer Hypothesis. First, the gains from trade will be distributed unfairly between nations exporting mainly primary products and those exporting mainly manufactures, and second, the inequality of per capita incomes between these two types of countries will increase by the growth of trade. Hence, the Prebisch-Singer hypothesis has been used as arguments for pursuing import substitution industrialization as well as tariff protection in developing countries.

While there have been numerous studies over the last 65 years, some confirming as well as some contradicting the hypothesis, our analysis above and the most recent literature reviewed below provide some tentative support for a refined Prebisch-Singer hypothesis. Excluding the large literature examining the impacts of improving or deteriorating ToT,[5] this literature review summarizes first the theoretical literature providing explanations for developing countries' declining ToT, and second, the recent literature on the empirical validity of the Prebisch-Singer hypothesis. The empirical studies focusing on Bangladesh's ToT are summarized in the Appendix.

III.1. Theoretical Foundations for the Prebisch-Singer Hypothesis

Johnson (1954) uses a neoclassical model to derive the change in the South's ToT as a complex function (see equation 1) of

   a) the growth rates of real income in the North and the South (respectively, y_1 and y_2),
   b) the North's and the South's income elasticities of demand for imports (respectively, e_{i1} and e_{i2}), and
   c) the North's and the South's price elasticities of imports (respectively, e_{p1} and e_{p2}).

$$\text{Change in ToT of the South} \quad = \quad \frac{e_{i1}\, y_1 - e_{i2}\, y_2}{(e_{p1} + e_{p2} - 1)} \qquad (1)$$

Given the impact of differences in income elasticities between the North and the South, Johnson's formula has been interpreted as representing a theoretical explanation for the first strand of the Prebisch-Singer hypothesis. However, an interesting result of Johnson's equation can be derived if assuming that the so-called Marshall-Lerner condition holds (i.e., the denominator $(e_{p1} + e_{p2} - 1)$ is positive)[6] and setting both income elasticities equal to one. In that case, Johnson's formula reduces to the South's ToT being determined entirely by the difference in the growth rates of real income between the North and the South. That is, the South's ToT deteriorate as long as the growth rate of real income is higher in the South than in the North. We will use this insight for one of our specifications in the empirical analysis below.

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[4] As detailed in Toye and Toye (2003), the Prebisch-Singer hypothesis contradicted a long tradition of most economists believing that the price of industrial manufactures would tend to decline relative to the price of agricultural products.
[5] See for example, Feenstra et al. (2009).
[6] The so-called Marshall–Lerner condition refers to the condition that an exchange rate devaluation or depreciation will only cause an improvement in the trade balance if the absolute sum of the long-term export and import demand elasticities is greater than unity.

After the Solow growth model conquered and dominated economic theory during the 1960s, many theoretical models were suggested of which some confirmed and some contradicted the Prebisch-Singer hypothesis. The most comprehensive explanations for the South's deteriorating ToT have been summarized by Findlay (1981, p. 428-429), stating that there are three major strands of the Prebisch-Singer hypothesis:

(1) The first one is that income-elasticity of demand for imports from the South is low in the North, while income-elasticity of demand for imports from North is high in the South.

(2) The second strand is that technological progress in the North tends to reduce the demand for imports from the South, while technological progress in the South tends to occur in the export sector.

(3) The third strand of the Prebisch-Singer hypothesis is that the structure of product and factor markets tends to be much more monopolistic in the North than the South, on account of the existence of large corporations and well-organized labor unions. This makes technological progress lead to a rise in incomes in the North, whereas it leads to a decline in the relative prices of exportable products in the South.

Building on Solow (1956 and 1957), Findlay (1981) derives a sophisticated model determining the ToT, assuming that the North produces a single composite commodity (manufactures), which can be used for either consumption or investment. In short, Findlay (1981, p. 454) comes to the conclusion that "the fundamental determinants of the terms of trade are the tastes, technology and factor endowments of the trading partners." Findlay also stresses that structural differences in the determination of the growth rates between the North and the South produce asymmetrical consequences on the ToT due to changes in technology and the propensity to save.

Building on the dual economy model of Lewis (1954), Chichilnisky (1981) has shown that under certain conditions of dualism in the production of goods and abundant labor supply in the South, an increase in the volume of exports from the South may bring about a sustained worsening of the South's ToT even if this increase in exports is due to a positive shift in demand from the North. Similarly, Brander and Spencer (1985) have shown that export subsidies expand market shares, but that the ToT move against the subsidizing country.

Beyond each model's unique details, most of these models build in one way or another on the assumption that the South produces and exports primary goods, while the North produces and exports manufactures. Hence, the question is if all these models can still explain why a developing country, whose main exports are no more primary goods but manufactures, experiences declining ToT. This question can indeed be answered in the affirmative as long as a model assumes an unlimited supply of labor in the South. Hence, the Prebisch-Singer hypothesis is not limited to the South exporting primary products, but based on structural differences between the South and the North. These structural differences are still relevant, despite the fact that many developing countries now export basic manufactures, while the industrialized countries export more sophisticated manufactures and services.

Indeed, Sarkar and Singer (1991) document that the developing countries' commodity composition of exports has undergone a major change in the direction of dominance of manufactures in their nonfuel exports, with strong growth in the volume of their manufactured exports. They then review the ToT evolution of these developing countries from 1965-1985 and note that this shift to manufactured exports did not allow them to escape unequal exchange relations with the industrial countries as the developing countries' barter ToT in manufactures showed signs of weakness rather than improvement.

Among the more recent theoretical contributions are Darity (1990), Sarkar (2001), Kaplinsky (2006), and Chung (2007). Darity (1990) reconsiders the determinants of the ToT for the cases in which a) the North is a Kaleckian economy and b) capital is completely mobile, leading to uniform profit rates between the North and the South in the long run. Darity shows that the long-run ToT will be independent of the North's markup if the North is a Kaleckian economy, and that it is theoretically possible for the North to raise its markup but experience a deterioration in its ToT.

Sarkar (2001) provides a neo-Kaleckian framework that can explain why the ToT turn against the South even if the North experienced a higher rate of technical progress than that of the South. The neo-Kaleckian framework is characterized by surplus capacity and an effective demand problem in the North and a capacity constraint in the South.

Kaplinsky (2006) builds on the growing recognition during the early 1990s, that manufacturing is a very heterogeneous sector, and that the prices of many of the manufactures exported by developing economies were falling. Kaplinsky provides three new explanations for developing countries' declining ToT, which are related to (a) the de-commodification of many primary products, (b) the growing concentration of global buying in manufactures, and (c) the impact of China's increasing presence in the global economy.

Chung (2007) has shown that labor-augmenting technological progress turns the ToT against the growing country, while capital-augmenting technological progress shifts the ToT in favor of the growing country. Labor-augmenting technical progress is generally defined as technical progress that increases the effective labor input, while capital-augmenting technical progress is defined as technical progress that increases the effective capital input. Given Bangladesh's deteriorating ToT, Chung's work implies that Bangladesh's technical progress is rather labor-augmenting than capital augmenting, which is however debatable.

The two main conclusions from reviewing all these theoretical models are that a) the early models explaining the Prebisch-Singer hypothesis based on developing countries exporting primary products are still able to explain deteriorating ToT of developing countries now exporting simple manufactures, and b) many aspects of the more recent theoretical contributions are not necessarily consistent with Bangladesh's experience, and hence, an empirical verification is required.

III.2. Empirical Studies Examining the Validity of the Prebisch-Singer Hypothesis

There are at least five major studies in this century examining the empirical validity of the Prebisch-Singer Hypothesis. Bloch and Sapsford (2000), Erten (2011) and Fu et al. (2012) examine the ToT over many decades, while Harvey et al. (2010) and Aretzki et al. (2013) examine the ToT

over several centuries.[7]

Bloch and Sapsford (2000) studied the structural differences between the production lines of industrialized and developing countries, focusing on differences in wage and price determinations between primary production and manufacturing. They use data post-World War II and find some evidence to support the Prebisch-Singer hypothesis, except that there are net improvements in the ToT of primary producers during periods of particularly rapid manufacturing growth. Our examination of Bangladesh's ToT, which covers an additional 15 years compared to Bloch and Sapsford data, is consistent with their finding.

Harvey et al. (2010) applied not only new techniques that require fewer statistical assumptions, but also collected data going back to 1650 to disentangle long-term trends from shorter-term cycles. They concluded that their findings provide robust support for the Prebisch-Singer hypothesis.

Partly building on Sarkar and Singer (1991), Erten (2011) argues in favor of including the major trading partners as well as the commodity composition into the analysis. His paper provides an analysis of the ToT of developing countries vis-à-vis developed countries, which also takes into account the changes in the composition of imports/exports. Using an autoregressive model to estimate the long-run trend for the period of 1960-2006, Erten's results indicate that the ToT have deteriorated in developing countries at an unequal rate leaving some countries worse than others. In general, the highest decline in ToT is suffered by the least developed and highly indebted countries, while non-oil exporters among developing countries are much better off than the major exporters of manufactures, which is explained by the pressure on manufacturing prices due to the emergence of China.

Similarly, Fu et al. (2012) analyze the unit prices of imports into the European Union, Japan, and the United States during 1989-2006 of manufactured products in which China specializes. They find that imports from middle income countries are in close price competition with those from China and that there has been price competition between China and high-income countries in low-technology products. By contrast, the impact of China's exports on low-income countries is not through price competition but through market expansion.

Aretzki et al. (2013) employ 25 time series (some of them also going back as far as 1650) and panel data stationarity tests that allow for endogenous multiple structural breaks to differentiate between the secular trend and short run volatility of relative primary commodity prices. Their results show that all the series are stationary after allowing for endogenous multiple breaks. Though test results on the Prebisch-Singer hypothesis are mixed, a majority of the series show negative trends. They also make a first attempt at identifying the potential drivers of the structural breaks. Finally, they investigate the dynamics of the volatility of the 25 relative primary commodity prices, whereby they come to the conclusion that the volatility in commodity prices has increased in recent years.

Despite various sophistications, these five comprehensive reviews are overall not only confirming the validity of the Prebisch-Singer hypothesis, but also stress that developing countries shifting

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[7] While not strictly a review of the Prebisch Singer Hypothesis, Baffes and Etienne (2016) come to the conclusion that income has a negative and highly significant effect on real food commodity prices, a finding that is consistent with Engel's law and Kindleberger's thesis, the predecessors of the Prebisch-Singer hypothesis.

their exports to basic manufactures have not seen improvements in their ToT. This is partly explained by fierce competition developing countries face, especially from China. Finally, all these issues, especially the impact of China, seem highly relevant for Bangladesh's ToT deterioration.

IV.   Model Specification, Results and Robustness Checks

IV.1.   Model Specification

While there is a huge literature examining the evolution of the terms of trade as well as examining the implications of deteriorating terms of trade, empirical literature analysing the factors that determine a country's terms of trade is close to non-existing. This is the case not only for Bangladesh, but also for other countries.

Given the importance of income elasticities in the theoretical literature explaining the ToT, it would make sense to consider income elasticities as exogenous variables. However, as Senhadji (1998) has pointed out, it is difficult to obtain accurate time series data for income elasticities. The key problem is that income elasticities cannot be observed but would need to be estimated using many of the same variables that are also needed to estimate the ToT. Hence, the estimations become not only recursive but also lead to statistically insignificant results. The model specifications used for our econometric analysis does therefore not include any estimation of elasticities.

Excluding income elasticities, there is no standard specification of exogenous variables determining a country's ToT. However, what is clear based on the few existing empirical studies as well as our own preliminary econometric analyses, is that a country's ToT are determined not only by characteristics of that country, but economic variables of that country relative to that of its major trading partner's economic variables. These economic variables include relative export quality, relative export quantity, and the exchange rate (which is by definition a relative measure of one country's currency to another currency or currencies). Hence, the five external variables of the initial regression specification are: relative export quality, relative export quantity, the exchange rate, political instability and a trade policy indicator.

- Relative export quality: With regards to export quality, we will initially make use of a new multi-level export quality database that has been developed by Henn et al. (2013), which provides an export quality index for 178 countries, estimated based on a quality-augmented gravity equation and capturing cross-country variations in production costs.[8] Due to data constraints for all of Bangladesh's trading partners, we define relative export quality as changes in Bangladesh's export quality index relative to changes in the U.S. export quality index.
- Relative export quantity: The data for export quantity comes from the World Bank (2015). As was the case for export quality, due to data constraints for all of Bangladesh's trading partners we define our first indicator for relative export quantity as changes in Bangladesh's export quantity index relative to changes in the U.S. export quantity index.
- Exchange rate: The exchange rate is defined as taka per U.S. dollar, provided by the World Bank (2015). That is, an increase in the exchange rate implies a devaluation, while a

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[8] Given that the export quality database of Henn et al. (2013) ends with data for 2010, we use the World Bank (2015) data for export volume and export quantity to estimate export quality for 2011-2013.

decrease implies an appreciation of the taka.[9]
- Political instability: As Bangladesh's garments sector, especially garments exports, are influenced by political instability and foreign investors, we also include a political instability measure as exogenous variable in the regressions, which is approximated by the Transparency International's Corruption Perception Index (CPI).[10]
- Trade policy changes: Given the relevance of trade policies (especially the rise of China, which is the world's largest exporter of ready-made garments and Bangladesh's main competitor), we also include China's exports as a share of world exports as an exogenous variable. Beyond China joining the World Trade Organization (WTO) in 2001, this variable is also able to capture the expiration of the Multi-Fibre Arrangement (MFA), which governed the world trade in textiles and garments from 1974 to 2004.

All non-stationary time series (including the terms of trade, relative export quality, relative export quantity, and China's share in world exports) were de-trended using first differences. Though not critical for the results, all exogenous variables were lagged by one year to better capture the causal relationship. In other words, the initial regression equation is:

$$TOT_t = \alpha + \beta\ EXPQL_{t-1} + \gamma\ EXPQT_{t-1} + \delta\ EXCH_{t-1} + \zeta\ PI_{t-1} + \eta\ TP_{t-1} + \varepsilon_t \qquad (2)$$

whereby

α	is a constant
TOT_t	stands for ToT in year t
$EXPQL_{t-1}$	stands for relative export quality in year t-1
$EXPQT_{t-1}$	stands for relative export quantity in year t-1
$EXCH_{t-1}$	stands for the nominal exchange rate (taka per US$) in year t-1
PI_{t-1}	stands for political instability in year t-1
TP_{t-1}	stands for trade policy changes in year t-1
ε_t	is an error term in year t.

IV.2. Empirical Results

The detailed results of the initial regression specification are shown in the first column of Table 1. Among the initial five explanatory variables, the lagged exchange rate is significant at one percent, implicating that devaluations of the taka are strongly associated with ToT deteriorations. This is most likely due to the facts that (a) Bangladesh imports basically all of the raw material for its

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[9] Using the real exchange rate does not change the results significantly. Furthermore, we decided to use the taka per dollar exchange rate instead of the real effective exchange rate as data constraints for relative export quality and relative export quantity limit the analysis to comparing Bangladesh to the United States.

[10] For the years the CPI is not available, we use the World Bank's Country Policy and Institutional Assessment (CPIA) rating for Bangladesh. There are a variety of indicators that have been used as proxy for political instability, including the World Bank's Worldwide Governance Indicators (WGIs), and the Global Competitiveness Index (GCI). However, none of these indicators are available as annual time series data for the 1980s and 1990s.

RMGs and (b) the Bangladeshi RMG sector faces fierce competition within Bangladesh as well as from other countries. A devaluation makes the imports of cotton more expensive in domestic currency, while it lowers the U.S. dollar price of Bangladeshi garments.

Table 1: Estimation Results (including various robustness checks)

	(1)	(2)	(3)	(4)	(5)
Export quality					
Relative export quality index for all commodities of Henn et al. (2013)	61.347 (1.50)				
Relative export quality index for manufactures of Henn et al. (2013)		32.639 (2.01)*			
Export quality calculated from export value & quantity indices			0.191 (1.83)*	0.164 (1.80)*	0.185 (1.81)*
Relative export quantity					
Bangladesh exp. quantity index / U.S. export quantity index	-0.114 (-2.21)**		-0.174 (-1.66)*		
Bangladesh's GDP p.c. growth minus world GDP p.c. growth		-0.703 (-1.78)*		-0.807 (-1.85)*	
Share of Bangladesh's RMGs in total world exports					-378.09 (-2.26)***
Exchange rate (taka per U.S. dollar)	-1.683 (-3.96)***	-0.961 (-1.93)*	-1.256 (-2.86)***	-1.236 (-1.98)*	-1.231 (-3.37)***
Political Instability (Corruption Perception Index)	-2.735 (-2.76)**	-1.727 (-0.76)	-2.481 (-1.27)	-1.586 (-0.68)	-1.231 (-0.45)
Trade Policy Changes	-0.899 (-2.70)***	-0.287 (-0.70)	-0.432 (-1.60)	-0.396 (-1.31)	-0.641 (-2.07)**
Observations	33	33	33	33	30
R-squared	0.46	0.33	0.32	0.30	0.38

Notes: t-statistics are in parentheses; * indicates statistical significance close to 10 percent, ** indicates statistically significant at 5 percent, and *** indicates statistically significant at 1 percent.

On the other hand, changes in Bangladesh's export quality relative to changes in the U.S. export quality are statistically not significant in our initial regression specification, though the positive sign of the parameter is consistent with the assumption that improvements in relative export quality will improve the terms of trade. An inspection of the relative export quality variable shows an overall declining trend. Hence, the deteriorating export quality contributes to the decrease in Bangladesh's terms of trade. Keeping in mind that export quality is not observable, but has been estimated by Henn et al. (2013) using a complex gravity equation, it is not necessarily surprising that the relative export quality indicator for all commodities does not have a high level of significance.

The coefficient for the lagged relative export quantity carries a negative sign and is statistically significant at five percent, indicating that the so-called flooding of the market has a negative impact on export prices and hence on the ToT. This is both consistent with the recent literature, especially the literature analyzing the impact of China on other developing countries ToT (see Fu et al., 2012). Furthermore, the share of China's exports in world exports, which can be interpreted as a trade policy indicator, also shows a statistically significant negative impact on Bangladesh's ToT.

With regards to political instability, the coefficient for the lagged political instability variable is negative and statistically significant at five percent, indicating that political instability as measured by the corruption perception index (CPI) has a negative impact on the ToT.[11] Finally, the variable for global trade policy changes is significant at one percent in the initial regression specification.

IV.3. Robustness Checks

Given that the export quality variable was not significant in our initial specification (Column 1), we used a slightly different measure for relative export quality in our second specification (Column 2 of Table 1), which is the relative export quality index for manufactures (instead of the relative export quality index for all commodities).[12] As is shown in Figure 6, despite some volatility, Bangladesh's export quality for manufactured goods has been declining from 1980-2010.[13]

The second regression specification also used an alternative measure for relative export quantity, which is Bangladesh's GDP per capita growth rate minus the world's average GDP per capita growth rate. While these two changes result in a now slightly significant export quality variable, both the political instability variable and the trade policy change variable lose their previously high level of significance. The level of significance is also reduced for the new relative export quantity measure and the exchange rate, though both remain significant at around 10 percent.

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[11] The negative impact of political instability, especially on foreign direct investment, has been stressed in many contributions; for the case of Bangladesh, see Berg et al. (2011).

[12] As before, this variable was first differenced and then lagged by one period, to be consistent with the initial regression specification in column 1.

[13] Though not shown in Figure 6, the export quality index for the U.S. manufactured goods shows overall no trend with only small changes from year to year.

Figure 6: Export Quality Index for Bangladesh's Manufactured Goods, 1980-2010
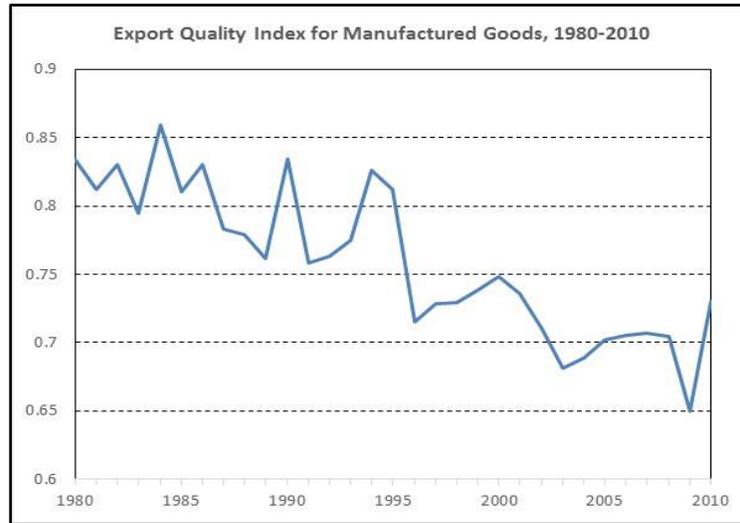
Source: Created by authors based on data from Henn et al. (2013).

The subsequent regression specifications (shown in columns 3 to 5) use a third measure for export quality,[14] which has been calculated from Bangladesh's export value index and Bangladesh's export quantity index, instead of using the estimated indices of Henn et al. (2013). As Table 1 shows, this results in always slightly significant results for the export quality measure.

- The specification of column 3 is the same as that of column 1, except that we use the calculated export quality variable (instead of the estimated relative export quality variable from Henn et al. (2013). Both, export quality and export quantity are significant at around ten percent, the exchange rate is significant at one percent. The level of significance for the political instability and trade policy improve compared to the second specification, but remain overall insignificant.

- The specification of column 4 is the same as that of column 2, except that we use the calculated export quality variable (instead of the estimated relative export quality variable for manufactures from Henn et al. (2013). The results of column 4 are very close to those of column 2: Export quality, export quantity and the exchange rate are all significant at around ten percent, while the political instability and trade policy variables remain insignificant.

- Column 5 uses the share of Bangladesh's RMGs in total world exports as another proxy for relative export quantity, [15] reflecting more directly the flooding of the market with cheap RMGs, which is highly significant (at one percent). Export quality remains significant at close to ten percent, while the exchange rate is now once again highly significant (at one percent). While the political instability variable remains statistically insignificant, the trade policy change variable is now again significant (at five percent).

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[14] As before, this variable was first differenced and then lagged by one period, to be consistent with the regression specifications in columns 1 and 2.

[15] To be consistent with previous specifications, this variable was also first differenced and then lagged by one period.

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Furthermore, we ran a variety of alternative regressions, including additional exogenous variables,[16] none of which was however statistically significant, while the t-statistics for the other exogenous variables remained close to those displayed in Table 1.[17]

V.   Conclusion and Recommendations

This study has shown that exchange rate devaluations have a strongly negative impact on the ToT of Bangladesh. Given that Bangladesh's exchange rate is market determined, and that attempts to stabilize the nominal exchange rate would likely be ineffective in the long-run, there is little that can and should be done directly via exchange rate policies. The interventions have to come via other channels, like monetary policies and trade policies.

Furthermore, our results indicate that increases in export quantity (which has been measured with three alternative indicators) have a negative impact on the ToT, while improvements in export quality (which has also been measured with three alternative indicators) have a positive impact on the ToT. However, as was shown in Figure 6 above, the problem in the case of Bangladesh is that its export quality for manufactured goods has overall been decreasing. Hence, Bangladesh's increased export value is due solely to increased quantity, but not quality. This implies that in addition to the long-standing policy recommendation for developing countries to diversify exports, it is also important to improve the quality of exports. In other words, export promotion policies focusing on export quantities might be reconsidered and redirected to focus on export quality and export prices.

Given that the results for the significance of political instability and global trade policy changes were mixed, we cannot establish a firm impact of these factors for Bangladesh's ToT; even though the consistently negative sign for the political instability variable as well as for the trade policy change variable seem to indicate some negative impact.

Finally, it should be stressed that the results of this study should not be interpreted as that garments exports have been harmful for Bangladesh. As has been documented in many studies, the employment and growth generated by the garment sector has been a key factor for Bangladesh's outstanding achievements in poverty reduction and the achievements of the Millennium Development Goals (MDGs). However, these achievements are likely to have been even better if Bangladesh had not experienced a sharp deterioration in its ToT.

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[16] The additional exogenous variables that were added one by one are Bangladesh's GDP per capita, GDP growth, the share of Bangladesh's RMGs in the United States' GDP, the share of manufactures in GDP, the share of agriculture in GDP, the share of services in GDP, fuel imports as percent of merchandise imports, net remittance inflows, and a variety of external debt indicators.

[17] We also run some regressions excluding either an export quality variable or an export quantity variable to check on the potential interdependence between export quantity and export quality. While such an interdependence cannot be ruled out with certainty, the t-statistics of these regressions did not support any endogeneity bias in the results provided in Table 1.

References

Arezki, Rabah; Kaddour Hadri; Prakash Loungani; and Yao Rao (2013). Testing the Prebisch-Singer Hypothesis since 1650: Evidence from Panel Techniques that Allow for Multiple Breaks. *International Monetary Fund (IMF) Working Paper*, WP/13/180 (August); available at: https://www.imf.org/en/Publications/WP/Issues/2016/12/31/Testing-the-Prebisch-Singer-Hypothesis-since-1650-Evidence-from-Panel-Techniques-that-Allow-40880.

Baffes, John and Xiaoli L. Etienne (2016). Analysing Food Price Trends in the Context of Engel's Law and the Prebisch-Singer Hypothesis. *Oxford Economic Papers*, Vol. 68, pp. 688-713.

Berg, Achim; Saskia Hedrich; Sebastian Kempf; and Thomas Tochtermann (2011). *Bangladesh's Ready-made Garments Landscape: The Challenge of Growth (*Frankfurt: McKinsey, Apparel, Fashion & Luxury Practice); available at: https://www.mckinsey.de/files/2011_McKinsey_Bangladesh.pdf.

Bloch, Harry and David Sapsford (2000). Whither the Terms of Trade? An Elaboration of the Prebisch-Singer Hypothesis. *Cambridge Journal of Economics*, Vol. 24, pp. 461-481.

Brander, James A. and Barbara J. Spencer (1985). Export Subsidies and International Market Share Rivalry. *Journal of International Economics*, Vol. 18, pp. 83-100.

Chichilnisky, Graciela (1981). Terms of Trade and Domestic Distribution: Export-led Growth with Abundant Labour. *Journal of Development Economics*, Vol. 8, pp. 163-92.

Chung, Chul (2007). Technological Progress, Terms of Trade, and Monopolistic Competition. *International Economic Journal*, Vol. 21, pp. 61-70.

Cuddington, John T.; Rodney Ludema; and Shamila A. Jayasuriya (2002). Prebisch-Singer Redux. Washington, DC: United States International Trade Commission, Office of Economics Working Paper, No. 2002-06-A (June); available at: https://ageconsearch.umn.edu/bitstream/15857/1/wp02006a.pdf.

Darity, William Jr. (1990). The Fundamental Determinants of the Terms of Trade Reconsidered: Long-Run and Long-Period Equilibrium. *American Economic Review*, Vol. 80, pp. 816-827.

Erten, Bilge (2011). North-South Terms-of-Trade Trends from 1960 to 2006. *International Review of Applied Economics*, Vol. 25, pp. 171-184.

Feenstra, Robert C.; Benjamin R. Mandel; Marshall B. Reinsdorf; and Matthew J. Slaughter (2009). Effects of Terms of Trade Gains and Tariff Changes on the Measurement of U.S. Productivity Growth. *NBER Working Paper* No. 15592 (December); available at: http://www.nber.org/papers/w15592.

Findlay, Ronald (1980). The Terms of Trade and Equilibrium Growth in the World Economy. *American Economic Review*, Vol. 70, pp. 291-299.

Findlay, Ronald (1981). The Fundamental Determinants of the Terms of Trade. In: S. Grassman and E. Lundberg (eds.) *The World Economic Order: Past and Prospects* (New York,

United States: St. Martin's Press), pp. 425-457.

Fu, Xiaolan; Raphael Kaplinsky; and Jing Zhang (2012). The Impact of China on Low and Middle Income Countries' Export Prices in Industrial-Country Markets. *World Development*, Vol. 40, pp. 1483-1496.

Gunter, Bernhard G.; Faizal Ahmed; A. F. M. Ataur Rahman; and Jesmin Rahman (2017). Do Patterns of Development and Macroeconomic Uncertainty Explain Bangladesh's Savings and Investment Puzzle? In: M. Faizul Islam, Rahim M. Quazi, and Farida C. Khan (eds.) *Money and Macroeconomics: Selected Topics from Bangladesh* (Dhaka, Bangladesh: University Press Ltd.), pp. 97-124 (Chapter 6).

Harvey, David I.; Neil M. Kellard; Jakob B. Madsen; and Mark E. Wohar (2010). The Prebisch–Singer Hypothesis: Four Centuries of Evidence. *Review of Economics and Statistics*, Vol. 92, pp. 367-377.

Henn, Christian; Chris Papageorgiou; and Nikola Spatafora (2013). Export Quality in Developing Countries. *International Monetary Fund (IMF) Working Paper*, WP/13/108 (May); available at: https://www.imf.org/external/pubs/ft/wp/2013/wp13108.pdf.

Hossain, Akhand Akhtar (2008). The Agricultural Terms of Trade in Bangladesh: An Econometric Analysis of Trends and Movements, 1952-2006. *Australian Economic Papers*, Vol. 47, pp. 38-52.

Hossain, Akhand Akhtar (2009). Macroeconomic Policies and Agricultural Terms of Trade, Bangladesh, 1952-2005. *Journal of Contemporary Asia*, Vol. 39, pp. 204-230.

Johnson, Harry G. (1954). Increasing Productivity, Income-Price Trends and the Trade Balance. *Economic Journal*, Vol. 64, pp. 462-485.

Kaplinsky, Raphael (2006). Revisiting the Revisited Terms of Trade: Will China Make a Difference? *World Development*, Vol. 34, pp. 981–995.

Lewis, W. Arthur (1954). Economic Development with Unlimited Supplies of Labour. *Manchester School*, Vol. 22, pp. 139-191.

Masuduzzaman, Mohammad and Muhammad Imam Hussain (2012). Terms of Trade and Its Implications: Bangladesh Perspective. Dhaka, Bangladesh: Bangladesh Bank, Research Department, Policy Analysis Unit (PAU), Working Paper Series, WP 1201 (February); available at: http://www.bb.org.bd/pub/research/workingpaper/wp1201.pdf.

Prebisch, Raúl (1950). *The Economic Development of Latin America and its Principal Problems* (New York, United States: United Nations).

Rahman, S. Hafeez (1976). An Analysis of Terms of Trade of Bangladesh, 1959/60 to 1974/75. *The Bangladesh Development Studies*, Vol. 4, pp. 375-98.

Sarkar, Prabirjit (2001). Technical Progress and the North–South Terms of Trade. *Review of Development Economics*, Vol. 5, pp. 433-443.

Sarkar, Prabirjit and Hans W. Singer (1991). Manufactured Exports of Developing Countries and Their Terms of Trade since 1965. *World Development*, Vol. 19, pp. 33-40.

Senhadji, Abdelhak (1998). Time-Series Estimation of Structural Import Demand Equations: A Cross-Country Analysis," *IMF Staff Papers*, 45, pp. 236-68; available at: https://www.imf.org/external/Pubs/FT/staffp/1998/06-98/pdf/senhadji.pdf.

Singer, Hans W. (1950). The Distribution of Gains between Borrowing and Investing Countries. *American Economic Review*, Vol. 40, pp. 473-485.

Solow, Robert M. (1956). A Contribution to the Theory of Economic Growth. *The Quarterly Journal of Economics*, Vol. 70, pp. 65-94.

Solow, Robert M. (1957). Technical Change and the Aggregate Production Function. *Review of Economics and Statistics*, Vol. 39, pp. 312-320.

Toye, John and Richard Toye (2003). The Origins and Interpretation of the Prebisch-Singer Thesis. *History of Political Economy*, Vol. 35, No. 3, pp. 437-467.

World Bank (2015). *World Development Indicators Database* (Washington, DC: World Bank); as posted on the World Bank website: http://data.worldbank.org/data-catalog/ (downloaded on April 9, 2015).

Appendix: Empirical Studies on Bangladesh's ToT

There are only four Bangladesh-specific studies that have examined issues related to the ToT. Rahman (1976) examined Bangladesh's ToT based on based on unit value indices (not price indices). Hossain (2008) and Hossain (2009) examined Bangladesh's trends of agricultural prices, industrial prices, and agricultural ToT (which were defined as the ratio of the agricultural wholesale price index to the industrial wholesale price index, expressed in percentage). Masuduzzaman and Hussain (2012) is the only study examining the ToT defined as the ratio of export prices over import prices. Unfortunately, there have been major revisions in Bangladesh's ToT data for the period from 1980 to 1993 since their study.

- Rahman (1976) analyzes Bangladesh's ToT from fiscal year 1960 to fiscal year 1975, using data from Bangladesh's Central Statistical Office based on unit value indices (not price indices), which as Rahman (p. 376) points out, 'is a common practice because of the obvious difficulty of obtaining price figures for individual imported items.' Rahman found that the commodity ToT moved in favor of Bangladesh during fiscal year 1960 to 1969, but experienced a serious decline during fiscal years 1970 to 1975, which Rahman explains with general disorder prevailing in the domestic front and an economic crisis in the advanced capitalist bloc during 1970-1975.

- Using annual data from 1952 to 2006, Hossain (2008) estimates a vector error-correction model and performs an impulse response analysis to determine the trends of agricultural prices, industrial prices, and agricultural ToT. Using the Dickey-Fuller (ADF) and the Kwiatkowski–Phillips–Schmidt–Shin (KPSS) tests, Hossain (2008) finds that both agricultural and industrial prices have a unit root while the agricultural ToT is trend-stationary. He then specifies a simple Nerlovian agricultural price determination model within the framework of aggregate demand and aggregate supply and finds that there exists a cointegral relationship between agricultural prices, industrial prices, per-capita real income and the real exchange rate between the Bangladeshi taka and the US dollar under the restriction that per-capita real income and the real exchange rate are long-run forcing variables. Hossain (2008) then estimates a four-variable vector error-correction (VEC) model and conducts an impulse response analysis for the post-independence period, 1973-2006.

- Building on the results of Hossain (2008), Hossain (2009) reviews Bangladesh's macroeconomic policies since the 1950s and draws inference on the issue whether the agricultural sector was systematically squeezed by turning the ToT against agriculture. He concludes that in the case of Bangladesh, there is evidence supporting a more classical economist view of an upward trend in the ToT of the agricultural sector due diminishing returns.

- Masuduzzaman and Hussain (2012) studied the drivers for the movements in the ToT from fiscal year 1980 to fiscal year 2009. The authors decompose the main price determinants in both the export and import baskets and find that the ToT have been affected by the productivity gains in the ready-made garment (RMG) sector, the relative value of exports and imports, the real effective exchange rate, as well as the East Asian crisis in 1996, but not by the phasing out of the Multi Fibre Arrangement (MFA).