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The Foreign-Income and Real-Exchange-Rate Elasticities of Bangladesh Exports

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Bangladesh began implementing trade-reform policies in the mid 1980s, leading to a gradual change in its anti-export-policy. Since then the share of exports in her GDP has been rising steadily with the economy growing at about 5 percent per annum. This growth is associated with structural change in the country's export composition favouring non-traditional exports, namely garments and frozen foods. This paper specifies and estimates an aggregate export-demand function; deploys Pesaran's bounds-testing approach to estimate export-elasticities of foreign income and the exchange rate; and tests for the stability of the estimated function. The empirical results, based on annual data for the period 1973–2010, suggest a long-run relationship between real exports and export-weighted foreign real income. Similarly, real exports and the real effective exchange rate of the taka are found to be related. Finally, the results suggest that the dynamic behaviour of exports possesses an error-correction representation. The CUSUM and CUSUMSQ tests suggest no significant instability in the export-demand function. However, the recursive and rolling-regression coefficients indicate that the export-demand function has undergone some structural change since the early 1990s. This is reflected in the decreasing sensitivity of real exports *vis á vis* the exchange rate.

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I. INTRODUCTION

As part of an outward-oriented, and therefore strongly market-oriented development strategy, Bangladesh has undertaken a series of trade reforms since the mid-1980s. Initially trade reforms were implemented to conform with IMF structural adjustment programmes aimed at reducing pressure on Bangladesh's foreign exchange reserves. This was achieved by lowering trade deficits [Hossain (1996); Rahman (1992)]. Subsequent reforms that were made were also expected to raise economic growth and lower inflation. These measures included the removal of quantitative restrictions on imports and the reduction and streamlining of import tariffs. As a result the anti-export bias in the inward looking trade policy of the earlier decades that relied on import substitution, gradually weakened.

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The anti-export bias in Bangladesh's external sector had reached a peak during the mid-1970s. By the mid-1990s the trade regime had become moderately 'liberal' (market-oriented, due to its export orientation) [World Bank (1997)]. Although the pace of trade reform has slowed down since the early 2000s, this has not prevented Bangladesh's emergence as an export-oriented economy. This contrasts sharply with the autarkic trade regime of the 1970s.¹ Some empirical studies suggest that the export-oriented trade liberalisation process, which is necessarily also real-exchange-rate-oriented, has raised economic growth in Bangladesh.² This finding is consistent with the literature which suggests a causal linkage between export orientation and economic growth.³

Bangladesh's economy has maintained a steady economic growth rate at about 5 percent per annum since the mid-1980s. This has been associated with structural change in its export-composition in favour of non-traditional exports, namely garments and frozen foods. The main aim of this paper is to investigate the export-demand behaviour in Bangladesh with annual data for the period 1973–2010. It specifies and estimates an aggregate export-demand function, deploys Pesaran's bounds-testing approach to estimate exports' elasticities of foreign income and exchange rate and tests for stability of the estimated function.⁴

The remainder of the paper is organised as follows. Section II reviews trade liberalisation measures under successive political regimes since the early 1980s. Section III shows the lessening of anti-export bias in policy and associated structural change in the composition of exports since the 1970s. Section IV specifies an aggregate export-demand function with foreign real income and the real exchange rate of the taka⁵ as its key arguments. Section V reports the sources of data deployed for this study and their compilation. Section VI illustrates the estimation techniques and reports the results. Section VII investigates whether the export-demand function was stable over the sample period of study. Section VIII summarises the findings of this study and states some conclusions.

¹The exports-to-GDP ratio has increased from less than 5 percent in the early 1970s to about 20 percent in the late 2000s.

²The studies include Begum and Shamsuddin (1998); Islam (1998); Ahmed (2000); Hossain (2000); Mamun and Nath (2005); Hossain and Alauddin (2005); Love and Chandra (2005); and Kemal, Uddin, Fernando and Colombage (2005).

³Several reasons can go towards explaining the suggested linkage between export-orientation and economic growth. First, in the Keynesian model, export growth leads to economic growth via a foreign-trade multiplier. Second, an increase in export growth raises foreign-exchange holdings, thereby mitigating the foreign-exchange constraint on economic growth. This permits the country to finance an increasing volume of imports of capital goods and technology. Third, foreign competition promotes scale economies and technological progress. Fourth, a higher level of export-orientation creates positive externalities, namely efficient management and adoption of the latest production methods and techniques. For details on these arguments, see Balassa (1978), Chow (1987), Dawson (2006), Jung and Marshall (1985), Michaely (1977), Ram (1987) and Tyler (1981).

⁴Ahmed (2000) has investigated the impact of the real exchange rate on export-response in Bangladesh. His findings suggest a positive response of exports to depreciation of the real exchange rate brought about under trade liberalisation programmes. This paper examines whether the real exchange rate of the taka remains significant in the export-demand function for Bangladesh. Bangladesh's current export basket is dominated by import-dependent manufactured goods. It is plausible that such exports are relatively less sensitive to movements of the real exchange rate.

⁵The taka is the currency unit of Bangladesh.

II. TRADE LIBERALISATION AND ECONOMIC OPENNESS⁶

Following independence from Pakistan in 1971, the Bangladesh government under Sheikh Mujibur Rahman opted for a socialist model of development [Islam (1977)]. Such development models set national economic self-sufficiency as the primary goal. Consequently, they view foreign trade with suspicion. To achieve the goal of national self-sufficiency, a high degree of protection was accorded to the import-substituting industries through import tariff-and non-tariff barriers and subsidies. This and other macroeconomic developments created an anti-export policy bias. Under the then exchange-rate system pegging the taka to pound sterling, monetary and fiscal policies that were set to be expansionary, in service of the self-sufficiency goal, caused high inflation. This resulted in a real exchange rate that overvalued the taka, thereby creating an incentive-structure in favour of the import-substituting industries and against the exporting industries. This anti-export policy bias lowered exports and created foreign-exchange shortages which, in turn, squeezed imports, reinforcing economic opportunity for expansion of the domestic import-substituting industries. The restrictive foreign-exchange constraints led to a regulatory system employing licences and permits that allowed only selected items to be imported. The imported goods carried high price-premiums. Consequently, black markets flourished and corruption became rampant [Hossain (1995)]. Bangladesh's trade openness under these anti-trade policies, measured by the share of exports plus imports in GDP, was about 5 percent which meant, the economy had become highly inefficient.

The fall of the Mujib government in 1975 and other political developments led to the introduction in late 1975 of an outward-oriented model of development under the *de facto* political leadership of General Ziaur Rahman. The Zia government emphasised export-led industrialisation and initiated trade reform measures. The major impetus to trade liberalisation, however, came during the period of General Ershad's government of 1982-1990, with the implementation from 1986 of two successive IMF-supported structural-adjustment programmes. Since the early 1980s, the policy agenda for trade liberalisation has moved forward in three phases: 1982-1986 (first phase), 1987-1991 (second phase) and 1992 to date (third phase). The first two phases coincided with two formal industrial-policy plans—the *New Industrial Policy of 1982* and the *Revised Industrial Policy of 1986* [CPD (1995)]—and were initiated during the Ershad era. The third phase (1992-present) covers the era of elected civilian governments of the Bangladesh Nationalist Party (BNP) and the Awami League. The period of BNP governments has been the longest but at the time of writing this study (January 2012) the Awami League was in power.

First Phase: 1982-1986

During the first phase of trade liberalisation, both export-diversification and import-liberalisation received priority. Until the early 1980s, exports were dominated by a few commodities, namely raw jute, jute goods and tea. Some government schemes had been instituted to shift the incentive structure towards the export-oriented industries. Export-promotion measures were introduced to promote non-traditional export items,

⁶This section draws some materials from Hossain (2012a).

especially ready-made garments and frozen foods. These measures included unrestricted duty-free access to imported inputs, concessionary duties on imported machinery, easy access to bank credits, subsidies to non-traditional exports, and tax rebates on export incomes [Rahman (1994)]. On the import side, policy changes included the lowering of tariff rates, rationalising of tariff structure, the removal of quantitative restrictions, and simplification of procedures and formalities. There was public support for the acceleration and deepening of trade reform from 1986, despite the fact that the reform was imposed by a military government operating under the externally-imposed strictures of IMF-supported structural-adjustment programmes. The explanation for this extraordinary public acceptance can be found in the emergence after the 1960s of the 'East Asian miracle' syndrome, whose success had turned the tide of both professional and public opinion against import-substituting-industrialisation. This contributed to the gradual build-up in Bangladesh, throughout the period from the mid-1970s to the mid-1980s, of a favourable political climate for trade liberalisation. Over the same period, growth of overseas workers' remittances had begun to relieve the country's foreign-exchange constraint on the importation of capital and consumer goods. These imports benefited both consumers and nascent industrialists. Especially, they benefited the latter who, until 2005, made high profits from exportation of ready-made garments under the Multi-Fibre Arrangement.

Second Phase: 1987-1991

During the second phase, the government introduced a range of incentive schemes to promote non-traditional exports, especially the burgeoning ready-made garments industry. Import-liberalisation measures remained effective. For example, the pace of import-liberalisation had increased in the first phase, with the policy switch abolishing the relatively long 'positive' list of import items permitted under licence, leaving only the much shorter 'negative' list whose importation was stopped without official permission. During this second phase, the number of items on this already relatively short 'negative' list was reduced even further.

Third Phase: 1992-Present

The third phase of trade liberalisation began in 1992. The country had been under two IMF structural adjustment programmes from 1986 to 1993 and a World Bank enhanced-surveillance programme during 1993-1994. The two IMF programmes were the *Structural Adjustment Facility (SAF)*, from 1986-87 to 1988-89; and the *Enhanced Structural Adjustment Facility (ESAF)*, operational from August 1990 to June 1993. The World Bank programme was the *Industrial Sector Adjustment Credits: ISAC-I and ISAC-II*. Significant trade liberalisation measures were introduced during *ESAF* (1990-1993) and the two *ISAC* programmes (1993-1994). Under *ISAC-II* import controls were removed; tariff structure was rationalised; trade-neutral taxes were introduced including a Value Added Tax (VAT); and customs administration was strengthened. Despite this raft of reforms, an IMF Report [IMF (1998)] estimated that the overall restrictiveness of Bangladesh's trade regime fell from a rating of 10 (most restrictive) in the early 1990s to 7 (moderately restrictive) by 1996. The major factor hindering more thoroughgoing trade

reform at the time was caution on the part of policy-makers. They harboured concerns over the potential of trade reforms to negatively impact Bangladesh's fiscal and balance-of-payments positions.

The import trade has since been further liberalised by a combination of relaxation and phased removal of quantitative import restrictions, together with sharp reduction in import tariffs. For example, the number of effective tariff slabs in 1992 was 18 and the highest tariff rate was 350 percent. By the end of 1999, the number of slabs had fallen to 7 and the highest rate slashed to just 40 percent. Both operative and statutory tariff rates remained in effect until 2000. Since 2001, the tariff structure has been further rationalised with the equalisation of operative and statutory tariffs and Bangladesh has implemented a Most Favoured Nation tariff policy, in which all nations from which Bangladesh imports a given product receive the lowest tariff rate that Bangladesh is prepared to impose on the product (i.e., the rate offered to the most favoured nation from which the product is sourced). Currently the number of tariff slabs is five, including a zero tariff rate, and the maximum rate of tariff is 25 percent [Bangladesh (2011)]. Counter to this trend, however, non-tariff barriers, which had earlier been reduced, have once again been increased.

The Export Promotion Zones

To promote exports, Bangladesh began setting up Export Promotion Zones (EPZs) in the early 1980s. These are special enclaves where fully export-oriented firms are provided with favoured treatment with respect to custom regulations, the importation of raw materials and intermediate goods, company taxation, the provision of infrastructure, and industrial regulations. The first EPZ was established at Chittagong in 1983 and the second at Dhaka in 1993. Eight EPZs now operate in the country. In 2010, export earnings from the EPZs were US\$1.7 billion, or about 10.5 percent of total exports [Bangladesh (2011); Hossain (2002)].

Economic Openness

The trade liberalisation policy has over the years boosted both the exports and imports of Bangladesh (Table 1). The exports-to-GDP ratio has increased from about 5 percent in the early 1980s to 19 percent during 2007-08. Import trade has expanded significantly from 11 percent during the late 1980s to 27 percent in 2007-08. The structure of imports has also altered in favour of industrial raw materials and intermediate goods. The government at present operates under the *Import Policy Order: 2010-2012*, which has been designed to conform to the country's agreements with the World Trade Organisation. This policy imposes certain restrictions on imports for reasons of public health, security, environment and religious imperatives. Currently there are 24 items on the import restriction list [Bangladesh (2010)]. This represents a moderately liberal import policy that has contributed to an increase in the production of export items which are dependent on imported raw materials and intermediate goods.

Table 1

Tariff Rate and Trade Openness, Bangladesh, 1970–2008

Year/ Period	Number of Tariff Bands	Maximum Tariff Rate (%)	Unweighted Average Tariff Rate (%)	Weighted Average Tariff Rate (%)	Exports (% of GDP)	Imports (% of GDP)	Exports plus Imports (% of GDP)
1970			85.0		2.4	2.3	4.7
1971-1975					3.5	7.0	10.5
1976-1980					4.8	12.0	16.9
1981-1985					5.2	14.1	19.3
1986-1990					5.7	11.3	17.1
1991-1995	12.8 ^a	252.5 ^a	41.7	23.2	8.1	12.9	20.9
1996-2000	6.6	43	20.9	15.8	11.1	17.2	28.3
2001-2005	5	32.5	16.0	10.8	13.3	19.5	32.9
2006	5	25	13.4	8.4	16.8	21.5	38.3
2007	5	25	12.2	7.0	20.4	28.5	48.8
2008	5	25	13.4	7.6	17.7	24.7	42.3

Source: Author's compilation based on BB, Economic Trends; GoB, *Bangladesh Economic Review*; BBS, *Bangladesh Statistical Yearbook*, and Razzaque and Raihan (2007).

Note: ^a1992-1994.

III. REDUCTION IN ANTI-EXPORT POLICY BIAS AND STRUCTURAL CHANGE IN THE COMPOSITION OF EXPORTS

From an historical perspective, the present trade and investment regime in Bangladesh is moderately liberal. The issue is the extent to which the modest softening in anti-export policy bias since the early 1980s has made a difference in export-orientation and industrialisation. As discussed earlier, the trade policy reform in Bangladesh aimed at turning the production-incentive structure in favour of exportables by lowering the protection of import-substituting industries by scaling down tariffs and removing quantitative restrictions on trade flows. Other policy instruments, including promotional measures such as export subsidies and tax holidays, were used to encourage short-run increases in output of exports as well as to create an export-friendly investment environment. This section provides information on the softening of anti-export policy bias in Bangladesh since the 1980s.⁷

Trade economists such as Krueger (1978) and Bhagwati (1978) have provided an analytical framework for classification of trade regimes. Using the real exchange rate as an indicator of the production-incentive structure across sectors, Bhagwati (1988) has distinguished between import-substituting (IS), export-promoting (EP) and ultra-export-promoting (ultra-EP) trade strategies. He has defined IS-strategy as the adoption of an effective exchange rate for the country's exports (EER_x) which is less than that for the country's imports (EER_m). Therefore, if $EER_m > EER_x$, it indicates that domestic producers face an incentive structure which is biased against exportables and in favour of domestic production of importables. Similarly, if $EER_m = EER_x$, a neutral production-incentive structure is indicated, in the sense that producers are indifferent to the distinction between exports and domestic sales. Although this IS trade strategy does not favour exports, Bhagwati considers it an export-promoting strategy. His logic is that developing countries start from an IS strategy and hence any trade-policy reforms that lead to $EER_m < EER_x$ reduce

⁷Anti-export policy bias is commonly estimated by an index based on the real-exchange-rate indices for exports and imports. Athukorala (1998) has used different measures of the real exchange rate to examine whether exporting is profitable to domestic sales.

the magnitude of anti-export policy bias and consequently improve export performance. Extending this logic, $EER_m < EER_x$ represents an ultra-export promoting strategy.

Table 2 reports data for the ratio of the effective exchange rate for imports (EER_m) to the effective exchange rate for exports (EER_x) in Bangladesh for the period 1974–2006.⁸ Following Bhagwati's (1988) classification, the reported data suggest that despite trade reforms, Bangladesh maintains an import-substituting trade strategy. Anti-export policy bias has remained positive, at about 0.2, since the early 2000s although it decreased through the period from the mid-1970s to the late 1990s. Bangladesh can therefore be considered a partial trade reformer. It has discarded some restrictive trade practices but has not undertaken sufficiently comprehensive trade reforms to achieve a truly export-promoting trade strategy [World Bank (2007)].

Table 2

Anti-export Trade Policy Bias, Bangladesh, 1975–2006

Period/Year	Anti-export Policy Bias
1975	3.70
1975–1979	2.51
1980–1984	1.92
1985–1989	1.88
1990–1994	1.57
1995–1999	1.24
2000	1.19
2001	1.20
2002	1.20
2003	1.18
2004	1.20
2005	1.19
2006	1.19

Source: Author's compilation based on Hossain and Alauddin (2005) and World Bank (2007).

Note: Anti-export policy bias is defined as the ratio of the real effective exchange rate for imports to the real effective exchange rate for exports for the period 1975–1991 and thereafter the anti-export policy bias is defined as the ratio of the nominal effective exchange rate for imports to the nominal effective exchange rate for exports. Under a neutral trade regime that neither discriminates exports nor imports, the value of this ratio should be one. When the value of this ratio exceeds one, it indicates policy bias against exports.

Structural Change in the Composition of Exports

As has been observed an export-oriented development strategy raises allocative efficiency and brings with it structural change in trade composition, in favour of exports, promoting economic growth. Real-exchange-rate-based trade liberalisation reduces anti-export policy bias, increases exports and brings structural change in the composition of exports by promoting non-traditional exports which are frequently more sensitive to the real exchange rate than traditional exports.⁹ This section provides an overview of Bangladesh's export composition, showing structural change in favour of non-traditional exports since the mid-1980s (Table 3).

⁸The data set is compiled based on World Bank (2007) and Hossain and Alauddin (2005).

⁹See Athukorala (1998); Bhagwati (1978, 1988); Krueger (1978); Little, Scitovsky, and Scott (1970); Michaely, Papageorgiou, and Choksi (1991); and ADB (2007).

Table 3

Composition of Commodity Exports, Bangladesh, 1977–2010

	1977– 1984	1985– 1990	1991– 1995	1996– 2000	2001– 2005	2006	2007	2008	2009	2010
Total Exports	700	1027	2031	4456	6471	10526	12178	14110	15709	16205
Primary Commodities	236	297	312	476	472	773	832	987	1015	884
Raw Jute		112	89	93	72	148	147	165	148	196
Tea		45	39	38	18	12	7	15	12	6
Frozen Food		115	157	302	339	459	515	534	455	437
Agricultural Products		16	12	25	25	105	88	120	267	242
Other Primary Commodities		9	15	18	18	49	75	153	133	3
Manufactured Goods	464	730	1719	3980	6000	9753	11346	13123	14694	15321
Jute Goods		321	300	310	249	361	321	318	269	540
Leather		106	155	193	212	257	266	284	177	231
Naptha, Furnace Oil and Bitumen		18	22	11	20	88	84	185	142	301
Readymade Garments		247	988	2370	3274	4084	4658	5167	5919	6013
Knitwear		0	147	746	1605	3817	4554	5533	6429	6483
Chemical Products		19	39	93	96	206	215	216	280	103
Shoes					58	95	136	170	187	204
Paper and Allied Products		9	3		1					
Handicrafts		3	6	6	6	4	8	5	6	4
Engineering Products		4	10	14	13	111	237	220	189	311
Other Manufacturing Products		3	49	236	502	730	867	1025	1096	1131
Traditional Exports (including Raw Jute, Jute Goods and Tea)	499	479	427	441	339	521	475	498	429	742
Nontraditional (Defined as Total Exports Les Raw Jute, Jute Goods and Tea)	201	549	1603	4014	6133	10005	11703	13612	15280	15463
Memorandum Items										
Primary Commodities (% of Total Exports)	33.8	29.9	15.9	11.0	7.3	7.3	6.8	7.0	6.5	5.5
Raw Jute (% of Total Primary Exports)		37.6	28.9	19.4	15.4	19.1	17.7	16.7	14.6	22.2
Frozen Food (% of Total Primary Exports)		38.9	50.2	63.6	71.9	59.4	61.9	54.1	44.8	49.4
Agri. Products & Other Primary Comm. (% of Primary Comm. Exports)		8.2	8.5	8.9	8.9	19.9	19.6	27.7	39.4	27.7
Manufactured Goods (% of Total Exports)	66.2	70.1	84.1	89.0	92.7	92.7	93.2	93.0	93.5	94.5
Readymade Garments (% of Total Exports)		22.0	47.8	52.9	50.8	38.8	38.2	36.6	37.7	37.1
Knitwear (% of Total Exports)		0.0	6.7	16.3	24.6	36.3	37.4	39.2	40.9	40.0
Readymade Garments and Knitwear (% of Total Exports)		22.0	54.6	69.2	75.4	75.1	75.6	75.8	78.6	77.1
Export Classification (% of Total Exports)										
Traditional (Raw Jute, Jute Goods and Tea)	72.0	48.9	22.2	10.2	5.3	4.9	3.9	3.5	2.7	4.6
Nontraditional (Total Exports, Excluding Raw Jute, Jute Goods and Tea)	28.0	51.1	77.8	89.8	94.7	95.1	96.1	96.5	97.3	95.4

Source: Data for 1985-2010: Bangladesh (Various Years) *Bangladesh Economic Review* and data for 1977–1984 are drawn from Sattar (1997).

Traditional Exports

Raw jute, jute goods and tea were the traditional exports from Bangladesh until the mid-1980s. Since then these exports have lost prominence and some non-traditional export items, especially ready-made garments and frozen-foods, have become dominant.

Raw Jute

World trade in raw jute has been declining steadily since the 1950s. The main reasons are the rapid growth of jute manufacturing industries in jute-producing countries and declining demand for jute fibre in jute consuming countries [IFC (2005)]. Bangladesh dominated the global raw jute market in the 1950s and 1960s [Mahmood (1981)]. As raw jute was the major cash crop, it came to be called the 'golden fibre' of Bangladesh, and is still known as such. Raw jute exports from Bangladesh have, however, been declining steadily since the 1960s to the extent that it has lost its significance as an export item. For example, the share of raw jute in Bangladesh's total export earnings was about one percent in 2008. The corresponding number in 1985 was about 41 percent. While some recent studies have suggested a positive outlook for raw jute exports on environmental grounds, it is unlikely to regain its former prominence in Bangladesh's export basket. Increased demand for food crops relative to jute and other cash crops continues to attract the interest of Bangladeshi farmers, leading to an allocation of resources towards food production and away from large-scale jute cultivation.

Jute Goods

World trade in jute goods has declined significantly since the 1950s. Bangladesh was the predominant raw jute exporter in the 1950s, graduating in the late 1950s to become a major exporter of jute goods throughout the 1960s and 1970s. Bangladesh gained its share of the world trade in jute goods at the expense of India, which until the 1960s had been the major exporter of jute goods [Mahmood (1981); Hossain (1995)]. The declining trend of world trade in jute goods has been reflected in the declining trend of jute-goods exports from Bangladesh. This occurred despite the fact that the lower demand for Bangladesh's jute goods in industrialised countries was partly compensated by increased demand from other developing countries. Currently the share of jute goods in Bangladesh's total exports is about 2.3 percent against 44 percent in the mid-1980s. Like raw jute exports, jute goods are unlikely to regain their former export significance for Bangladesh.

Tea

While tea is a traditional export item of Bangladesh, the world trade in tea has, however, received only marginal contributions from Bangladesh. The share of tea in Bangladesh's export earnings has declined from about 6 percent in the 1970s to less than 0.2 percent. This dramatic decline in the share of tea is largely explained by a sharp rise in export earnings from non-traditional items (especially ready-made garments); however, a significant part of the explanation lies in the fact that Bangladesh has not been successful in regaining some of its traditional tea export markets lost in the aftermath of the country's independence from Pakistan.

Leather and Leather Products

Bangladeshi exports of hides and skins, and of leather and leather products, exhibited an increasing trend between the early 1970s and the late 1980s. Export earnings from these items have declined since then, due mostly to supply constraints. Currently the share of leather and leather products in Bangladesh's total export earnings is about 2 percent.

Non-traditional Exports

Since the mid-1980s, some non-traditional export items, especially ready-made garments and frozen food products, have become dominant in the export trade of Bangladesh. Ready-made garments have emerged as the leading export item since the 1990s. Currently, ready-made garments and knitwear products contribute about 76 percent of total export earnings of more than \$14 billion. The abolition of the Multi Fibre Arrangement in 2005 did not have major impact on Bangladesh's garment and knitwear exports. The share of frozen food items in total export earnings is about 4 percent and rising steadily. Other developing non-traditional export items include pharmaceuticals, ceramic, light engineering, and horticultural products.

The trends and composition of exports show that the traditional export items (raw jute, jute goods and tea), which contributed about 35 percent of total export earnings in the mid-1980s, nowadays contribute only about 7 percent. Leather and leather products showed some promise during the 1980s but have not realised their earlier potential to become important non-traditional export items.

This review of Bangladesh's export trade reveals some weaknesses. First, there is apprehension that Bangladesh may not sustain its successes in the ready-made garment trade in a genuine quota-free environment. Bangladesh finds itself in competition with some fiercely competitive suppliers of textile and clothing goods, namely Cambodia, China and Vietnam. Second, the success of ready-made garments has not been replicated in other non-traditional exports. Consequently, Bangladesh's export base remains relatively undiversified, which makes exports vulnerable to competition, as well as to domestic and external shocks. Furthermore, there is doubt that trade reforms have altered the production-incentive regime sufficiently to be effective in raising exports by the full available potential. This weak export-response of trade liberalisation¹⁰ reflects the dominance of quota-based garment exports, which are dependent on imports of raw materials and intermediate inputs. It also indicates supply-side problems that cannot be removed without major capital expenditures on infrastructure development over and above revenue measures such as tariff reduction or monetary measures such as exchange-rate adjustment. Some recent policy measures suggest it is unlikely that necessary investment on development-

¹⁰Hossain (2012b) has investigated this issue by estimating an export-response function. The empirical results provide only weak-evidence in support of a positive export-response due to devaluation-based trade liberalisation. This paper does not examine export-response behaviour. Although an anonymous referee indicates its usefulness, this paper does not develop a simultaneous equation system involving both export demand and export supply functions. The exclusion of a supply-response function has the advantages of avoiding both conceptual and econometric problems while producing policy-credible results. An alternative approach uses domestic output in a hybrid export-volume function, which is presently controversial and not adopted here.

promoting infrastructure would be undertaken any time soon. For example, the government's recent escalation of para-tariffs—a policy that is incompatible with the outward-oriented development strategy which has served the country so well for so long [Razzaque and Raihan (2007)].

IV. MODEL SPECIFICATION

In trade literature¹¹ it is generally assumed that the exports of developing countries are supply-determined [Balassa (1978); Tyler (1981)]. A corollary of this assumption is that the external demand for an individual country's exportable goods is infinite. Two other related assumptions are often made. First, for a small exporting country, export prices are given and determined in the international market under free market forces of demand and supply. Second, the demand for exportable goods is perfectly price elastic. The essence of these assumptions is that a small exporting country is a price taker for its exportable items and that its volume of exports is determined by excess supply in the domestic market. This is not considered to be true as exports from small economies are often found demand determined. Foreign demand for an exporting country's goods depends on foreign income and the relative export prices in international markets. Accordingly, real exports are specified as an increasing function of foreign real income and a decreasing function of the real exchange rate of domestic currency.¹² Such an aggregate export-demand function is specified for Bangladesh in the following log-log form.¹³

$$LREX_t = \beta_0 + \beta_1 LRY_t + \beta_2 LREER_t + U_t \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

where $LREX$ is the log of real exports of Bangladesh,¹⁴ LRY is the log of export-weighted foreign real income,¹⁵ $LREER$ is the log of the real effective exchange rate¹⁶ of the taka, and U is a random error term with zero mean and a constant variance. In this specification, an increase in foreign real income increases the demand for Bangladesh's products. Depending on the value of β_1 , Bangladesh's exports can be income-elastic ($\beta_1 > 1$) or income-inelastic ($\beta_1 < 1$). Similarly, an appreciation of the real effective exchange rate of taka is expected to lower demand for Bangladesh's products. Depending on the absolute value of β_2 , Bangladesh's exports can be price-elastic ($|\beta_2| > 1$) or price-

¹¹The trade literature is voluminous. The major studies include Houthakker and Magee (1969); Goldstein and Khan (1985); Arize (1990, 2001); Athukorala (1981); Boltho (1996); Doyle (1998); Giles and Williams (2000); Roy (1991); Marquez and McNeilly (1988); Muscatelli and Stevenson (1995); Bahmani-Oskooee (1996); Bahmani-Oskooee and Nirooman (1998); Masih and Masih (2000); Hamori and Matsubayashi (2001) and Singh (2002).

¹²An implicit assumption behind this export-demand function is that supply is not a constraint on export trade.

¹³A log-log form is the standard model used in the foreign trade literature. This specification allows for direct estimation of the income- and price-elasticities of exports. The log-log specification also has various statistical advantages; in particular, it lowers heteroskedasticity problem.

¹⁴Export volume is defined as total export earnings in taka deflated by the export price index.

¹⁵Foreign real income is estimated as the export-weighted real GDPs of five developed countries (Canada, Germany, Japan, United Kingdom, and United States) plus other importers' GDPs, proxied by world real GDP.

¹⁶The IMF data series for the real effective exchange rate are used for estimation purposes. An increase (decrease) in the value of the REER represents an appreciation (depreciation) of the taka.

inelastic ($|\beta_2| < 1$).¹⁷ If the coefficient on the real effective exchange rate is found not different from zero, Bangladesh's exports can be interpreted as unresponsive to the real exchange rate-based trade liberalisation. Such insensitivity may also originate from changes in the composition of exports in favour of products which are heavily import-dependent.

V. DATA

The data deployed for this study are compiled from both domestic and international statistical publications. The data for export earnings in taka and the export price index are drawn from *Economic Trends* (Bangladesh Bank), *Economic Review of Bangladesh* [Ministry of Finance, Government of Bangladesh (GoB)] and the *Statistical Yearbook of Bangladesh* (Bangladesh Bureau of Statistics). The data for the export-weighted foreign real income are estimated by the author based on Bangladesh's export shares for five major importing countries and the rest of the world. The five countries are the United States, the United Kingdom, Japan, Germany and Canada. Bangladesh's export shares for these countries are estimated based on data drawn from the Asian Development Bank's *Key Indicators of Developing Member Countries of the Asia-Pacific* and the *Economic Review of Bangladesh*, published by Government of Bangladesh. The GDPs at constant prices for these five developed countries and the World are drawn from IMF, *International Financial Statistics Yearbook*. The GDP volume for the world is used as a proxy for the GDP volume for the rest of the world. The data for the real effective exchange rate of the taka (REER) are obtained from the IMF by the author through personal communication. The data gap for the REER for the period 1970-1979 are estimated using the bilateral real effective exchange rate of the taka with the US dollar. The data for the REER estimated this way are spliced with the IMF data to generate a series with a common base. All the empirical results are generated after logarithmic transformation of the data series for all the variables in the level form over the sample period 1973–2010.¹⁸ Figures 1a to 1c report the data series in the level form where LREX is the log of real export earnings (taka), LRY is the log of export-weighted foreign real income (index), and LREER is the log of the real effective exchange rate of the taka (index). An increase in the value of this index represents an appreciation of the real effective exchange rate. Table 4 reports descriptive statistics for the data series deployed for this study.

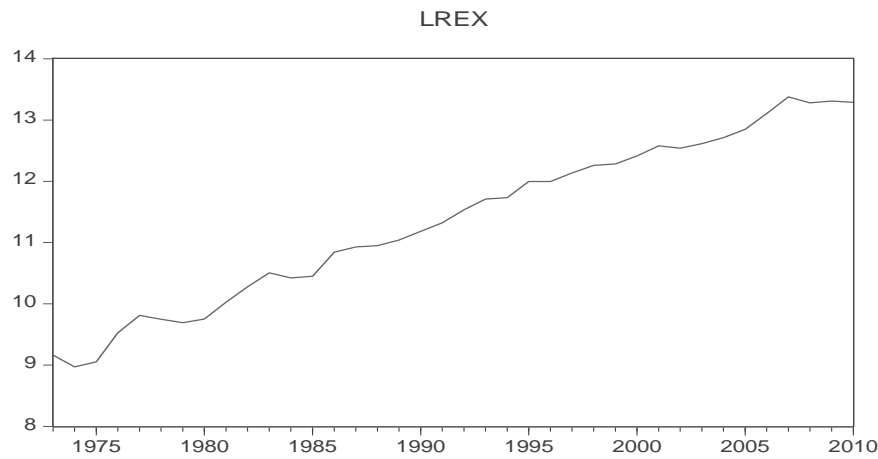
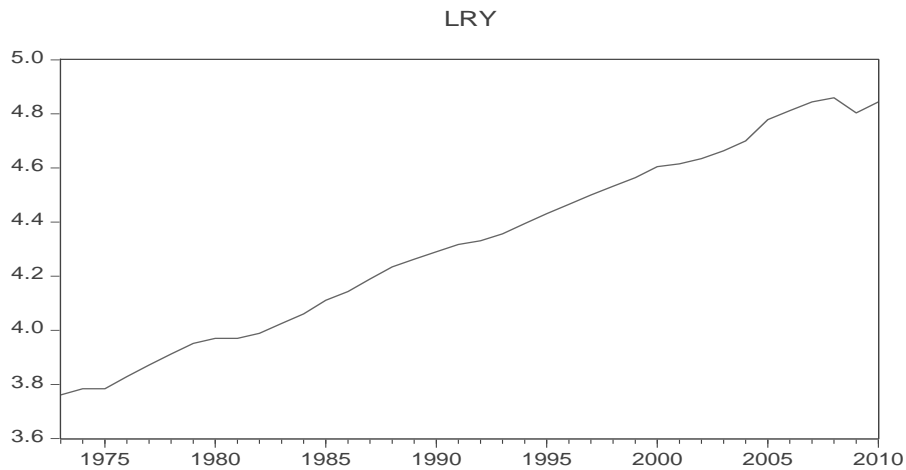
¹⁷In the current literature there is debate on the role of the real exchange rate in export performance. With a significant increase in Bangladesh's intermediate-goods trade over recent decades, the impact of the real exchange rate on its import flows has arguably diluted the impact of the real exchange rate on its export flows. ADB (2007:64) has developed this view: 'The depreciation (or appreciation) of a currency lowers (raises) the foreign-currency price of exports but also increases (reduces) the home-currency price of component imports. To the extent that import content costs rise (decline), this will offset any expansion in demand induced by depreciation (appreciation)'.

¹⁸Transformation of data in the first-order log-difference form and the use of one to three lagged terms have shortened the estimation period from 1973–2010 to 1975/1977–2010.

Table 4

Descriptive Statistics of the Data Series

	LREX	LRY	LREER
Mean	11.35	4.32	4.62
Median	11.43	4.32	4.60
Maximum	13.38	4.86	5.33
Minimum	8.97	3.76	4.43
Standard Deviation	1.35	0.35	0.16
Skewness	-0.16	-0.01	2.68
Kurtosis	1.82	1.75	12.31
Jarque-Bera	2.37	2.47	182.83
Probability	0.31	0.29	0.00

**Fig. 1a. Log of Real Export Earnings (Taka) (LREX)****Fig. 1b. Log of Export-weighted Foreign Real Income (Index) (LRY)**

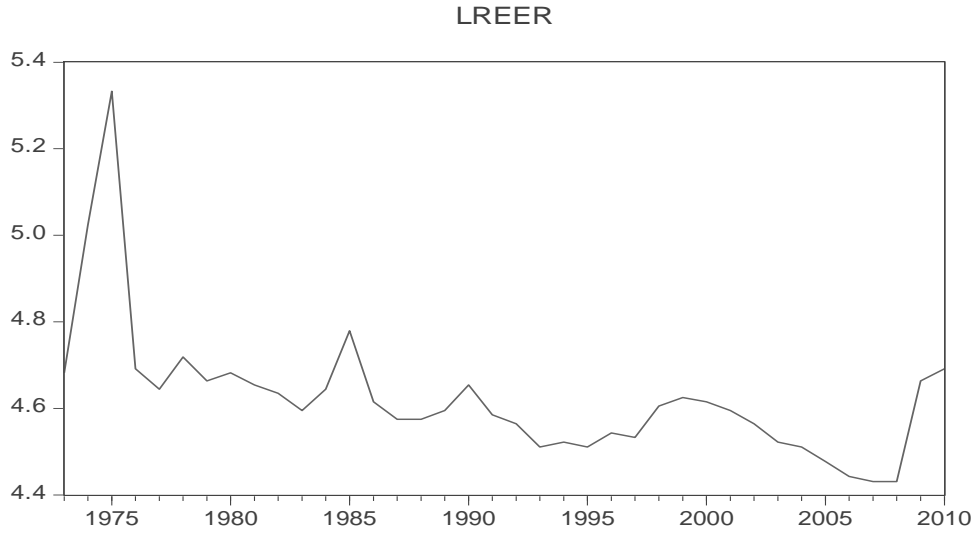


Fig. 1c. Log of the Real Effective Exchange Rate of the Taka (Index) (LREER)

VI. ESTIMATION AND RESULTS

This section deploys Pesaran's bounds-testing approach to cointegration¹⁹ to establish a long-run relationship between real exports, foreign real income and the real effective exchange rate of the taka. This approach to determining a cointegral relationship is appropriate for the present study for at least two reasons. First, Pesaran's bounds test does not require pre-testing of the time-series properties of variables in the regression, although such information could be useful for inference when the test results are inconclusive. Second, the results obtained by Pesaran's test are more robust for small samples than most alternatives, especially Johansen's multivariate cointegration tests.

The ARDL Bounds Testing Approach to Cointegration

The error-correction form of the auto-regressive distributed lag (ARDL) model in the variables of LREX, LRY and LREER is specified as follows:

$$\begin{aligned} \Delta LREX_t = & \alpha_0 + \alpha_1 T + \sum \beta_i \Delta LREX_{t-i} + \sum \gamma_i \Delta LRY_{t-i} + \sum \phi_i \Delta LREER_{t-i} \\ & + \delta_1 LREX_{t-1} + \delta_2 LRY_{t-1} + \delta_3 LREER_{t-1} + U_t \quad \dots \quad \dots \quad \dots \quad (2) \end{aligned}$$

where the coefficients β_i, γ_i and ϕ_i represent the short-run dynamics of the underlying variables in the ARDL model and the coefficients δ_i represent the long-run relationship. This specification is based on the maintained hypothesis that the time-series properties in the export-demand relationship in Bangladesh can be approximated by a log-linear VAR(p) model, augmented with intercept (α_0) and (probably) trend (T). Although in the specification the value of 'i' can be infinity, the model is estimated sequentially with one to three lag terms.²⁰

¹⁹See Pesaran and Shin (1996); Pesaran and Pesaran (2009); Pesaran and Smith (1998); and Pesaran, Shin, and Smith (2001).

²⁰Pesaran and Pesaran (1997) suggest that a lag length of one period can be a reasonable choice when the data frequency is annual.

Testing for the Hypothesis that $\delta_1 = \delta_2 = \delta_3 = 0$

Equation (2) is estimated first in a restricted form by excluding the level-form lagged variables and is then tested for the significance of the lagged level variables through a variable-addition test (F-test). The estimated F-statistic for the restriction that $\delta_1 = \delta_2 = \delta_3 = 0$ in the specification with *LREX* as dependent variable is denoted by $F(LREX | LRY, LREER)$, where, as defined above, *LRY* is the log of foreign real income and *LREER* is the log of the real effective exchange rate of the taka. This process is repeated for the specification with *LREER* or *LRY* as dependent variable. The estimated F-statistic for the restriction that $\delta_1 = \delta_2 = \delta_3 = 0$ in the latter specifications is denoted by $F(LRY | LREX, LREER)$ or $F(LREER | LREX, LRY)$. Finally, the estimated F-statistics are compared with the critical values to determine whether a long-run relationship exists between real exports, foreign real income and the real effective exchange rate of the taka. In addition, the estimated F-statistics can be used to draw infer whether any of these variables can be considered a long-run forcing variable in determining the others.

Table 5 reports the F-statistics produced when one, two and three lags are included in the specification. The model is estimated for two cases: with both intercept and trend (C,T) and with intercept only (C). The results are sensitive to the inclusion of trend in the specification for real exports as dependent variable. In the specification with both unrestricted intercept and unrestricted trend, the critical value band for $k=2$ is {4.205-5.109} and {4.903-5.872} at the 90 percent and 95 percent significance levels, respectively. In the specification with the intercept only, the critical value bands for $k=2$ are {3.182-4.126} and {3.793-4.855} at the 90 percent and 95 percent levels, respectively. The $F(LREX | LRY, LREER)$ statistic in the specification with or without trend is above the upper limit of the critical band with one-period lag, suggesting that the null hypothesis of no long-run relationship between *LREX*, *LRY* and *LREER* can be rejected at the 95 percent significance level. In the specification *LREER* as dependent variable (with trend), the statistic $F(LREER | LREX, LRY)$ again exceeds the upper bound of the band and therefore the null hypothesis of no long-run relationship between *LREER*, *LREX* and *LRY* is rejected. These results suggest that *LREER*, in particular, cannot be treated as a 'long-run' forcing variable for explanation of *LREX*. The results for *LRY* are sensitive to the inclusion of trend in the specification. Foreign real income can, however, be considered a long-run forcing variable in determining real exports or the real effective exchange rate of the taka.

Table 5

<i>Testing for the Long-run Relationship between LREX, LRY and LREER (F-test)</i>						
Lags	F-statistics		F-statistics		F-statistics	
	$\frac{F(LREX \hat{=} LRY^f; LREER)}{1975/1977-2010}$	$\frac{F(LREX \hat{=} LRY^f; LREER)}{1983-2010}$	$\frac{F(LRY^f \hat{=} LREX; LREER)}{1975/1977-2010}$	$\frac{F(LRY^f \hat{=} LREX; LREER)}{1983-2010}$	$\frac{F(LREER \hat{=} LREX; LRY^f)}{1975/1977-2010}$	$\frac{F(LREER \hat{=} LREX; LRY^f)}{1983-2010}$
With Constant						
1	6.03	3.24	2.98	1.17	7.43	4.04
2	2.07	3.64	2.12	1.5	18.38	1.04
3	3.3	4.8	1.29	1.47	2.55	2.51
With Constant and Trend						
1	7.65	3.17	7.52	5.16	7.31	4.06
2	1.46	2.87	1.98	0.56	16.31	1.07
3	3.15	4.53	1.25	0.99	2.1	1.81

Source: Pesaran and Pesaran (2009).

Note: The critical value bounds of the F-statistic for $k = 2$ with constant are {3.182 to 4.126} and {3.793 to 4.855} at 90 percent and 95 percent confidence respectively and those for $k = 2$ with constant and trend are {4.205 to 5.109} and {4.903 to 5.872} at 90 percent and 95 percent confidence respectively.

Testing for the Hypothesis that $\delta_1 = 0$

To complement the Wald test results for the joint hypothesis, the presence of a long-run relationship among *LREX*, *LRY* and *LREER* can be examined via a t-test using the specified error-correction model (2). This can be done by testing for the significance of the coefficient on one-period lagged dependent variable, $LREX_{t-1}$.²¹ Pesaran, Shin and Smith (2001) have provided the lower and upper bound critical values for this statistic. Table 6 reports the test results, which weakly support the presence of a long-run relationship among *LREX*, *LRY* and *LREER*.

Table 6

<i>Testing for the Long-run Relationship between LREX, LRY and LREER (t-test)</i>		
Lags	Coefficient on $LREX_{t-1}$ (t-statistics are in Parentheses)	
	(1975/1977-2010)	(1983-2010)
With Constant		
1	-0.40(-2.30)	-0.66(-2.75)
2	-0.31(-1.92)	-0.59(-3.01)
3	-0.42(-2.91)	-0.65(-3.57)
With Constant and Trend		
1	-0.69(-3.24)	-0.73(-2.73)
2	-0.35(-1.65)	-0.61(-2.61)
3	-0.46(-2.44)	-0.56(-2.26)

Note: The critical value bounds of the t-statistic with constant are $\{-2.57 \text{ to } -3.21\}$ and $\{-2.86 \text{ to } -3.53\}$ at 90 percent and 95 percent confidence respectively and those with constant and trend are $\{-3.13 \text{ to } -3.63\}$ and $\{-3.41 \text{ to } -3.95\}$ at 90 percent and 95 percent confidence respectively [Pesaran, Shin, and Smith (2001)].

Estimating Coefficients of the Long-run Relationship

The second stage of the ARDL modelling involves estimating coefficients of the long-run relations and inferring their values. In general, in estimating long-run coefficients, the ARDL technique estimates $(p+1)^k$ number of regressions to obtain the optimal lag-length for each variable, where p is the maximum number of lags and k is the number of variables in the equation. This paper uses the *Schwarz Bayesian Criterion* (SBC) to select the optimal order of lag.

Table 7 reports the estimated coefficients on foreign real income and the real effective exchange rate with real exports as the dependent variable. The export-demand equation has been estimated with three lag terms in the variables and no time trend. The model is also estimated for two sample periods: 1975/1977-2010 and 1983-2010. Table 8 reports the error-correction models associated with the estimated long-run relationships for the sample periods: 1977-2010 and 1983-2010.

²¹Banerjee, Dolado and Mestre (1998) also suggest that the presence of a long-run relationship can be examined via the t-statistic on the coefficient on the lagged dependent variable.

Table 7

<i>Long-run Coefficients on Foreign Income and the Real Effective Exchange Rate</i>		
	Model: ARDL (1,0,0) (1977-2010)	Model: ARDL (1,0,0) (1983-2010)
Regressors	Coefficient (t-ratio)	Coefficient (t-ratio)
Intercept	3.70 (0.60)	-1.54(-0.54)
LRY ^f	3.44 (12.04)	3.45 (23.12)
LREER	-1.47 (-1.34)	-0.37 (-0.71)
The Wald test:		
H ₀ : Coefficient on LRY ^f = 0	c ² ₍₁₎ = 144.89	c ₂₍₁₎ = 534.31
H ₀ : Coefficient on LRY ^f = 1	c ² ₍₁₎ = 72.84	c ₂₍₁₎ = 269.52
H ₀ : Coefficient on LREER = 0	c ₂₍₁₎ = 1.79	c ₂₍₁₎ = 0.50
H ₀ : Coefficient on LREER = 1	c ₂₍₁₎ = 5.06	c ₂₍₁₎ = 6.83

In the estimated model for the complete or shorter sample period, the coefficient on foreign real income bears a positive sign and is significant at the 5 percent level. The Wald test rejects the proposition of unit elasticity of foreign real income. The estimated income elasticity for the post-reform period 1983-2010 is 3.45, which is significantly greater than one. The coefficient of the real effective exchange rate bears a negative sign but is not statistically significant. The overall results suggest that Bangladesh's exports are highly income-elastic but price-inelastic.

The error-correction model (associated with the long-run export demand relationship) suggests that real export growth is sensitive to changes in the real exchange rate but not the growth rate of foreign real income. Quibria (1997) notes that in the early years of trade liberalisation, Bangladesh maintained a competitive real exchange rate through monetary and fiscal policy discipline. In addition, although the nominal exchange rate was pegged to the US dollar, it was adjusted frequently to avoid creating an overvalued currency originating from relatively high and volatile inflation. Together with exchange-rate adjustment, import tariffs were reduced. The liberalised import policy lowered the incentive structure for the production of import-substitutes. The resultant reduction in anti-export policy bias led to an increase in the production of exportables. A negative coefficient on the real effective exchange rate is consistent with the theory behind real-exchange-rate-based trade liberalisation. In a recent study, ADB (2007) has suggested that in a country where primary and manufactured goods dominate the export trade, such exports are sensitive to the real exchange rate. Exports of labour-intensive manufactured products and primary commodity exports (which use domestic raw materials) are more sensitive to the real exchange rate. The short-term impact of changes in the real exchange rate on export growth is consistent with this interpretation. It is, however, not clear why Bangladesh's exports, which are now dominated by import-dependent manufacturing products, would show short-term sensitivity to changes in the real exchange rate.

Table 8

Error-correction Model of Real Exports

Regressors	Model: ARDL (1,1,1) (1976-2010)	Model: ARDL (1,0,0) (1983-2010)
	Coefficient (t-ratio)	Coefficient (t-ratio)
DLY ^f	-0.71 (-0.66)	1.98 (3.01)
DLREER	-0.96 (-3.15)	-0.87 (-2.69)
Error-correction Term (-1)	-0.31 (-2.18)	-0.58 (-3.21)
The Wald test:		
H ₀ : Coefficient on D LY = 0	$c^2_{(1)} = 0.44$	$c2_{(1)} = 0.38$
H ₀ : Coefficient on D LREER = 0	$c^2_{(1)} = 9.87$	$c2_{(1)} = 8.51$
H ₀ : Coefficient on Error-correction Term (-1) = 0	$c^2_{(1)} = 4.76$	$c2_{(1)} = 12.59$

Figure 3 reports the actual and fitted values of the growth of real exports as estimated by the error-correction model. The model fits the data well. In particular, the predicted growth of real exports closely matches their recorded growth.

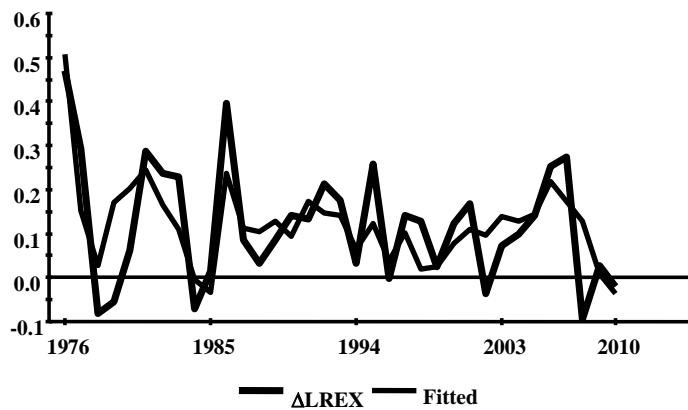


Fig. 3. Plot of Actual and Fitted Values of Δ LREX

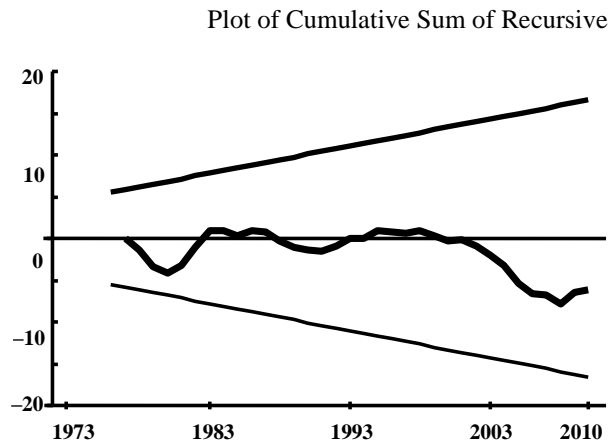
VII. STRUCTURAL CHANGE IN THE EXPORT-DEMAND FUNCTION

Pesaran's bounds-test results suggest that foreign real income and the real effective exchange rate of the taka are the key determinants of real export earnings in Bangladesh. Stock and Watson (2007) suggest that structural changes in parameter values can take place due to changes in economic policy regimes; economic transformation associated with economic growth; and inventions and innovations that affect different sectors of the economy differently or at different rates. This section examines whether the export-demand function was stable over the sample period of study.

The CUSUM and CUSUMSQ Tests

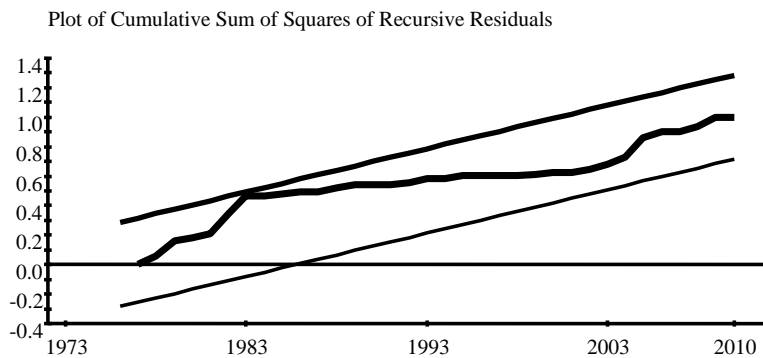
The stability of the export-demand function can be analysed formally by conducting the CUSUM and CUSUM of squares of residuals tests. In doing so, the

export-demand equation is estimated by OLS over the sample period 1973–2010. The plotted CUSUM and CUSUMSQ Figures (4a to 4b) do not show parameter-or variance instability. The paper earlier noted that, from the late 1980s to the late 1990s, gradual trade reform in Bangladesh raised its level of export orientation and brought structural change in export composition. However, this did not cause instability in the export-demand function. To examine further the possibility of any sharp break in the export-demand relationship, the Quandt-Andrews unknown-breakpoint test is conducted. The test results suggest a break in the export-demand relationship in 1992 (Table 9). This breakpoint coincides with rapid trade reforms during the early years of the BNP government that came to power in 1991.



The straight lines represent critical bounds at 5 percent significance level.

Fig. 4a. The CUSUM Test



The straight lines represent critical bounds at 5 percent significance level.

Fig. 4b. The CUSUM of Squares Test

Table 9

The Quandt-Andrews Unknown Breakpoint Test

Statistic	Value	Prob.
Maximum LR F-statistic (1992)	4.38	0.08
Exp LR F-statistic	1.49	0.04
Average LR F-Statistic	2.6	0.01

Notes: 1. Null hypothesis: no breakpoints within 10 percent trimmed data.

2. Varying regressors: All equation variables.

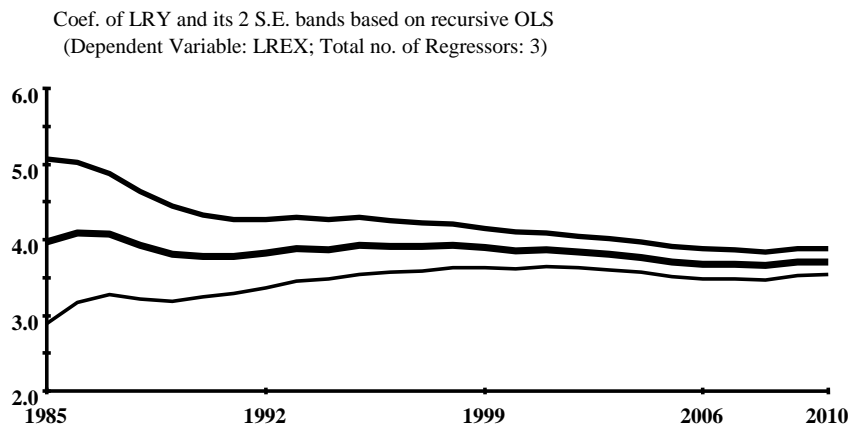
3. Test sample: 1977-2007.

4. Number of breaks compared: 31.

Recursive and Rolling Regression Results

Any sharp or rapid structural change in the export-demand function can be observed by estimating the equation for a base sample period and then estimating sequentially by adding one or more observations. This is the recursive approach to estimating a long-run relationship for different sub-samples on a sequential basis. Estimating an export-demand relationship by this approach may reveal smooth or abrupt changes in parameter values during shocks and reforms. By releasing earlier observations and including new observations to keep the sample size fixed, the rolling regression technique provides information on changes in parameter values in a double-logarithmic model.

Figures 5 to 6 plot the recursive and rolling regression coefficients in the export-demand function. The sample size for the rolling regression is 25. The estimated recursive coefficients show that the income elasticity of demand for exports remains relatively stable while the (absolute) value of export elasticity with respect to the real exchange rate has been decreasing since the early 2000s. The rolling regression results suggest that the real exchange rate has become insignificant in the export-demand function since the 2000s. Foreign income elasticity of demand for exports, however, remains significantly greater than one.



Coef. of LREER and its 2 S.E. bands based on recursive OLS
 (Dependent Variable: LREX; Total no. of Regressors: 3)

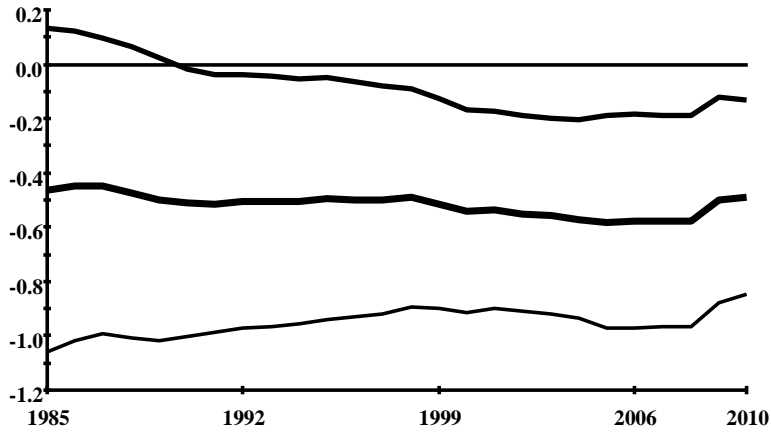
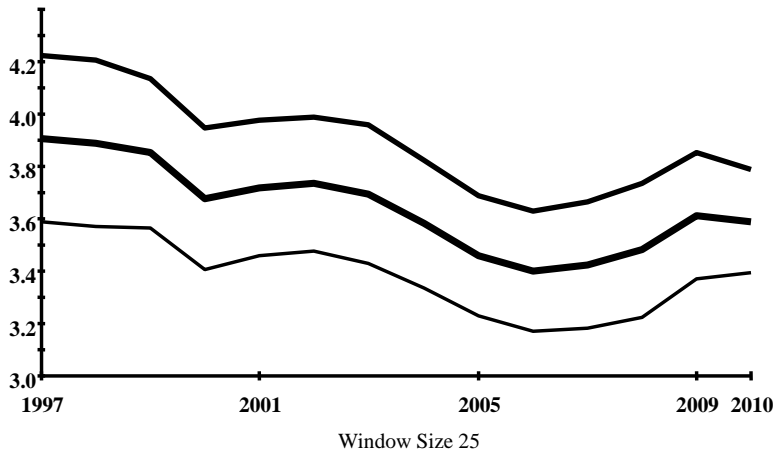


Fig. 5. Recursive Coefficients

Coefficient of LRY and its two*S.E. bands based on rolling OLS
 (Dependent Variable: LREX; Total no. of Regressors: 3)



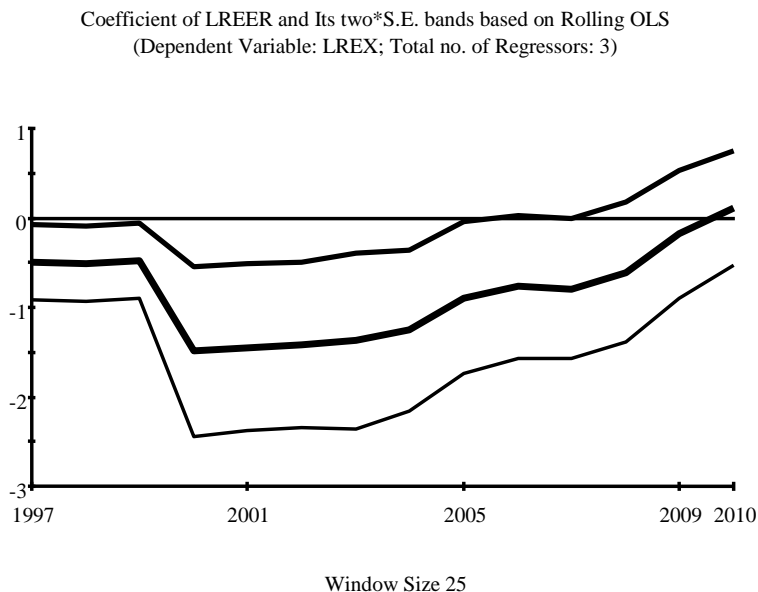


Fig. 6. Rolling Regression Coefficients

VIII. SUMMARY AND CONCLUDING REMARKS

In the mid-1980s, Bangladesh began implementing trade-reform policies, which led to slow but steady softening of its anti-export-policy bias. Since then the share of exports in GDP in Bangladesh has steadily increased and its economy has grown at about 5 percent per annum. Such economic growth has been associated with a structural change in export composition in favour of non-traditional exports, namely garments and frozen foods. This paper has specified an aggregate export-demand function, deployed Pesaran's bounds-testing approach to estimate exports' elasticities of foreign income and exchange rate and tested for its stability. The empirical results (based on annual data for the period 1973–2010) suggest that in Bangladesh, there exists a long-run relationship between real exports, export-weighted foreign real income and the real effective exchange rate of the taka and that the dynamic behaviour of exports has an error-correction representation. The CUSUM and CUSUMSQ tests suggest no significant instability in the export-demand function. However the recursive and rolling regression coefficients indicate that the export-demand function has undergone some structural change since the early 1990s, which is reflected in the decreasing sensitivity of real exports with respect to the exchange rate.

The empirical results reported have some implications for the export trade. Since the mid-1980s there has been significant structural change in the composition of Bangladesh's exports. Manufacturing products have become more dominant in the export basket. Generally, both primary and manufactured exports are sensitive to changes in the

real exchange rate. However, as the ADB (2007) study has suggested, with the rise in the export share of manufacturing products with high import content, the sensitivity of exports with respect to the real exchange rate may decrease. Although Bangladesh's exports remain sensitive to changes in the real exchange rate, the rolling regression results suggest that the sensitivity of exports with respect to the real exchange rate was not significantly different from zero in recent years. To the extent that the growth of real exports is sensitive to changes in the real exchange rate, an exchange rate policy under a managed floating system can be used to avoid exchange-rate misalignment. This objective can be achieved through fiscal and monetary policy discipline and adjustment of the nominal exchange rate to shocks to the economy.

The empirical results suggest that foreign income remains the major determinant of Bangladesh's exports. While the growth of foreign real income remains the key factor in the country's rapid export growth, there is some scope for promotion of non-traditional exports with low import-content that may have remained sensitive to the real exchange rate. Unlike most countries of East Asia, Bangladesh has an advantage in labour-intensive non-traditional products given its low real wages. The experience gained in the garment export industry remains useful to other labour-intensive industries. As all successful economies of East Asia have done since the beginning of the 1960s, Bangladesh can, and should, use this situation to its advantage [Rhee (1990)].

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