

Impacts of Trade Liberalization on Exports: Bangladesh Experience

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Abstract: This article analyses and explains the impacts of trade liberalization on exports in Bangladesh. A number of empirical studies suggest that there exists positive relationship between trade liberalization and export performance. In case of Bangladesh it is observed that the TGR of exports in the pre-liberalization regime i.e. from 1972-1973 to 1989-1990 is 8.81 per cent while the same is 11.90 per cent in the post-liberalization period i.e. from 1990-1991 to 2009-2010. The TGR for the whole study period i.e. from 1972-1973 to 2009-2010 is estimated as 11.56 per cent. It indicates that the growth rates of exports are higher in the post-liberalization period. On the other hand, it is observed that the CAGR of exports in the pre-liberalization regime i.e. from 1972-1973 to 1989-1990 is 8.54 while the same is 11.88 per cent in the post-liberalization period i.e. from 1990-1991 to 2009-2010. The CAGR for the whole study period i.e. from 1972-1973 to 2009-2010 is estimated as 10.63 per cent. It can be concluded that trade reforms or trade liberalization in Bangladesh has positive impact on exports in Bangladesh. Chow Breakpoint test indicates that there is a structural change in exports of Bangladesh. The price elasticity of export supply is estimated at 0.25, the income elasticity of export supply is estimated at 0.50 and the gross fixed capital formation elasticity of export supply is estimated at 0.73. The estimated coefficient of liberalization dummy is very low (0.16) which is insignificant meaning that liberalization of trade has not significant impact on the export supply performance of Bangladesh. Therefore, the policy makers should be more cautious in designing the trade policy reforms in Bangladesh for reaping the full benefit of trade liberalization. The relative price of real export is negatively related to the demand of real export as expected and the relationship is statistically significant at 5 per cent level meaning that relative price is an important determinant of export demand.

Key Words: Trade Liberalization, TGR, CAGR, Chow Breakpoint, Price Elasticity of Exports, Structural Change.

Introduction:

The positive impact of trade liberalization export and growth is supported by a number of studies such as Little, Scitovsky and Scott (1970), Balassa (1971, 1982), Bhagwati (1978), Kruger (1978), Athukorala (1997), Ahmed (2001). A number of other studies show no or little link between trade performance and trade liberalization such as UNCTAD(1989), Agosin (1991), Clarke and Krikpatrick (1992), Greenway and Sapford (1994), Jenkins(1996). Bangladesh export trade is well responded with

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the intervention of trade liberalization programs. The average growth rate of export was about 7.07 per cent during the period from 1973-1974 to 1977-1978. GDP growth rate registered about 7.5 per cent which was slightly higher than export growth during the FFYP. During the SFYP export growth was achieved at around 5.0 per cent. In the TFYP and FFYP periods, export grew at an average rate of 11.27 per cent and 18.18 per cent respectively. The major export items are ready-made garments, knitwear, frozen foods, leather and leather products, jute and jute products, tea, ceramics, textile fabrics, home textiles, light engineering products including bicycles, handicraft and agro-based products. The higher growth rate of export was contributed by sharp increase of some non-traditional export items in the export basket such as Ready-Made Garments, Frozen Food, Specialized Textiles, Fertilizer etc. However, exports as a percentage of GDP were about 6.0 per cent and 9.0 per cent during these two plan periods. During the period from 1995-96 to 1999-2000 export grew continuously at an average growth rate of about 10.73 per cent while GDP growth rate was posted at about 5.27 per cent. Export as a percentage of GDP increased to 14.22 per cent. On the other hand, export as a source of import financing increased substantially. It was about 35.22 per cent in the FFYP and 30.37 per cent in the SFYP, while the rate was 58.0 per cent in the FFYP. In 1999-2000 export earnings was about 70 per cent of total import payments. This article analyses and explains the impacts of trade liberalization on exports in Bangladesh.

Review of Literature

The impact of trade liberalization on trade performance in Bangladesh is still a relatively less researched area. Some studies examined the degree of trade liberalization in the context of Bangladesh economy². There have been no systematic and in-depth studies to examine the overall impact of trade liberalization on trade performance of Bangladesh. There are some relevant studies which have been carried out for other countries. The existing literatures, related to this study, are briefly reviewed in this section.

Reza (1981) analyses the chronic trade deficit of Bangladesh arguing that the export base and export earnings are persistently very low over a long span of time. He finds out the performance of export sub-sector is very

² Remarkable studies include: Ahmed(1999, 2001), Rahman(1992), Mahmood, Rahman and Hasan(1991), Dean, Desai and Ridel(1994), Hossain(1997), Alam(1995), Bayes, Hossain and Rahman(1995), World Bank(1996), Yilmaz and Varma(1994), Kabir (1988), Raihan (2007), Rimi, Aziz and Kakoly(2009).

poor because of heavy concentration on few traditional items like raw jute, jute goods, tea, fish, leathers etc. Analyzing the trade figures from 1950 to 1978 he tries to show the problems and prospect of this sub-sector. He also focuses the employment potential and income distribution implications of export-oriented strategy of development. He also suggests for export-led growth strategy instead of import substitution growth strategy as a policy option³.

A. R. Bhuyan (1982) examines the prospect of non-traditional exports focusing on the imports of machinery and industrial raw materials. He shows that the demands for non-traditional items have been growing and there remains scope for modernization and expansion of this sub-sector⁴. He does not give details about the transformation and diversification of non-traditional exports. The policy reforms for improvement of exports have not been focused in this study.

Kabir (1988) estimated the aggregate import and export demand functions of Bangladesh using time series data for a sample period from 1973 to 1983. In his study, he chooses domestic price, foreign price, foreign exchange reserve, exchange rate as explanatory variables. He estimates the price elasticity and income elasticity of our exports and imports but he does not analyse the growth trend of export and imports and the impact of trade reforms⁵. The trade policy or reforms and its impact on the export performance have been ignored in this study.

Mahmood (1982) explains the possibilities of the export led growth in Bangladesh. He argues that a country like Bangladesh can achieve high standards of living only through industrialization and expansion of trade in manufacturing. Citing examples of South Korea, Taiwan, Singapore, Hong Kong he mentions that Bangladesh should avoid import substitution industries and move to manufactured export because the demand for manufactured exports are more stable compared to traditional products. He argues that traditional exports suffer from supply inelasticity in the world market⁶. His study does not include the trade reforms and its impact on trade performance.

³ Sadrel Reza, *The Export Trade of Bangladesh 1950-1978* (Dhaka: University of Dhaka, 1981).

⁴ A. R. Bhuyan, *Non-Traditional Exports of Bangladesh: Trends, Performance and Prospects* (Dhaka: Bureau of Economic Research, University of Dhaka, 1982).

⁵ R. Kabir, "Estimating Import & Export Demand Functions: The Case of Bangladesh", *The Bangladesh Development Studies*, Vol. 16, No. 4 (Dhaka: BIDS, 1988).

⁶ Wahiduddin Mahmood, "Possibilities of Export-led Growth in Bangladesh", *The Bangladesh Journal of Political Economy*, Vol. 6, No. 1 (Dhaka: 1982).

Talukdar (1983) analyses the diversification of export with reference to Ready Made Garments (RMG). He points out that Bangladesh has comparative advantage in RMG because of cheap labour. He opines that export earnings could be enhanced through promotion of RMG. This study places more weights on RMG export. But other developing countries have been enjoying comparative advantage in RMG. So, in order to face global challenges Bangladesh should diversify export base⁷.

Roy (1991) analyses the determinants of export performance of Bangladesh using an econometric analysis. He examines the causal relationship of the determining factors and export performance for Bangladesh. His study finds that the export performance of Bangladesh is associated with greater commodity diversification of exports. He shows that commodity exports have been diversified more over the years. Liberalization of trade and industrial policies has important consequences for the composition of exports as well as growth and stability⁸. But this study does not specifically cover the relationship between impact of trade liberalization and trade performance.

Raihan (2007) analyzed the dynamics of trade liberalization in Bangladesh⁹ in the context of policies and practices by using modern tools of economic analysis. He reviewed theoretical evidences between trade liberalization and economic growth, trade liberalization policies and programs in Bangladesh. He conducted a time-series evaluation of Bangladesh's trade liberalization in a changing perspective and in a global perspective, a dynamic panel econometric study on Bangladesh manufacturing industries, Short-run vs. Long-run Macro impacts of trade liberalization: an inter-temporal computable general equilibrium (CGE) model of Bangladesh. He has attempted to investigate the 'Trade Liberalization--Growth Nexus' in the context of the manufacturing industries in Bangladesh and to explore the alternative options for the future direction of trade policy reform in Bangladesh.

Ahmed (2001) analyzes the trends and impact of trade liberalization in Bangladesh. He examines the impact of trade liberalization on import demand, export supply, industrial growth of Bangladesh using modern

⁷ Md. Serajul Islam Talukdar, "Scope for the Diversification of Export Trade in Bangladesh with Special Reference to Ready Made Garments", Bank Parikrama, Vol. 8, Nos. 3, 4 (Dhaka: BIBM, 1983).

⁸ Dilip Kumar Roy, "Determinants of Export Performance of Bangladesh", The Bangladesh Development Studies, BIDS, Vol. 19, No. 4 (Dhaka: BIDS, 1991).

⁹ Selim Raihan, Dynamics of Trade Liberalisation in Bangladesh: Analyses of Policies and Practices (Dhaka: Pathak Shamabesh, 2007).

time series method of co-integration and error correction modeling. In analyzing Bangladesh experience with trade liberalization he addresses a number of key issues such as nature and policy instruments of trade liberalization, the degree of trade liberalization, impact of trade liberalization on import demand, export supply, industrial growth and government revenue, and external constraints faced by Bangladesh. He finds that both at aggregate and commodity level the import is generally less sensitive to import price changes whereas export both at aggregate and commodity level are sensitive to real exchange rate and relative prices. Bangladesh export supply is found as price inelastic at both levels. Using ECM he finds that trade liberalization has significant role in improving the trade performance of Bangladesh¹⁰.

Abedin (2004) analyses the policy measures taken by the Government of Bangladesh in the mid-1980s as the process of globalization. He discusses the origin, implementation process and effects of Structural Adjustment Programs as part of globalization process. He mentions that it has come into implementation since 1991 and the SAP has been partially successful in removing balance of payment problems, keeping inflation rate at reasonable rates, reducing budget deficits, promoting GDP growth rates and raising the growth rates of both exports and imports¹¹. He uses times series data for selected macro economic variables and draws clear comparison between pre-SAP and post-SAP situations.

Datt (2004) defines globalization as the process of integrating all economies of the world so that there is free movement of goods, services, technology, capital and even cross border movement of labour. Globalization has four parameters such as (i) reduction of trade barriers, (ii) free flow of capital, (iii) free flow of technology, (iv) free movement of labour. He explains that the impact of globalization on Indian economy by showing its share in world exports raises from 0.54 per cent in 1990 to 0.67 per cent in 1999. Indian imports increases from 8.3 per cent of GDP in 1991-1992 to 12.3 per cent in 1995-1996¹².

¹⁰ Nasiruddin Ahmed, Trade Liberalization in Bangladesh: An Investigation into Trends (Dhaka: The University Press Limited, 2001).

¹¹ M. Zainul Abedin, "Structural Adjustment programs in Bangladesh: Their Origin, Implementations and Effects", Economic Globalisation-Social Conflicts, Labour and Environmental Issues, ed. by Clem Tisdell and Raj Kumer Sen (UK: Cheltenham, Edward Elgar), 2004, pp. 227-243.

¹² Ruddar Datt, "Globalisation, the WTO and its Impact on India: A Developing Country Perspective", Economic Globalisation-Social Conflicts, Labour and Environmental Issues, ed. by Clem Tisdell and Raj Kumer Sen (UK: Cheltenham, Edward Elgar), 2004, pp. 106-123.

Hossain and Alauddin (2005) examined the process of Bangladesh's trade liberalization and its impact on the growth and structure of exports, imports, GDP and other relevant macroeconomic variables with particular emphasis on exports¹³. This study provides an updated account of the various structural adjustment programs undertaken in Bangladesh including trade, fiscal, industrial and financial reforms, and explains how these reforms supplemented one another to promote greater market and export orientation. Various Indicators of trade liberalization show a substantial shift of the Bangladesh external trade regime and the resultant reduction in anti-export bias.

Rimi, Aziz and Kakoly¹⁴ empirically examined the export-led growth hypothesis on Bangladesh using co-integration and multivariate Granger Causality technique. The study findings support the export-led growth hypothesis that there are strong bi-directional causality between export growth and economic growth in Bangladesh. The bi-variables model with GDP as dependent variable and export as independent variable and the multivariate model with GDP as dependent variable and export and import as independent variables provides the similar result. They suggested for promoting exports to enhance the economic growth of Bangladesh.

Exports of Bangladesh

Exports of Bangladesh in the pre-liberalization (1972-1989) and post-liberalization (1990-2010) regimes are shown in the Table 1:

¹³ Mohammad A. Hossain and Mohammad Alauddin, "Trade Liberalization in Bangladesh: The Process and Its Impact on Macro Variables Particularly Export Expansion", *Journal of Developing Areas*, Vol. 39(1), 2005.

¹⁴ Tamanna Afreen Rimi, Ahmed Tariq Aziz, and Israt Jahan Kakoly, "Export-Led Growth (ELG) Hypothesis: An Empirical Investigation on Bangladesh", *BISS Journal*. vol. 30(3). (Dhaka: BISS, 2009), pp. 335-350.

Table 1 Export of Bangladesh

Regime	Year	Export (Million US\$)	Growth Rate ¹⁵ (%)	5-yearly Moving Average Growth Rate ¹⁶ (%)	Export as % of GDP(%)
	1972-1973	348.42	-	-	4.22
Pre-liberalization	1973-1974	371.76	6.70	-	3.33
	1974-1975	382.68	2.94	3.73	2.79
	1975-1976	380.47	-0.58	7.41	4.47
	1976-1977	417.01	9.60	11.14	6.75
	1977-1978	493.74	18.40	14.77	5.15
	1978-1979	618.82	25.33	13.83	5.16
	1979-1980	749.44	21.11	9.55	5.81
	1980-1981	709.85	-5.28	7.81	5.72
	1981-1982	625.89	-11.83	6.36	5.49
	1982-1983	686.60	9.70	5.19	6.45
	1983-1984	810.99	18.12	3.78	5.86
	1984-1985	934.43	15.22	12.36	6.05
	1985-1986	819.21	-12.33	13.35	5.88
	1986-1987	1073.77	31.07	10.71	5.68
	1987-1988	1231.2	14.66	11.26	6.20
	1988-1989	1291.56	4.90	16.27	6.24
	1989-1990	1523.71	17.97	13.27	6.63
Post-liberalization	1990-1991	1717.55	12.72	14.24	5.49
	1991-1992	1993.92	16.09	14.53	6.35
	1992-1993	2382.89	19.51	18.34	7.39
	1993-1994	2533.9	6.34	18.16	7.46
	1994-1995	3472.57	37.04	17.70	9.13
	1995-1996	3882.42	11.80	17.16	9.54
	1996-1997	4418.28	13.80	16.48	10.41
	1997-1998	5161.2	16.81	10.73	11.70
	1998-1999	5312.86	2.94	10.85	11.60
	1999-2000	5752.2	8.27	6.60	12.16
	2000-2001	6467.30	12.43	5.12	13.76
	2001-2002	5986.09	-7.44	7.75	12.58
	2002-2003	6548.44	9.39	8.86	12.61
	2003-2004	7602.99	16.10	10.70	13.46
	2004-2005	8654.52	13.83	15.33	14.33
	2005-2006	10526.16	21.63	16.62	15.06
	2006-2007	12177.86	15.69	15.47	16.88
	2007-2008	14110.80	15.87	13.52	15.92
	2008-2009	15565.19	10.31	-	18.42
	2009-2010	16204.65	4.11	-	19.45

Source: Source: EPB, Export Statistics (various issues), IMF, International Financial Statistics (various issues), GOB, Bangladesh Economic Review (various issues).

In 1972-1973 the export figure was only 348 million US\$. It has been increased over the years with fluctuations in the trend. It reached to 1523.71 million US\$ in 1989-1990 - the highest figure in the pre-liberalization period. The export was US\$ 1717 million in 1990-1991

¹⁵ Growth Rate = $[(X_t - X_{t-1}) / X_{t-1}] \times 100$

¹⁶ 5-yearly Moving Average = $(Y_1 + Y_2 + Y_3 + Y_4 + Y_5) / 5$, $(Y_2 + Y_3 + Y_4 + Y_5 + Y_6) / 5$ and so on.

which sharply rose to 3472.57 million US\$ in 1994-1995 with 37.04 per cent growth rate. The export growth was very impressive except few exceptions. The export grew to 6467.30 million US\$ in 2000-2001 with 12.43% growth rate. The year 2005-2006 can be marked as an important year for our foreign trade as export reached to 10526.16 million US\$ i.e. one billion US\$ export is achieved for the first time. After that the export continued to grow even in the situation of global economic slowdown. In 2006-2007 the export was US\$ 12177.86 million with the growth rate of 15.69 per cent. The export rose to US\$ 15565.19 million in 2008-2009 from 14110.80 million US\$ in 2007-2008. The export grew at 4.11 per cent and reached to 16204.65 million US\$ in 2009-2010.

Exports as percentage of GDP were very low at single digit figures throughout the entire pre-liberalization period. It was 4.22 per cent in 1972-1973, 2.79 per cent 1974-1975, 6.45 per cent in 1984-1985 and 6.63 per cent in 1989-1990. On the other hand, it was about 7.46 per cent in 1993-1994, 9.54 per cent in 1995-1996, 10.41 per cent in 1996-1997, 13.46 per cent in 2003-2004, 15.06 per cent in 2005-2006 and 19.45 per cent 2009-2010. Therefore, the export as percentage of GDP substantially increased in the post-liberalization period. The 5-yearly moving average growth rates of exports were 3.73 per cent in 1974-1975, 11.14 per cent 1976-1977, 13.83 per cent in 1977-1978, 3.78 per cent 1983-1984, 12.36 per cent in 1984-1985, 16.27 per cent in 1988-1989 and 13.27 per cent in 1989-1990 in pre-liberalization period. Compared to the pre-liberalization period the 5-yearly moving average growth rates of export were higher in post-liberalization period. It was 14.24 per cent in 1990-1991, 18.16 per cent in 1993-1994, 17.16 per cent in 1995-1996. The lowest rates were observed in 2000-2001 (5.12 per cent) and 2002-2003 (8.86 per cent). The 5-yearly moving average growth rates of exports were 15.33 per cent in 2004-2005 and 13.52 per cent in 2007-2008.

Trade Performance and Trade Liberalization

Export Propensity, Import Penetration and Trade Openness

The trade performance of a country can be evaluated by the Export Propensity, Import Penetration and Trade Ratio or Trade Openness. The three indicators are calculated for both pre-liberalization and post-liberalization regimes. The estimates are presented in Table-2.

Table 01: Export Propensity, Import Penetration and Trade Openness

Regime	Year	Export Propensity [(X / Y) x100]	Import Penetration [M / (Y+M-X)] x100	Export as % of Import	Trade Openness [(X+M) / Y] x100
Pre-liberalization	1973-1974	3.33	9.16	40.19	13.08
	1974-1975	2.79	7.35	27.28	10.46
	1975-1976	4.47	13.33	29.84	20.46
	1976-1977	6.75	10.27	47.66	17.42
	1977-1978	5.15	12.06	36.60	18.16
	1978-1979	5.16	12.34	39.77	18.51
	1979-1980	5.81	14.87	54.62	22.26
	1980-1981	5.72	15.14	28.02	22.55
	1981-1982	5.49	16.17	24.33	23.72
	1982-1983	6.45	15.57	29.74	23.70
	1983-1984	5.86	14.10	34.47	21.32
	1984-1985	6.05	13.59	35.30	20.82
	1985-1986	5.88	12.75	34.65	19.63
	1986-1987	5.68	12.47	40.98	19.11
	1987-1988	6.20	13.03	41.23	20.26
	1988-1989	6.24	13.66	38.27	21.07
Post-liberalization	1989-1990	6.63	13.91	40.53	21.72
	1990-1991	5.49	10.60	49.50	16.69
	1991-1992	6.35	10.73	57.58	17.60
	1992-1993	7.39	12.06	59.78	20.09
	1993-1994	7.46	11.80	59.62	19.84
	1994-1995	9.13	14.48	59.52	24.51
	1995-1996	9.54	15.74	55.89	26.44
	1996-1997	10.41	15.87	61.69	27.31
	1997-1998	11.70	16.21	68.60	28.78
	1998-1999	11.60	16.54	66.26	29.12
	1999-2000	12.16	16.82	68.45	29.93
	2000-2001	13.76	18.72	69.28	33.63
	2001-2002	12.58	17.02	70.09	30.54
	2002-2003	12.61	17.55	67.80	31.22
	2003-2004	13.46	18.23	69.73	32.76
	2004-2005	14.33	20.27	65.83	36.11
	2005-2006	15.06	21.92	71.38	38.90
	2006-2007	16.88	23.37	70.98	42.22
	2007-2008	15.92	24.56	65.24	43.30

Notes: X = Export, M= Import, Y = GDP

Source: Estimated from Appendix Table A .

The export propensity is ranged from the lowest 2.79% in 1974-1975 to the highest 6.76% in 1976-1977 in the pre-liberalization regime while it is ranged from the lowest 5.49% in 1990-1991 to the highest 16.88% in 2006-2007 in the post-liberalization regime. The import penetration is ranged from the lowest 7.35% in 1974-1975 to the highest 16.17% in 1981-1982 in the pre-liberalization regime while it is ranged from the

lowest 10.60% in 1990-1991 to the highest 24.56% in 2007-2008 in the post-liberalization regime. The trade openness is ranged from the lowest 10.46% in 1974-1975 to the highest 23.72% in 1981-1982 in the pre-liberalization regime while it is ranged from the lowest 16.69% in 1990-1991 to the highest 43.30% in 2007-2008 in the post-liberalization regime. Export as percentage of import has substantially increased during the post-liberalization period. The lowest value was achieved as 24.33% in 1981-1982. It reaches as high as 71.38% in 2005-2006. The trend growth rate (TGR) of export propensity, import penetration and trade openness of Bangladesh during the pre-liberalization and post-liberalization regimes are presented in Table 3.

Table 02: TGR of Export Propensity, Import Penetration and Trade Openness

Period	Export Propensity (%)	Import Penetration (%)	Trade Openness (%)
Pre-Liberalization	3.25	2.22	2.43
Post-Liberalization	5.87	4.50	5.13
Overall	4.29	1.92	2.63

Note:

1. $TGR = [\text{Anti-log of estimated } b - 1] \times 100$, L means natural logarithm
2. The estimated coefficients are highly significant since the p-value of the estimated coefficients are found 0.000 except Trade Openness Coefficient in Pre-liberalization period (0.013).

Source: Table 2

The trend growth rate of export propensity is found 3.25 per cent during the pre-liberalization period which has significantly increased to 5.87 per cent during post-liberalization period. The trend growth rate of import penetration is found higher in the post-liberalization period (4.50%) as compared to the pre-liberalization period (2.22%). The trend growth rate of trade openness of Bangladesh is found more than double in post-liberalization period (5.13%) as compared to the pre-liberalization period (2.43%). The overall trend growth rates of export propensity, import penetration and trade openness are found 4.29 per cent, 1.92 per cent and 2.63 per cent respectively. It can be concluded that export propensity, import penetration and trade openness of Bangladesh has significantly increased in the post-liberalization period.

Growth Trend of Exports

The trend growth rate (TGR) and compound annual growth rate (CAGR) of exports are estimated separately for the pre-liberalization and post-liberalization regimes as well for the entire study period from 1972-1973 to 2009-2010. The estimates are presented in the Table 4. It is observed

that the TGR of exports in the pre-liberalization regime i.e. from 1972-1973 to 1989-1990 is 8.81 per cent while the same is 11.90 per cent in the post-liberalization period i.e. from 1990-1991 to 2009-2010. The TGR for the whole study period i.e. from 1972-1973 to 2009-2010 is estimated as 11.56 per cent. It indicates that the growth rates of exports are higher in the post-liberalization period.

On the other hand, it is observed from Table 4 that the CAGR of exports in the pre-liberalization regime i.e. from 1972-1973 to 1989-1990 is 8.54 while the same is 11.88 per cent in the post-liberalization period i.e. from 1990-1991 to 2009-2010. The CAGR for the whole study period i.e. from 1972-1973 to 2009-2010 is estimated as 10.63 per cent. It can be concluded that trade reforms or trade liberalization in Bangladesh has positive impact on exports in Bangladesh.

Table 3: Trend of Growth Rates and Compound Annual Growth Rates for Exports

Period	Export Propensity (%)	Import Penetration (%)	Trade Openness (%)
Pre-Liberalization	3.25	2.22	2.43
Post-Liberalization	5.87	4.50	5.13
Overall	4.29	1.92	2.63

Note:

1. TGR = [Anti-log of estimated $b - 1$] X 100, L means natural logarithm

2. CAGR = [Ending Value/Beginning Value]^{1/N - 1}

Source: Estimated from Table 1.

Test of Hypothesis

Using t-test the following hypothesis is tested whether trade liberalization has positive impact on export growth in Bangladesh.

H⁰: There is no change in export growth between pre and post trade liberalization regimes.

H¹: There is significant positive change in export growth between pre and post trade liberalization regimes.

The t-test is performed on the basis of trend regression of the pre-liberalization and post-liberalization periods.

$$t_{37df} = (b_1 - b_2) / \sqrt{(se_{b_1})^2 + (se_{b_2})^2}$$

Here, b_1 = slope coefficient of time variable in the pre-liberalization period, b_2 = slope coefficient of time variable in the post-liberalization period, se = standard error of slope coefficient. Now by putting the values

in the formula the t-statistic is computed as:

$$t_{37df} = (0.037 - 0.049) / \sqrt{(0.002)^2 + (0.002)^2} = -4.26$$

Decision: The table value of t-statistic at 37 degree of freedom is 1.65 and the absolute value of calculated t-statistic is 4.26. Since the calculated value is higher than the critical t-value so the null hypothesis H_0 is rejected and the alternative hypothesis H_1 is accepted at 5 per cent significance level implying that the export is significantly increased in the post-liberalization regime.

Chow Breakpoint Test

The structural change in export of Bangladesh to the liberalization of trade is tested by Chow Test using the F-test :

$$F = \frac{(RSS - (RSS1 + RSS2)/k)}{(RSS1 + RSS2)/(n^1 + n^2 - 2k)}$$

Table 5 Chow Breakpoint Test: 1989

Test	Test Statistics	P-value
F-statistic	14.86	0.000
Log likelihood ratio	23.86	0.000

Chow Breakpoint test is conducted based on 1989-90 and it is found that F-statistic is greater than F critical value at 2, 34 degree of freedom and the p-value 0,000 indicates that the null hypothesis H_0 of structural stability is rejected. Therefore, it can be concluded that there is a structural change in exports of Bangladesh. The growth trends of export and import are presented in Figures 6.1 and 6.2 for pre-liberalization period and post-liberalization period respectively.

Figure 1 Growth Trend of Export and Import in Pre-Liberalization Regime

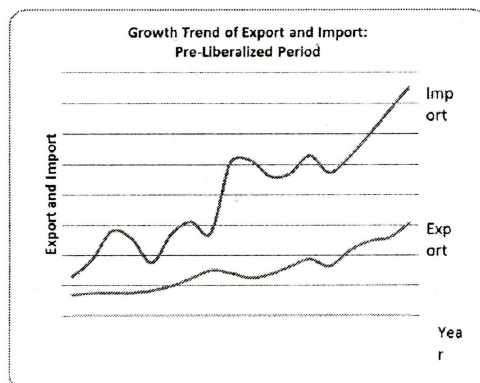
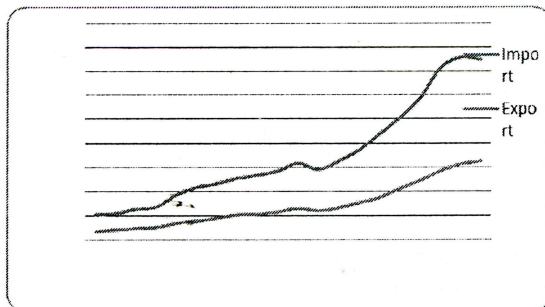


Figure 2 Growth Trend of Export and Import in Post-Liberalization Regime



Instability of Exports

The instability is measured separately by using Coppock's Instability Index (CII) for pre-liberalization period and post-liberalization period. The CII is also measured for the overall study period. The estimate results are shown in the following table. It is evident from the value of CII that the exports of Bangladesh in pre-liberalization period is more instable as compared to post-liberalization period as expected. The CII is computed as 11.56% for the pre-liberalization period and 7.76% for the post-liberalization period. The overall CII is 10.00% for the study period (Table 6).

Table 6 Instability of Exports

Period	Coppock Instability Index(CII) in %
Pre-liberalized 1972-1973 to 1989-1990	11.56
Post-liberalized 1990-1991 to 2009-2010	7.76
Overall 1972-1973 to 2009-2010	10.00

Note: CII = [Anti-log ? log variance- 1] X 100.

Source: Estimated from Table 1.

Growth Trend of Major Export Commodities

The growth trend of major commodities such RMG, Tea, Leather, Frozen Foods, Jute Manufacture, Raw Jute and Pharmaceuticals etc. are estimated. A comparison between the growth rates of RMG and Non-RMG exports as well as Primary and Manufactured exports are also estimated. The structural stability is tested by 'Chow Break point Test'.

Growth Trend of RMG and Non-RMG Exports

The Trend Growth Rates and the Compound Annual Growth Rates for Exports of RMG and Non-RMG Commodities are shown in Table 7.

Table 7 Trend Growth Rates and Compound Annual Growth Rates for Exports of RMG and Non-RMG Commodities

Period	Estimated Trend Regression	TGR ¹ (%)	CAGR ² (%)
Pre-liberalization	LNRMG = 6.22 + 0.042T	4.27	5.63
1976-1977 to 1989-1990	LRMG = -3.86 + 0.834T	130.27	112.13
Post-liberalization	LNRMG = 5.53 + 0.076T	7.89	7.64
1990-1991 to 2009-2010	LRMG = -5.12 + 0.130T	13.91	14.27
Overall	LNRMG = 6.07 + 0.02T	5.65	6.63
1976-1977 to 2009-2010	LRMG = -0.037 + 0.055T	40.21	48.86

Note:

1. $TGR = [\text{Anti-log of estimated } b - 1] \times 100$
2. log means natural logarithm
3. $CAGR = [\text{Ending Value/Beginning Value}]^{1/N} - 1$

Source: Researcher's Own Calculation.

The trend growth rate of RMG in the pre-liberalization regime is 130.27 per cent while the same is 13.91 per cent in the post-liberalization regime. The trend growth of RMG export for the entire study period is 40.21 per cent. The trend growth rate of non-RMG exports was 4.27 per cent in the pre-liberalization regime and 7.89 per cent in the post-liberalization regime. The trend growth of non-RMG export for the entire study period was 5.65 per cent.

Chow Breakpoint Test for RMG Export

The structural change in export of RMG and Non-RMG due to the liberalization of trade is tested by Chow Test (Table 8).

Table 8 Chow Breakpoint Test for RMG: 1989

Test	Test Statistics	P-value
F-statistic	205.18	0.000
Log likelihood ratio	91.33	0.000

The critical value of F at 2 and 30 degree of freedom (Fdf 2, 30) is 19.5 at 5% and 99.5 at 1% level of significance. Since the calculated value of F equals to 205.18 is greater than the critical values of F at both 5% and 1% level of significance, the null hypothesis of no structural change is rejected. It can be concluded that there is presence of statistically significance structural breakpoint in the exports of RMG between pre-liberalization and post-liberalization periods.

Chow Breakpoint Test for Non-RMG Export

The Chow test is also conducted for exports of Non-RMG commodities by using the same procedure and the calculated F is found as 9.78 and p value is 0.000 (Table 9).

Table 9 Chow Breakpoint Test for Non-RMG: 1989

Test	Test Statistics	P-value
F-statistic	9.78	0.000
Log likelihood ratio	17.07	0.000

The calculated F-statistic is greater than the critical value of F at 2, 30 degree of freedom (Fdf 2, 30) is at both 5% and 1% level of significance. Since the calculated value of F is greater than the critical values of F at both 5% and 1% level of significance, the null hypothesis of no structural change is rejected. So it can be concluded that there is also structural breakpoint in the exports of Non-RMG.

Growth Trend of Primary and Manufactured Exports

The Trend Growth Rates for Exports of Primary and Manufactured Commodities are shown in Table 10.

Table 10 Trend Growth Rates for Exports of Primary and Manufactured Commodities

Period	Estimated Trend Regression	TGR ¹ (%)
Pre-liberalization 1972-1973 to 1989-1990	LPEX = 4.90 + 0.053T	5.41
	LMEX = 5.16 + 0.099T	10.45
Post-liberalization 1990-1991 to 2009-2010	LPEX = 4.68 + 0.054T	5.59
	LMEX = 5.18 + 0.119T	12.58
Overall 1972-1973 to 2009-2010	LPEX = 4.94 + 0.046T	4.70
	LMEX = 4.97 + 0.124T	13.20

Note: TGR = [Anti-log of estimated b - 1] X 100

Source: Researcher's Own Calculation.

The trend growth rate of export of primary commodities was 5.41 per cent in the pre-liberalization regime while the same was 5.59 per cent in the post-liberalization regime. The trend growth of export of manufactured commodities was 10.45 per cent in the pre-liberalization period and the same was 12.58 per cent in the post-liberalization period. The trend growth of export of primary commodities for the entire study period was 4.70 per cent while the trend growth rate of the export of manufactured commodities was 13.20 per cent. Therefore, it can be concluded that the export of manufactured commodities increased in the post-liberalization period as compared to the export of primary commodities.

Chow Breakpoint Test for Export of Primary Commodities

The structural stability of the export of primary commodities is tested by chow breakpoint test (Table 11).

Table 11 Chow Breakpoint Test for Export of Primary Commodities: 1989

F-statistic	2.089972	Prob. F(2,34)	0.139297
Log likelihood ratio	4.406096	Prob. Chi-Square(2)	0.110466

The test result confirms that there exists no structural breakpoint in the series of exports of primary commodities from Bangladesh during the study period. Since the F-statistic is 2.089 which is lower than the F-critical value and it is also confirmed by the p-value equals to 0.139 which is greater than any level of significance.

Chow Breakpoint Test for Export of Manufactured Commodities

The structural stability of the export of manufactured commodities is tested by chow breakpoint test (Table 12).

Table 12 Chow Breakpoint Test for Export of Manufactured Commodities: 1989

F-statistic	11.04789	Prob. F(2,34)	0.000201
Log likelihood ratio	19.02660	Prob. Chi-Square(2)	0.000074

The test result confirms that there exists structural breakpoint in 1989 in the series of exports of manufactured commodities from Bangladesh during the study period. Since the F-statistic is 11.04 which is higher than the F-critical value and it is also confirmed by the p-value equals to 0.000 which is lower than any level of significance (?).

Growth Trend of Exports of Selected Commodities.

The growth trend of exports of selected commodities such as leather, jute goods, frozen foods and pharmaceuticals are presented in Table 13.

¹⁷ Tea, Leather, Jute Goods, Frozen Foods and Pharmaceuticals.

Table 13 Growth Trend of Exports of Selected Commodities :¹⁷ 1972 - 2010

Period \ Exports	Estimated Trend Equations		
	Pre-liberalization 1972-1989	Post-liberalization 1990-2010	Overall 1972-2010
Tea	TEA= 2.97 + 0.057T	LTEA=5.70 - 0.093T	LTEA=3.76- 0.025T
	TGR ¹ (%) = 5.85	TGR ¹ (%) = (-) 9.69	TGR ¹ (%) = (-) 2.51
Leather	LLHR=2.91 + 0.122T	LLHR=4.57+ 0.025T	LLHR=3.46- 0.065T
	TGR ¹ (%) = 13.02	TGR ¹ (%) = 2.53	TGR ¹ (%) = 6.66
Jute Manufactures	LJMF=5.29 + 0.034T	LJMF=5.48+ .0075T	LJMF= 5.51 + .007T
	TGR ¹ (%) = 3.46	TGR ¹ (%) = 0.75	TGR ¹ (%) = 0.78
Raw Jute	LJMF= 4.83 - .0080T	LJMF=3.53+ .0365T	LJMF= 4.71 - .002T
	TGR ¹ (%) = (-) 0.81	TGR ¹ (%) = 3.72	TGR ¹ (%) = (-) 0.28
Frozen Foods	LTEA=1.34 + .0235T	LTEA= 4.00 + .06T	LFF= 2.39 + .0119T
	TGR ¹ (%) = 26.48	TGR ¹ (%) = 6.29	TGR ¹ (%) = 12.64
Pharmaceuticals	LPHAR=3.00+ 0.048T	LPHAR=3.89+ .21T	LPHAR=4.31+ .21T
	TGR ¹ (%) = 4.89	TGR ¹ (%) = 22.88	TGR ¹ (%) =23.74

Note:

1. TGR = [Anti-log of estimated b - 1] X 100
2. Log means natural logarithm

Source: Researcher's own calculation.

Market Concentration of Bangladesh Exports

The export of Bangladesh is not only concentrated by products but also by destination. More than 50 per cent of total export is gone to only five countries such as the USA, the UK, Germany, France and Belgium. Here the growth trend of country wise export and the share of total export are analyzed. The share of exports to the above mentioned five countries in total exports is shown in Table 6.14.

Table 14 Share of Exports of Five Countries in Total Exports.

Year	Total Export (in Mn US\$)	Exports to Five Countries (in Mn US\$)	Share in Total Exports (%)
1972-1973	348.42	140.21	40.20
1977-1978	493.74	136.61	27.70
1982-1983	686.60	161.12	23.50
1987-1988	1231.20	559.48	45.40
1992-1993	2382.89	1432.64	60.10
1997-1998	5161.20	3459.28	67.00
2002-2003	6548.44	4462.11	68.10
2007-2008	14110.80	8580.92	60.80
2008-2009	15565.19	9263.82	59.50

Source: Researcher's Own Calculation.

The share of exports of five countries was 40.20 per cent in 1972-1973, 27.70 per cent in 1977-1978, 23.50 per cent in 1982-1983, 45.40 per cent in 1987-1988 during the pre-liberalization regime. On the other hand, the share of exports of the same five countries was 60.10 in 1992-1993, 67.00 per cent in 1997-1998, 68.10 per cent in 2002-2003, 60.80 per cent in 2007-2008 and 59.50 per cent in 2008-2009 during the post-liberalization regime. It is evident that the export of Bangladesh is heavily concentrated in the five markets.

The trend growth rates of exports to major destination is presented in Table 15. The TGR of exports to the USA was 12.84 per cent in the pre-liberalization period and 10.69 per cent in the post-liberalization period. The TGR of exports to the UK was 6.50 per cent in the pre-liberalization period and 13.66 per cent in the post-liberalization period. The TGR of exports to the Germany was 14.3 per cent in the pre-liberalization period and 16.15 per cent in the post-liberalization period.

Table 15 Trend Growth Rates of Exports to Major Destination.

Country	Period	Estimated Trend Equation	TGR ¹
USA	Pre-liberalization	$3.57 + 0.121T$	12.84
	Post-liberalization	$4.61 + 0.102T$	10.69
	Overall	$3.49 + 0.138T$	14.87
UK	Pre-liberalization	$3.11 + 0.063T$	6.50
	Post-liberalization	$2.66 + 0.128T$	13.66
	Overall	$2.59 + 0.127T$	13.57
Germany	Pre-liberalization	$1.38 + 0.135T$	14.39
	Post-liberalization	$2.27 + 0.149T$	16.16
	Overall	$0.99 + 0.190T$	20.95
France	Pre-liberalization	$1.59 + 0.071T$	7.34
	Post-liberalization	$2.40 + 0.123T$	13.07
	Overall	$0.87 + 0.169T$	18.57
Belgium	Pre-liberalization	$2.45 + 0.121T$	9.09
	Post-liberalization	$2.61 + 0.098T$	10.31
	Overall	$2.30 + 0.108T$	11.35
Total Five Countries	Pre-liberalization	$1.37 + 0.209T$	23.23
	Post-liberalization	$0.56 + 0.004T$	0.41
	Overall	$1.42 + 0.325T$	38.40

Note: TGR = [Anti-log of estimated b - 1] X 100

Source: Researcher's Own Calculation.

The TGR of exports to the France was 7.34 per cent in the pre-liberalization period and 13.07 per cent in the post-liberalization period. The TGR of exports to the Belgium was 9.09 per cent in the pre-liberalization period and 10.31 per cent in the post-liberalization period. The overall trend growth of exports to the five countries was 38.40 per cent.

The degree of market concentration of Bangladesh's export is measured

by Herfindhal and Finger-Kreinin market concentration indices is presented in Table 6.16. The higher the value of the index, the high the degree of concentration. The concentration is based on exports to five countries.

Table 16 Market Concentration of Bangladesh Export

Year	Herfindhal (H) Index	Finger -Kreinin(FK) Index
1972-1973	0.162	0.101
1977-1978	*0.076	0.038
1982-1983	0.055	0.017
1987-1988	0.206	0.127
1992-1993	0.361	0.201
1997-1998	0.449	0.235
2002-2003	0.464	0.241
2007-2008	0.369	0.204
2008-2009	0.354	0.198

Note:

Source: Estimated from Table 11.

$$\text{Note: } H = \sum_{a=1}^n \left(\frac{BXa}{BXW} \right)^2 ; 0 < H < 1$$

$$FK = \sum_{a=1}^n \left(\frac{BXa}{BXW} - \frac{1}{n} \right)^2 / 2 ; 0 < FK < 1$$

Source: Estimated from Table 11.

Here H represents Herfindhal Index and FK represents Finger-Krenin Index. BXa means Bangladesh export to country 'a' while BXW means Bangladesh export to the world. Both the indices are constructed based on Bangladesh exports to major five countries. The Herfindhal Index is 0.162 in 1972-1973 which becomes lower to 0.076 in 1977-1978 and 0.055 in 1982-1983. The index has jumped to 0.206 in 1987-1988 and it has been on increasing trend becoming 0.464 in 2002-2003. The Herfindhal Index based on five countries has become slightly lower in recent years such as 0.369 and 0.354 in 2007-2008 and 2008-2009 respectively. On the other hand the Finger-Krenin Index is estimated as 0.101 in 1972-1973, 0.038 in 1977-1978, 0.017 in 1982-1983, 0.127 in 1987-1988. It has sharply increased to 0.201 in 1992-1993, to 0.235 in 1997-1998, to 0.241 in 2002-2003. The Finger-Krenin Index has declined slightly to 0.204 in 2007-2008 and 0.198 in 2008-2009. It is clearly seen in the Table 16 that market concentration has been increased in respect to the five countries concerned substantially during the post-liberalization period.

Econometric Approach of Model Estimation

The aggregate export demand model is specified as:

$$LRX_t = \beta_1 + \beta_2 LRPX_t + \beta_3 LWY_t + \beta_4 LIBD_t + \varepsilon_t, (\varepsilon_t \sim N(0, \sigma^2))$$

[LRX_t = Real Exports in log form, $LRPX_t$ = Relative Price of Exports in log form, LWY_t = World Income in log form, $LIBD_t$ = Liberalization Shift Dummy, ε_t = Error Term, β = Coefficients]

Test of Stationary of the Variables of Aggregate Export Demand Model

To check the Stationarity of the variables, except the liberalization dummy, Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests have been conducted both at levels and at the first difference of each variable of the Aggregate Export Demand Model of Bangladesh.

ADF Unit Root Test

Augmented Dickey-Fuller (ADF) test of the Aggregate Export Demand Model is shown in Table 17.

Table 17 ADF Unit Root Test of Export Demand Model

Variables	Level / First Difference	Intercept	Intercept and Trend	Conclusion
LRX	Level	-0.554 (0.986)	-2.859 (0.186)	I(1) and I(1) Non-stationary
	First Difference	-6.976 (0.000)	-6.971 (0.000)	I(0) and I(0) Stationary
LRPX	Level	-1.122 (0.696)	-3.690 (0.035)	I(1) and I(1) Non-Stationary
	First Difference	-8.591 (0.000)	-8.470 (0.000)	I(0) and I(0) Stationary
LRWY	Level	-4.080 (0.003)	-1.380 (0.849)	I(0) and I(1) Inconclusive
	First Difference	-5.195 (0.000)	-5.944 (0.000)	I(0) and I(0) Stationary

Note:

1. ADF test Critical Values for model with intercept: -3.62 for 1% level of significance, -2.94 for 5% level of significance and -2.61 for 10% level of significance.
2. ADF test Critical Values for model with intercept and trend: -4.23 for 1% level of significance, -3.54 for 5% level of significance and -3.20 for 10% level of significance.
3. Unit Root Tests are performed by Econometric Software E-Views 5.0.
4. Figures in Parenthesis show p-values.

It is observed from the above ADF test (Table 17) that most of the variables are non-stationary at the level for model with intercept and intercept and trend. But it is interesting to note that all the variables are I(0) i.e. stationary at the first difference for model with intercept and intercept and trend.

Co-integration Test

The Co-integration test conducted by maximum eigenvalue is shown in Table 18. The null hypothesis of 'no cointegrating relationship ($r = 0$)' is rejected at 5% level of significance. The other cases of null hypotheses are not rejected at any level. Therefore, it can be concluded that there is only one cointegrating vector at 5% level of significance.

Table 18 Johansen Co-integration Test Based on Maximum Eigenvalue

Trend assumption: Linear deterministic trend

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesis		Eigenvalue	Max-Eigen Statistics	0.05% Critical Value	p-value**
Null	Alternative				
$r^* = 0$	$r = 1$	0.496	24.70	24.14	0.042
$r \leq 1$	$r = 2$	0.338	14.88	17.79	0.130
$r \leq 2$	$r = 3$	0.228	9.32	11.22	0.105
$r \leq 3$	$r = 4$	0.001	0.43	4.12	0.864

Note: Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

The Co-integration test conducted by trace test is shown in Table 19. The null hypothesis of 'no cointegrating relationship ($r = 0$)' is rejected at 5% level of significance. The other cases of null hypothesis are not rejected at any level. Therefore, it can be concluded that there is only one cointegrating vector at 5% level of significance.

Table 19 Johansen Co-integration Test Based on Trace Test

Trend Assumption: Linear Deterministic Trend

Unrestricted Cointegration Rank Test (Trace)

Hypothesis		Eigenvalue	Trace Statistics	0.05% Critical Value	p-value**
Null	Alternative				
$r^* = 0$	$r = 1$	0.496	48.96	40.17	0.005
$r \leq 1$	$r = 2$	0.338	24.25	24.27	0.050
$r \leq 2$	$r = 3$	0.228	9.37	12.32	0.148
$r \leq 3$	$r = 4$	0.001	0.04	4.12	0.864

Note: Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Granger Causality Test of Export Demand

The casual relationship among the variables of the aggregate export demand model is presented in Table 6.33. It reveals that there is no casual

relationship between Real Export Demand (RX) and Relative Price of Export (RPX). There is no casual relationship between Real World Income (RWY) and Real Export Demand. Real World Income has granger cause to relative price of Export. Relative price has granger cause to liberalization.

Table 20 Granger Causality Test of the Aggregate Export Demand Model

Sl.	Null Hypothesis	F-Statistics	Probability
1	LOG(RPX) does not Granger Cause LOG(RX)	0.81225	0.45308
2	LOG(RX) does not Granger Cause LOG(RPX)	1.31245	0.28370
3	LOG(RWY) does not Granger Cause LOG(RX)	1.47351	0.24473
4	LOG(RX) does not Granger Cause LOG(RWY)	0.32837	0.72257
5	LIBD does not Granger Cause LOG(RX)	1.21910	0.30927
6	LOG(RX) does not Granger Cause LIBD	1.80791	0.18086
7	LOG(RWY) does not Granger Cause LOG(RPX)	4.15660	0.02516
8	LOG(RPX) does not Granger Cause LOG(RWY)	0.22468	0.80006
9	LIBD does not Granger Cause LOG(RPX)	1.71090	0.19733
10	LOG(RPX) does not Granger Cause LIBD	3.65275	0.03763
11	LIBD does not Granger Cause LOG(RWY)	0.79221	0.46180
12	LOG(RWY) does not Granger Cause LIBD	2.34717	0.11241

Note: Lag=2, Observation=35

Table 21 Direction of Causality Based on Granger Test

Null Hypothesis	Results	Conclusion
$H_0: 1$	Accepted	Relative Price of Export has no Granger cause to Real Export Demand.
$H_0: 2$	Accepted	Real Export Supply has no Granger cause to Relative Price of Export.
Direction of Causality		No casual relationship
$H_0: 3$	Accepted	Real World Income has no granger cause to Real Export Demand.
$H_0: 4$	Accepted	Real Export Demand has no Granger cause to Real World Income.
Direction of Causality		No casual relationship
$H_0: 5$	Accepted	Liberalization has no Granger cause to Real Export Demand
$H_0: 6$	Accepted	Real Export demand has no Granger cause to Liberalization
$H_0: 7$	Rejected	Real World Income has no Granger cause to Relative Price
$H_0: 8$	Accepted	Relative Price has no Granger cause to Real World Income
$H_0: 9$	Accepted	Liberalization has no Granger cause to Relative Price
$H_0: 10$	Rejected	Relative Price has Granger cause to Liberalization
$H_0: 11$	Accepted	Liberalization has no Granger cause to Real World Income
$H_0: 12$	Accepted	Real World Income has no Granger cause to Liberalization

Source: Researcher's Own Calculation.

Estimation of Export Demand Model by OLS

The export demand model is run by OLS method because all the variables are stationary at the first difference and they are cointegrated. The estimates are shown in Table 22.

$$LRX = -3.73 - 0.70LRPX + 1.53LRWY + 0.25LIBD$$

Table 22 Regression Results of Export Demand Model

Dependent Variable: LOG (RX)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.73	1.45	-2.58	0.015
LOG(RPX)	-0.70	0.32	-2.22	0.033
LOG(RWY)	1.53	0.32	4.78	0.000
LIBD	0.25	0.12	2.13	0.040
Test Statistics				
R-squared	0.95	Mean dependent var		3.23
Adjusted R-squared	0.94	S.D. dependent var		0.78
S.E. of regression	0.18	Akaike info criterion		-0.50
Sum squared resid	1.09	Schwarz criterion		-0.33
Log likelihood	13.51	F-statistic		226.19
Durbin-Watson stat	1.95	Prob(F-statistic)		0.000

All estimated coefficients are in expected sign and all are statistically significant (Table 6.35). The R² of the model is very high i.e. 0.95 and adjusted-R² is 0.94. It signifies that about 95 per cent variation in the dependent variable i.e. demand of real export (RX) is explained by the independent variables i.e. relative price of export demand (RPX), real income of the World (RWY) and Liberalization Dummy (LIBD). The DW statistic is high i.e. 1.95 and the F-statistics of the model is computed as 226.19. The mean of the dependent variable in logarithm is found as 3.23 and the standard deviation is 0.78. The relative price of real export is negatively related to the demand of real export as expected and the relationship is statistically significant at 5 per cent level meaning that relative price is an important determinant of export demand. The coefficient of real world income is positive meaning that the demand of real export has positively related with real world income and the relationship is statistically significant at 1 per cent level. The estimated coefficient of liberalization dummy is very low (0.25) but it is significant at 5 per cent level meaning that liberalization of trade has significant impact on the export demand performance of Bangladesh. So the policy makers should be more cautious in designing the trade policy reforms in Bangladesh for reaping the full benefit of trade liberalization.

The trend of Real Export, Real World Income and Relative price of Export is shown in Figures 6.6, 6.7 and 6.8. The real export demand has a smooth upward trend with some drifts. The world income has increasing trend with minor fluctuations. The relative price has declining trend.

Vector Error Correction Model for Export Demand Model

The estimated coefficients of VECM for aggregate export demand function is shown in Table 6.36. The short run elasticity of real export demand is -0.250 with respect to real export at one lag and it is statistically significant at 5 per cent. The short run elasticity of real export demand is -0.076 with respect to relative price at one lag and it is statistically significant. The short run elasticity of real export demand is -0.643 with respect to real world income at one lag but it is not statistically significant. The short run elasticity of real export demand is 0.232 with respect to liberalization dummy is 0.15 and it is statistically significant at 5 per cent level of significance.

Table 23 Vector Error Correction Model for Export Demand Model

Dependent Variable: ? Log (RX)

Method: Engle Granger Vector Error Correction

Repressors	Coefficients	T-statistics	Test Statistics	
C (Intercept)	0.092	1.59	R-squared	0.650
$\Delta \text{Log(RX)}(-1)$	-0.250	-0.89	Adj. R-squared	0.423
$\Delta \text{Log(RX)}(-2)$	-0.028	-0.11	Sum sq. resids	0.403
$\Delta \text{Log(RPX)}(-1)$	-0.076	-0.33	F-statistic	16.30
$\Delta \text{Log(RPX)}(-2)$	0.176	0.85	D.W.	1.55
$\Delta \text{Log(RWY)}(-1)$	-0.643	0.48	Ramsey RESET	0.045
$\Delta \text{Log(RWY)}(-2)$	0.397	0.327	HET	2.60
$\Delta \text{LIBD}(-1)$	0.150	2.45	Log likelihood	21.12
$\Delta \text{LIBD}(-2)$	-0.053	-0.539	Akaike AIC	-1.001
ECT(-1)	-0.18	-1.94	Schwarz SC	-0.558

Source: Estimated from Appendix Table A.

The ECT is found negative (-0.18) means that any short run disequilibrium of mode will be converged in the long run. However, the low magnitude of the coefficient indicates the slow speed of adjustment.

Vector Auto Regression Model for Aggregate Export Demand Model

The estimated coefficients of VAR for aggregate export demand function is shown in Table 6.37. The short run coefficient of real export demand is 0.622 with respect to its own value at one lag and it is statistically significant at 5 per cent. The short run coefficient of real export demand is -0.362 with respect to relative price at one lag and it is statistically significant at 5 per cent. The sign of the coefficient is consistent with the usual demand law. The coefficient of real export demand is 1.01 with respect to real World Income at one lag which is statistically significant

at 5 per cent level. The sign of this coefficient is consistent with law of income demand and it is greater than unity means the export demand is highly responsive with foreign income. The short run coefficient of real export demand is 0.095 with respect to liberalization dummy at one lag and it is statistically significant at 5 per cent.

Table 24 VAR Estimates Aggregate Export Demand Model

Dependent Variable: Log (RX)

Repressors	Coefficients	T-statistics	Test Statistics	
C (Intercept)	-1.94	-1.99	R-squared	0.605
Log(RX)(-1)	0.622	2.33	Adj. R-squared	0.366
Log(RX)(-2)	0.196	0.76	Sum sq. resids	0.403
Log(RPX)(-1)	-0.362	-0.15	F-statistic	376.30
Log(RPX)(-2)	-0.266	1.42	Log likelihood	44.01
Log(RWY)(-1)	1.01	0.80	Akaike AIC	-1.94
Log(RWY)(-2)	-0.464	-0.39	Schwarz SC	-1.54
LIBD(-1)	0.095	1.96	D.W.	1.75
LIBD(-2)	0.056	0.57	Ramsey RESET	0.032

Source: Estimated from Appendix Table A 1.1.

Short run and Long Run Elasticity of Aggregate Export Demand

The short run and long run elasticities are shown in Table 6.38. The long run price elasticity of export demand is estimated -0.58 while income elasticity is 1.63. The short run price elasticity and income elasticity are -0.36 and 1.01 respectively. The income elasticity of export found in other studies is 1.58 (Emran and Shilpi, 1996), 1.83 (Islam and Hasan, 2004), 4.19 (Ahmed, 2001). The income elasticity of this study is consistent with other studies except Ahmed's study. The price elasticity of export demand is -0.58 which is consistent with the estimates of other studies such as -0.72 (Emran and Shilpi, 1996), -0.77 (Ahmed, 2001).

Table 25 Long Run and Short Run Elasticity of Aggregate Export Demand

Dependent Variable: Log(RX)		
Variables	Short Run	Long Run
Log(RPX)	-0.36	-0.58
Log(RWY)	1.01	1.63
LIBD	-0.09	-0.152

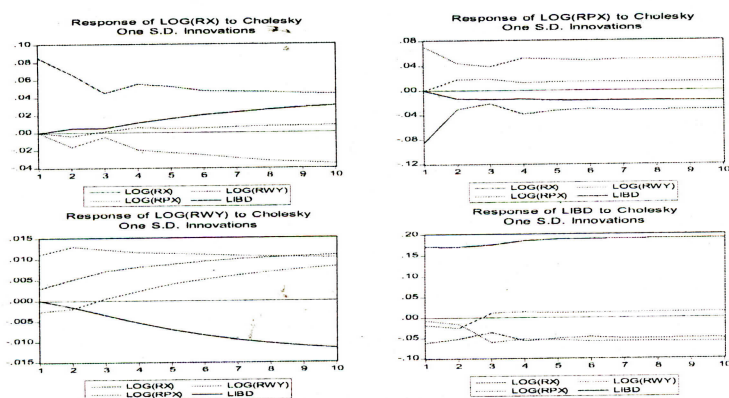
Source: Table 24.

Impulse Responses based on VECM Model

The impulse responses of the variables in VECM are presented in Figure 3. The impulse responses imply that the variables move 'too far away' from each other independently instead of moving together. The

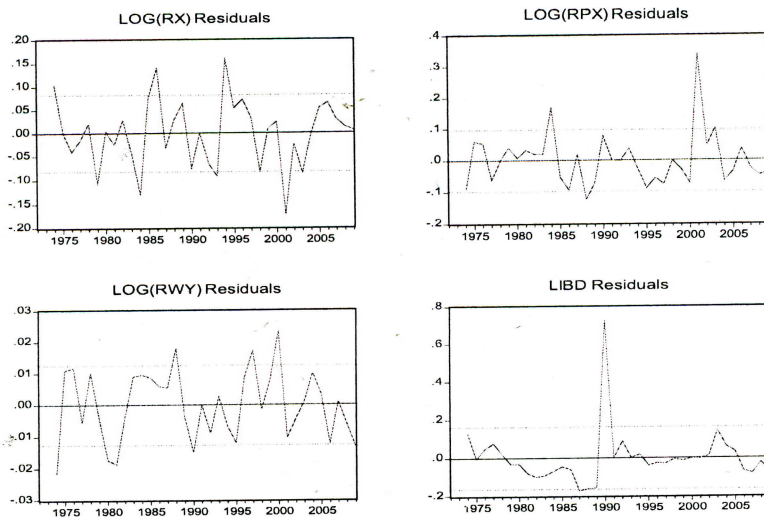
independent variables are responded with real export demand in a divergent way. The response of relative price to other variables is found uncorrelated and divergent. In case of real World Income other variables move independently. The response of liberalization dummy indicates that the variables move independently.

Figure 3 Impulse Responses of the Export Demand Model in VECM



Source: Estimated from Appendix Table A 1.1.

Figure 4 Residuals of Export Demand Model



Source: Estimated from Appendix Table A

Conclusion

This chapter analyses and explains the impacts of trade liberalization on exports in Bangladesh. It is observed that the TGR of exports in the pre-liberalization regime i.e. from 1972-1973 to 1989-1990 is 8.81 per cent while the same is 11.90 per cent in the post-liberalization period i.e. from 1990-1991 to 2009-2010. The TGR for the whole study period i.e. from 1972-1973 to 2009-2010 is estimated as 11.56 per cent. It indicates that the growth rates of exports are higher in the post-liberalization period. On the other hand, it is observed that the CAGR of exports in the pre-liberalization regime i.e. from 1972-1973 to 1989-1990 is 8.54 while the same is 11.88 per cent in the post-liberalization period i.e. from 1990-1991 to 2009-2010. The CAGR for the whole study period i.e. from 1972-1973 to 2009-2010 is estimated as 10.63 per cent. It can be concluded that trade reforms or trade liberalization in Bangladesh has positive impact on exports in Bangladesh. Chow Breakpoint test indicates that there is a structural change in exports of Bangladesh. It is evident from the value of Coppock Instability Index (CII) that the exports of Bangladesh in pre-liberalization period is more instable as compared to post-liberalization period as expected.

The price elasticity of export supply is estimated at 0.25, the income elasticity of export supply is estimated at 0.50 and the gross fixed capital formation elasticity of export supply is estimated at 0.73. The estimated coefficient of liberalization dummy is very low (0.16) which is insignificant meaning that liberalization of trade has not significant impact on the export supply performance of Bangladesh. Therefore, the policy makers should be more cautious in designing the trade policy reforms in Bangladesh for reaping the full benefit of trade liberalization. The relative price of real export is negatively related to the demand of real export as expected and the relationship is statistically significant at 5 per cent level meaning that relative price is an important determinant of export demand. The coefficient of real world income is positive meaning that the demand of real export has positively related with real world income and the relationship is statistically significant at 1 per cent level. The estimated coefficient of liberalization dummy is very low (0.25) but it is significant at 5 per cent level meaning that liberalization of trade has significant impact on the export demand performance of Bangladesh. The next chapter deals with the impacts of trade liberalization on trade balance.

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Appendix Table A

Export, Import, Real Export, Real GDP, Relative Price of Export Supply, Real Gross Capital Formation,
Real World Income, Relative price of Export Demand, Real Effective Exchange Rate of Bangladesh.

Year	Export (million US\$)	Import (million US\$)	RX (million US\$)	RGDP (million Taka)	RPXs (1995-96 = 1.00)	RGCF (million Taka)	RWY (1995- 96 = 100)	RPXd (1995- 96 = 1.00)	REER (1995-96 = 100)	LIBD
1972-73	348.42	650	74.46	19081	0.85	1140	50	1.74	90.00	0
1973-74	371.76	925	57.96	28993	1.15	2240	54	1.96	100.00	0
1974-75	382.68	1403	89.04	27808	1.10	5541	55	1.69	114.00	0
1975-76	380.47	1275	122.89	29382	1.25	4316	58	1.59	90.00	0
1976-77	417.01	875	163.75	30167	1.28	5104	61	1.61	101.00	0
1977-78	493.74	1349	155.51	32301	1.30	6443	63	1.6	138.00	0
1978-79	618.82	1556	159.86	33852	1.37	8106	66	1.68	156.00	0
1979-80	749.44	1372	158.82	34130	1.41	9028	68	1.86	137.00	0
1980-81	709.85	2533	212.08	35288	1.46	10603	69	2	146.00	0
1981-82	625.89	2572	268.61	35722	1.52	11825	70	1.51	155.00	0
1982-83	686.6	2309	337.44	37470	1.56	12783	72	1.34	170.00	0
1983-84	810.99	2353	315.15	39503	1.58	13431	75	1.22	178.00	0
1984-85	934.43	2647	319.76	40693	1.66	14714	78	1.2	172.00	0
1985-86	819.21	2364	475.17	42459	1.68	15601	81	1.36	145.00	0
1986-87	1073.77	2620	516.87	44234	1.69	16641	84	1.12	170.00	0
1987-88	1231.2	2986	534.25	45513	1.70	17998	87	1.13	155.00	0
1988-89	1291.56	3375	635.82	46661	1.72	19092	91	1.16	163.00	0
1989-90	1523.71	3759	722.29	49753	1.74	20431	93	1.11	162.00	0
1990-91	1717.55	3470	724.25	51444	1.78	21723	94	1.11	151.00	1
1991-92	1993.92	3463	879.87	53619	1.79	22031	95	1.05	179.00	1
1992-93	2382.89	3986	961.12	145568	1.85	23010	96	1.02	140.00	1
1993-94	2533.9	4250	1029.09	151514	1.81	25201	98	0.93	120.00	1
1994-95	3472.57	5834	1345.29	158976	1.84	27558	99	0.92	88.00	1
1995-96	3882.42	6947	1385.70	166324	1.00	30067	100	0.92	75.00	1
1996-97	4418.28	7162	1641.95	175285	1.86	33254	103	0.94	90.00	1
1997-98	5161.2	7524	1843.35	184448	1.92	36939	107	0.99	88.00	1
1998-99	5312.86	8018	1773.95	193429	1.93	41395	109	1.2	76.00	1
1999-00	5752.2	8403	2121.29	204928	1.95	45489	112	1.5	78.00	1
2000-01	6467.3	9335	2694.62	215735	1.98	48800	117	2.1	65.00	1
2001-02	5986.09	8540	2511.90	225261	2.10	51616	118	2.5	55.00	1
2002-03	6548.44	9658	2633.45	237101	2.15	55829	120	1.6	62.00	1
2003-04	7602.99	10903	3001.78	251968	2.30	60221	123	1.7	67.00	1
2004-05	8654.52	13147	3686.37	266975	2.38	65740	127	1.8	70.00	1
2005-06	10526.16	14746	4905.18	284673	2.45	72776	130	1.9	72.00	1
2006-07	12177.86	17157	6448.95	302971	2.25	78808	131	1.7	76.00	1
2007-08	14110.8	21629	5773.69	321726	2.20	85481	134	0.99	90.00	1
2008-09	15565.19	22507	6258.98	340197	2.34	87024	136	0.89	85.00	1

Source: IMF, *International Financial Statistics* (various issues); GOB, *Bangladesh Economic Review* (various issue); EPB, *Export Statistics* (various issues); Bangladesh Bank, *Economic Trends* (various issues).