FACTORS AFFECTING VOLATILITY OF BANGLADESH TRADE DEFICIT: AN ECONOMETRIC ANALYSIS

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Abstract

Bangladesh, one of the rising member countries of South Asia, passed a severe economic hardship during its post-independence period of 1970s till 1980s. Historically, Bangladesh inherited trade deficit from Pakistan legacy. Economic scenario, however, has had a distinct turnover in 1990s when share of export earnings from traditional items dragged down dramatically and that of non-traditional items grew apace. In parallel to export earnings, the import spending has also increased observing larger pace that worsens trade deficit volume and volatility as well. This study, thus, primarily endeavors to examine the trends in the trade deficit volume and volatility and also to identify the factors responsible for influencing that pattern. In so doing, the study employs two periods and examines, based on secondary data, the mean and standard deviations of trade deficit in two periods. The findings reveal that both mean and standard deviation have been increased by many-fold during the last 26 fiscal years starting from 1983/84. Consequently, these outcomes lead the economy to uncertainties that aggravate management of the production sector and overall macroeconomic policy-planning as well. The regression model shows that there have been three significant variables that influenced the foreign trade volume and volatility. These are the GDP, population number and the excise and duties for import. The study concludes with a recommendation of two policy initiatives in order to minimize the economic uncertainties. In so doing, government budget ought to be balanced and the import sector should be restricted to squeeze the import spending.

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1. INTRODUCTION

The balance of trade or net exports (sometimes symbolized as NX) is the difference between the monetary value of exports and imports in an economy over a certain period of time. A positive balance of trade is known as a trade surplus and consists of exporting more than is imported; a negative balance of trade is known as a trade deficit or informally, a trade gap. The balance of trade is sometimes divided into a goods and a services balance; especially in the OECD countries, the terms 'visible' and 'invisible' balance are used (Dopke, 2004). The balance of trade forms part of the current account, which also includes other transactions such as income from the international investment position as well as international aid. If the current account is in surplus, the country's net international asset position increases correspondingly. Equally, a deficit decreases the net international asset position. The trade balance is identical to the difference between a country's output and its domestic demand. This is, actually, the difference between what goods a country produces and the amount of goods it buys from abroad, but it does not include money re-spent on foreign stocks, nor does it factor the concept of importing goods to produce for the domestic market.

Measuring the balance of trade can be problematic because of problems with recording and collecting data. As an illustration of this problem, when official data for the entire world's countries are added up, exports exceed imports by a few percent; it appears the world is running a positive balance of trade with itself. This cannot be true, because all transactions involve an equal credit or debit in the account of each nation. The discrepancy is widely believed to be explained by transactions intended to launder money or evade taxes, smuggling and other visibility problems. The balance of trade is, however, likely to differ across the business cycle. In export-led growth (such as oil and early industrial goods), the balance of trade will improve during an economic expansion. However, with domestic demand-led growth (as in the United States and Australia) the trade balance will worsen at the same stage in the business cycle. Strong GDP growth economies such as the United States, the United Kingdom, Australia and Hong Kong run consistent trade deficits, as well as poorer countries also experiencing a lot of investment. Developed nations such as Canada, Japan, and Germany typically run trade surpluses. China also has a trade surplus that hit the record of $262 billion for 2007 (Macartney, 2008). A higher savings rate generally corresponds with a trade surplus. Correspondingly, the United States with its negative savings rate consistently has high trade deficits.

The relationship between economic growth and volatility is an issue where there is no consensus amongst researchers. Modern economists are particularly split on the economic impact of the trade deficit. On the one hand, some put forward that trade deficit is not significant. Those who defend this position refer to explanations of comparative advantage. Moreover, trade deficits have often been associated with international competitiveness. In fact, payments to foreigners have intergenerational

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effects: by shifting the consumption schedule over time, some generations may gain and others lose (Bivens 2004). However, a trade deficit may incur consumption in the future if it is financed by profitable domestic investment, in excess of that paid on the net foreign debts. Similarly, an excess on the current account shifts consumption to future generations, unless it raises the value of the currency, deterring foreign investment. By and large, volatility is considered a determinant of economic growth but the trade off is different for different studies. In theory, proponents of a positive relationship are based on the 'Schumpeterian view' or 'creative destruction' of economic fluctuations where innovative firms induce both high growth and high volatility, as the economy adjusts to the advent of a new technological paradigm (Helpman and Trajtenberg, 1998). Milton Friedman (1980) argued that trade deficits are not important as high exports raise the value of the currency. This opinion is shared by David Friedman (1990) who states that they are 'fossil economics', based on ideas obsolete since David Ricardo.

Milton Friedman (1980), the Nobel Prize-winning economist and father of Monetarism, argued that many of the fears of trade deficits are unfair criticisms in an attempt to push macroeconomic policies favorable to exporting industries. He stated his belief that these deficits are not harmful to the country as the currency always comes back to the country of origin in some form or another (country A sells to country B, country B sells to country C who buys from country A, but the trade deficit only includes A and B). In fact, in his view, the "worst

case scenario" of the currency never returning to the country of origin was actually the best possible outcome: the country actually purchased its goods by exchanging them for pieces of cheaply-made paper. As Friedman put it, this would be the same result as if the exporting country burned the dollars it earned, never returning it to market circulation.

Friedman also believed that deficits would be corrected by free markets as floating currency rates rise or fall with time to encourage or discourage imports in favor of the exports, reversing again in favor of imports as the currency gains strength. A potential difficulty, however, is that currency markets in the real world are far from completely free, with government and central banks being major players, and this is unlikely to change within the foreseeable future. Nevertheless, recent developments have shown that the global economy is undergoing a fundamental shift. For many years the U.S. has borrowed and bought while in general, the rest of the world has lent and sold. However, as Friedman predicted, this paradigm appears to be changing.

Friedman and other economists have also pointed out that a large trade deficit (importation of goods) signals that the country's currency is strong and desirable. To Friedman, a trade deficit simply meant that consumers had opportunity to purchase and enjoy more goods at lower prices; conversely, a trade surplus implied that a country was exporting goods its own citizens did not get to consume or enjoy, while paying high prices for the goods they actually received. In view of the fact

that countries with a highly positive trade balance (such as Germany or Japan) offer their citizens the same or more goods and services as do countries with a negative trade balance (such as the United States or the United Kingdom), this hypothesis must certainly be regarded as falsified.

On the other hand, trade deficit is considered harmful, because some economists believe that GDP and employment can be dragged down by an over-large deficit over the long run (see e.g. Griswold (2007), CBO (2000), Friedman (2002), Joseph (1976)). Generally, high volatility creates insecurity regarding the long-run profitability of investment, so this will entail lower investment activity and therefore lower growth and irreversibility of investment (e.g. Pindyck, 1991). Negative correlation is presented as well, if growth occurs through learning-by-doing (Martin and Rogers, 1997). Empirically, there is also mixed evidence about the sign of the relationship. The best-known studies that found negative relationships, are those of Ramey and Ramey (1995) and Dawson and Stephenson (1997), incorporating country and state data respectively. Nevertheless, another set of more recent studies found contrasting results (e.g. Imbs (2002); Dopke (2004) and Dejuan and Gurr (2004)).

The Keynesian model, according to Thirlwall and Hussain (1982) and Thirlwall (1991), assumes the balance of trade position is the main constraint on economic growth, imposing a limit on demand growth to which supply adapts. In Thirlwall's law, exports play a crucial role along with balance of payments in determining the long-term economic growth. The role of exports in economic growth is also discussed by McCombie (1985, 1993) and McCombie and Thirlwall (1994). An article by Siebert (1992) provides an account of the decline in the long-term economic growth of Germany in the neoclassical tradition. In his comprehensive discussion, he attributes the slowdown to changes in factors of production and factor productivities, environmental protection, external developments, economic policies and institutional changes in the economy. Although he mentions the importance of exports, he does not acknowledge the crucial role exports play in determining the long-term growth of Germany. In a recent article, Atesoglu (1993) furnished empirical support for Thirlwall's law from the United States.

Like many of the countries of the world, Bangladesh has also been fighting soaring trade deficits since its liberation in 1971. A report reveals that Bangladesh's trade deficit soared by more than 150 percent in the first four months of the current fiscal year of July 2007 and June 2008, dragging the current account balance to a negative 229 million U.S. dollars (BB 2008). During the fiscal period, export earnings stood at 3.970 billion U.S. dollars against the import payments of 5.709 billion U.S. dollars (EPB, 2008). Unfortunately, designing a policy response to trade deficit is ignored. Uchitelle (1987) provides a brief review of uncertainties surround the trade deficit. Gilpin (1997) presents a good introduction how trade deficit and uncertainty could work as a major impediment to sustained strength in the dollar currency. Garrison (1991) summarized the uncertainties involved in both

federal budget and trade deficit that could hinders decision making process in portfolios and also could reduce rate of return by greater hedging in the rest of the economy. Thus, without going through the pale of exploring whether this outcome is bad or good, there is no doubt that deficit creates the uncertainty.

To respond to the trade deficit problem and resulting uncertainties related to it, policy makers need quantitative information, but perhaps most fundamentally they need information on the magnitude of the trade deficit's volatile trend itself. Although uncertainty is, by its very nature, is difficult to quantify, the result of this study could provide some hints in that direction of economic uncertainty that may could hit the economy. The primary objective of the paper is to focus on the volatility condition of the balance of trade deficit during the fiscal period of 1983/84 to 2008/09 and to identify the factors significantly responsible for creating uncertainties in terms of volatile trade deficit persisted in Bangladesh economy. It will also discuss about the economic policy implication in response to this problem.

2. BANGLADESH ECONOMY AT A GLANCE

Bangladesh, one of the rising member countries of South Asia, passed a severe economic hardship during its post-independence period of 1970s till 1980s. Economic scenario, however, has had a distinct turnover in 1990s when share of export earnings from traditional items of mainly jute goods dragged down tremendously and that of non-traditional items

of mainly knitwear and woven garments and others shoot up. For example, export earnings from traditional items amounted to US $518.77 million (4.93%) and that of non-traditional items stood at US $10007.39 million (95.07%) during the fiscal year of 2005-2006 as compared to 64.20% for traditional items and 35.16% for non-traditional items respectively during the fiscal year of 1984-1985 (EPB, 2006). Recently, Bangladesh has adopted a policy framework that is called Medium Term Macroeconomic Framework (MTMF) (from the fiscal year 2004-2005 to 2009-2010), the broad objective of which is to promote economic growth and employment, including small and medium size enterprise development, in a manner consistent with the poverty reduction goal by channeling an increasing share of government expenditure into social and infrastructural sectors and directly poverty alleviation activities. An effective link of resources has been established among GDP, fiscal, monetary and external sector in this framework. Basically, this framework is a 3-year planning to inject resources into the prioritized sectors. At present, NTMF has been updated by the Ministry of Finance Division in order to prepare a Medium Term Budget Framework (MTBF). Some important variables of the macro economy have been projected in 3-year duration considering the recent macroeconomic trends and future possibilities and uncertainties to achieve the target. The trends and projections of key indicators of macroeconomic framework have been shown in the Exhibit 1:

EXHIBIT 1: Medium Term Macroeconomic Framework: Key Indicators (in US $)

Indicators	Actual		Revised		Estimated	
	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
Growth Rate of GDP (%)	6.0	6.6	6.5	7.0	7.0	7.2
GDP deflator	5.1	5.2	5.6	6.0	5.2	4.9
Average Inflation (CPI)	6.5	7.2	7.0	6.5	5.5	5.0
Gross Domestic Invest. (in percent of GDP)	24.5	24.7	25.3	26.2	27.4	28.1
Total Revenue	10.3	10.3	10.6	10.8	11.1	11.2
Tax	8.2	8.2	8.4	8.6	9.1	9.2
Non-Tax	2.1	2.1	2.2	2.2	2.0	2.0
Total Expenditure (Billion US dollars)	14.0	13.9	14.3	16.4	14.9	15.0
Annual Development Program	5.0	4.6	4.6	5.0	5.3	5.4
Balance of Payments (in million US dollars)						
Exports (f.o.b.)	8.6	10.4	12.6	14.9	17.6	20.7
Imports (f.o.b.)	11.9	13.3	16.0	19.0	22.5	26.3
Gross Official Reserves (in million US dollars)	2.9	3.4	4.5	4.9	5.3	6.2

Sources: Bangladesh Economic Review 2007.

3. HYPOTHSES TO BE TESTED

The primary objectives of the paper are, as mentioned earlier, to find out specific impacts of six socio-economic variables on the international trade balance volume and volatility of Bangladesh economy. In order to attain those objectives, the present study postulates two hypotheses. One of them is the null hypothesis that two mean values of trade volume for the two time periods are the same which can be expressed in the following mathematical notation:

$$H_0: \mu_1 - \mu_2 = 0$$

where μ_1 is the mean of trade volume in the period of the fiscal year of 1983/84 to 1995/96 and μ_2 is the mean of the same in the period of the fiscal year of 196/97 to 2008/09 in the data.

In tests of two means of the two periods the alternative hypothesis is set as

$$H_1: \mu_1 - \mu_2 < 0$$

In order to test the volatility of the trade volume, the study puts forward the following hypothesis for the standard deviation that of the form

H_0: $\sigma_1 - \sigma_2 = 0$

against the following alternative:

H_1: $\sigma_1 - \sigma_2 < 0$

where σ_1 is the standard deviation of the trade volume for the period of 1983/84 to 1995/96 and σ_2 is that of the period the fiscal year of 196/97 to 2008/09.

4. METHODOLOGY

Given the nature and scope of the study, different secondary data sources are taken into consideration. Out of all sources, statistical yearbook of Bangladesh Bureau of Statistics provides the most useful and precise data base that was mostly used for this study. Bangladesh Economic Review (BER) published by the Ministry of Finance and Export Statistics of Bangladesh Export Promotion Bureau also provided additional support of databases, which were indispensable for this study to carry on. Due to unavailability of monthly data, the yearly data were used from the fiscal year of 1983/84 to 2008/09. If the monthly data were available, it could have been explored an added advantage of fulfilling large sample criterion that could provide better output of the study. However, in order to get a sophisticated output, the SPSS was used for the data analysis process. In order to show the change over time, the data were divided into two groups--- from 1983/84 to 1959/96 and from 196/97 to 2008/09. By analyzing two sets of data-each set consists of 13 years of data (altogether 26 years data), the investigation was done in order to de-

tect and compare the change in foreign trade volume and volatility of Bangladesh.

Although there have been several statistical methods for measuring the volatility, the standard deviation is one of the most widely used statistics. Another measure of variation and volatility is range that is very easy to compute and interpret (McClave, 2005). For the analysis, the following multiple regression model has been used:

$$\textbf{FTB} = \boldsymbol{\alpha} + \boldsymbol{\beta_1}\textbf{GDP} + \boldsymbol{\beta_2}\textbf{CPI} + \boldsymbol{\beta_3}\textbf{POP} + \boldsymbol{\beta_4}\textbf{DUT} + \boldsymbol{\beta_5}\textbf{IFF} + \boldsymbol{\beta_6}\textbf{FER} + \boldsymbol{\varepsilon}$$

where,

FTB: Foreign Trade Balance (Taka in millions)

GDP: Gross Domestic Product in Constant Market Price (1995/96 = 100).

CPI: Consumer Price Index (General)

POP: Total Population (in millions)

DUT: Duty (indices) for Import

IFF: Indices of Fare and Freight

FER: Foreign Exchange Rate (Taka per US Dollar)

$\boldsymbol{\alpha}$, $\boldsymbol{\beta_1}$ **to** $\boldsymbol{\beta_6}$: Parameters to be estimated and

$\boldsymbol{\varepsilon}$: The disturbance term

5. RESULTS AND DISCUSSIONS

Arguably, it is plausible that if the volatility of the export-import balance has not been changed, the statistical test must confirm the fact by concluding that the standard deviations for the two periods are

EXHIBIT 2: SUMMARY STATISTICS FOR BANGLADESH FOREIGN TRADE BALANCE

	Yearly Volume of Balance of Trade (in million Taka)	
	1983/84 - 1995/96	1996/97 - 2008/09
Mean	63230.77	200461.5
Median	56000	180000
Standard deviation	22716.2	75410.67
Range	84000	190000
Number of Observations	13	13
Statistical Test (T-test)	T-Observed = 7.576**	
Statistical Test (F-test)	F-Observed = 119.099***	

**p<.01, ***p<.001

equal. Otherwise, if there has been a significant change in the standard deviations in two periods -- from 1983/84 to 1995/96 and from 1996/97 to 2008/09, then the conclusion could be drawn that the market is volatile. Here, the mean values for the two periods are also recorded. The summary statistics for the change in the foreign trade deficit of Bangladesh (in million Taka) is provided in Exhibit 2.

It has been performed the t-test for equality of two means and the F-test to investigate the equality of standard deviations for two periods. Observed t-test and F-statistics support the hypotheses that there is a significant increase in the mean and stan-dard deviation during the two compared periods. Consequently, it can be concluded that the average of the trade deficit and its volatility has significantly increased. The same conclusion is applicable to the statistics of range, which supports the earlier evidences of vulnerable trade deficit volume and volatility of Bangladesh export-import market.

An examination of the data indicates that there might be some correlation between some specified variables and the volatility of the foreign trade deficit volume. To further analyze the relationships between them, a multiple regression model is run. The result is provided in Exhibit 3:

EXHIBIT 3: REGRESSION RESULTS

	Coefficients	Standard errors	t-Statistics
Intercept	652234.0	323822.3	2.014*
GDP	182.445	83.718	2.179*
POP	-5817.78	2.339.256	-2.487*
DUT	-7.763.345	3632.34	2.137*

*p<.05, R^2 = .97, Adj. R^2 = .96, N = 26, Dependent Variable = Foreign Trade Balance

In the regression results, only significant variables are enlisted along with their respective coefficients, standard errors and t-statistics. Based on the result, it concludes that among the six, three explanatory variables such as GDP, total population and Import Duty contributed significantly to predicting the volatility of the trade deficit volume. The signs of two variables i.e. population and import duty are negative implying opposite relationship between trade deficit and each of these two variables. That means if import duty goes high, trade deficit will go down. This implies anti-trade liberalization which would safeguard the domestic production organizations following the classical economic theory of protectionism. In order to be self-dependent and self-sufficient, Bangladesh needs to follow the advocates of protectionism to some extent during for a specified period of time. Actually, the sign of the population variable seems somewhat ambiguous, but it has a possible explanation. The positive growth of skilled human resources could induce export oriented productive activities that could boost up the export earning sector. If the import sector is sustained, then trade deficit may be reduced. In that case, larger and skilled human capital is a positive parameter to reduce the trade deficit gap. Based on the statistical tests, it can, however, be concluded that the volatility of the foreign trade deficit volume has increased many-fold during the pre-specified period of 1996/97 - 2008/09 compared to the 1983/84-1995/96 period.

Since the test statistic for analysis of variance (ANOVA) is distributed as Fisher's F, it should not be surprising that analysis of variance and the t test for two population means are also closely related. An analysis of variance performed on observations from two groups will yield exactly the same p-value as a non-directional t test performed on the same data. Thus, the strategy underlying analysis of variance is based on the notion that all of the variability among the sample scores obtained from the population is attributable to two sources: variability that is associated with systematic differences among populations (treatment) and all other sources of variability (error), which are assumed to operate randomly throughout the population and therefore to contribute variability in equal measure to the population (Frank and Althoen 1994). The ANOVA result of this study is provided in Exhibit 4.

EXHIBIT 4: ANOVA

|	df	SS	MS	F
Regression	6	1,92E+13	3,20E+13	119.099***
Residual	19	5.10E+09	268326790.7	
Total	25	1.97E+11		

***p<.001

The *F* value is found to be significant and it can be concluded that two populations of foreign market trade volumes from which the samples are drawn do not have identical mean. This simply implies to support the null hypothesis to be rejected. Furthermore, all these statistical tests support the hypotheses that the GDP value, population number and import duty influenced significantly the volatility of the balance of export-import trade volume during the periods mentioned earlier in the paper.

6. DEFICIT-TREND UNCERTAINTIES AND THEIR POLICY IMPLICATIONS

In Exhibit 4 the trends in the yearly foreign trade balance (ftb), import (imp) and export (exp) have been depicted. Undoubtedly, export earnings are increased manyfold, but import spending is also on an increasing trend. In order to get rid of these deficit-trend uncertainty two sorts of policy measures could be drawn. Firstly, budgetary imbalance ought to be reduced. This task is imperative, because government budget constitutes three major sectors namely government sector, private and corporate sector and foreign trade sector (Garison, 1991). A balance budget implies that $(G - T) + (I - S) + (X - M) = 0$, where G is government expenditure, T is tax revenue, I is investment spending, S is private and corporate saving, X is export revenue and M is expenditure on imports. This equation is satisfied when $G = T$, $I = S$ and $X = M$. That is the sector-accounts of the macroeconomy are in balance when government finances its programs with tax revenues, domestic investment is funded by private and corporate saving and revenues from exports match expenditures on imports.

EXHIBIT5: TREND IN EXPORT, IMPORT AND BALANCE OF TRADE OF BANGLADESH
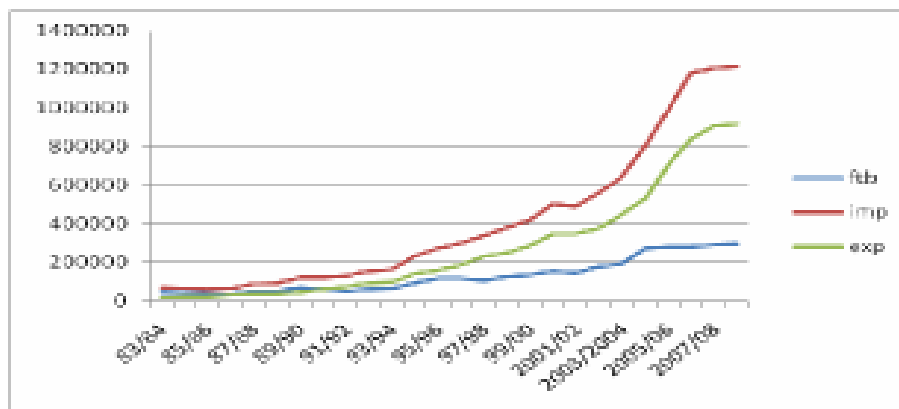
Source: The present study (2008).

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Sectoral imbalances that reflect a chronic and dramatic imbalance in the public sector, however, are a different matter (Garison, 1991). Deficit-induced uncertainties embedded in the offsetting imbalances in the investment and foreign trade sectors can hinder market processes and degrade economic performance. These uncertainties in resulting hindrances are central to the argument for a balance or near balance in the government budget. Besides, the budgetary imbalance implies some combination of offsetting imbalances in the investment and foreign trade sectors. Domestic saving may be diverted away from private credit markets and into the government treasury; revenues received by the trading parties may be lent to the government rather than spent on exportable goods. The former effect constitutes a crowding out effect on domestic investment and the later constitutes a foreign trade deficit. This fact can be translated into the following equation: $(G - T) = (S - I) + (M - X)$, where deficit budget is equal to crowding out of domestic investment plus the foreign trade deficit. That means in order to get a balanced export-import market, government budget ought to be balance.

Secondly, in order to reduce trade deficit, the import sector should also be squeezed. This initiative is essential for achieving a growing and strong economy which aspires to be self-dependent. Domestic infant industries need to be protected from the international competition. Otherwise the local industries will die in their infantries. India is a prime example in this regard. India has been under the policy of protectionism since its independence.

Nowadays, India is regarded as one of the progressive industrialized countries of the world that is competing in the world market with a dominant stronghold. Similar policy of protectionism is needed to reduce the import spending.

So there is not too much to be delighted looking at the sharp increasing trend in export growth other than to say that the rising trend in export and import trade in the fiscal year of 2005/06 has been sustained (BER, 2007). By and large, whatever the case is, trade surplus rather than trade deficit has been a robust sign of a healthy economy. In that respect, Bangladesh has to formulate a policy that would help minimize trade deficit in order for getting a potential economic stronghold of the economy. However, it is evident from the exhibit 4 that growth trend in foreign trade deficit is sustained starting from the fiscal period of 2003/04. This indicates, of course, a good sign for the foreign trade sector of the economy.

7. CONCLUSION

The objectives of the present study were mainly two-fold. One is to look at the changing pattern of the volume and volatility of the trade deficit of Bangladesh economy and to identify the factors accountable for creating this volatility during the pre-specified fiscal period of 1983/84 and 2008/09. In order to take a closer look on these aspects, this study divided the entire period into two parts. One is from the fiscal year of 1983/84 to 1995/96 and the other is from 1997/98 to 2008/09. The findings of the study reveal that both the volume and volatility of

the trade deficit of Bangladesh economy have been increased many times in comparison to earlier period. The results also identify that the variables such as total GDP, total number of population and import duty are responsible significantly for creating the volatility of the foreign trade deficit of Bangladesh export-import market for the last 26 fiscal years of study period. Generally, trade deficit is marked as a bad sign of the economy. However, irrespective of going into that debate of bad or good, the study concludes that trade deficit is still substantially higher and volatile, which ought to be minimized in order to get a good economic environment of Bangladesh.

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