Does the exchange rate influence the exports?
Evidence from Bangladesh

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Abstract. This paper attempts to examine the nature of the association between the exchange rate and exports of Bangladesh. The study uses the cointegration approach to show the long-run relationship between the variables using time series data from 1981 to 2015. The result suggests that the nonstationary data of export and exchange rate become stationary at the first difference and these two first degree autoregressive series don't exhibit any long-run association. So, the findings provide a distinctive insight about future foreign exchange policy in the developing countries like Bangladesh. However, the policymakers also must be careful about the other macroeconomic and foreign trade factors before formulating any policy based on this study. The first section of the paper, introduction, objectives, is followed by the literature review, data and method, results and the concluding remarks.

Keywords. Exchange rate, Depreciation, Cointegration.

JEL. F31, F32, C18.

1. Introduction

In any open economy, the foreign exchange market allows currencies to be exchanged to facilitate international trade and financial transactions. There is a traditional view that volatility of the rate at which the exchange occurs affects the country's trade balance. A country's economic development largely depends on its export performance and exchange rates play a vital role in a country's level of trade. The inter-relationship between a nation's imports and exports and its exchange rates is a complicated one because of the feedback loop between them. The exchange rate influences the trade surplus (or deficit), which in turn affects the exchange rate and so on. The theory suggest that a weaker exchange rate leads the export become cheaper. Conversely a strong domestic currency makes imports cheaper. Ultimately, the value of exchange rate naturally

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affects the demand for exports and imports. The central bank is the exchange rate management authority in Bangladesh. Until recent past, fixed exchange rate system was prevailing in Bangladesh in which case the central bank controlled the value of BDT (Bangladeshi Taka). To enhance the resilience of the economy in responding shocks Bangladesh formally stepped over to market-based exchange rate for the taka from 31st May 2003. In 2003, US Dollar was traded at BDT 55 to one US$. During mid-2004 and 2005 the movement of local currency against USD was very rapid, so Bangladesh bank had to intervene in the market turning to a managed float exchange rate system. But the scenario started to change gradually. Since 2004, GDP growth of Bangladesh has been largely driven by its exports. Intuitively, depreciation is expected to be freer and more frequent under floating exchange rate regime. Again, both the pattern and the destination of our export and import have been changed significantly near past. Therefore, knowledge of the extent to which exchange rate variability affects exports is important for designing exchange rate policy. So, this study attempts to find out the relationship between exchange rates and exports of Bangladesh.

2. Objective and motivation

The prime objective of this study is to look at if there is any association between the exchange rate and the depreciation in Bangladesh at long run. It has been observed that both the exchange rate and export incurred a significant change in last two decades. Theory suggests that an increase in the exchange rate (depreciation) usually stimulates the export. So, there might be a relationship between these two important macroeconomic variables. These fluctuations and theoretical perceptions are the core incentives to this work.

3. Literature review

Alam (2010) attempted to find the link between real exchange rate and export earnings. Granger causality has been tested to see if real exchange rate depreciation of Taka has any contribution to export earning of Bangladesh. He found no causality run from real depreciation of Taka to export earnings of Bangladesh. The necessity of sub sector wise analysis is needed according to the findings.

Bristy (2013) analyzed the impact of exchange rate volatility on the export of Bangladesh. Empirical explanation is investigated by using co-integration test in the long run and dynamic adjustment from a vector error correction model in the short run. The results showed that depreciation improves export but volatility of exchange rate offsets the export growth by increasing uncertainty. The study also says previous year's exchange rate has vital effects as trade contracts are made at the earlier period.

Doganlar (2010) tried to estimate the impact of exchange rate volatility on the exports of five Asian countries namely Turkey, South Korea,

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Malaysia, Indonesia, Pakistan. The examination used Engle-Granger residual based cointegrating technique. The results indicated that the exchange rate volatility reduced real exports for those countries. This might mean, if exchange rate volatility increases producers prefer to sell in domestic market.

Genc, & Artar (2014) studied two factors; determining the impact of exchange rates on imports and investigating the impact of exchange rates on exports of economically developing countries. The focus was also on establishing whether there is a co-integrated relationship between effective exchange rates of selected emerging countries. By applying the panel co-integration method for the period of 1985-2012, results are found that there is co-integrated relationship between effective exchange rates and exports-imports of emerging countries in the long run.

Begum, & Shamsuddin (2007) studied and researched about export and economic growth in Bangladesh. The effect of exports on economic growth in Bangladesh, based on a two-sector growth model. Using annual data for the period 1961-92. Using Autoregressive Conditional Heteroscedastic model of economic growth, which is found to capture the volatility of the Bangladesh economy also the results suggests that an increase in the share of investment in GDP significantly increases the growth rate of GDP in normal years, but negligibly increases GDP growth in abnormal years. The contribution of exports to economic growth was more pronounced during 1982-90 when the government pursued a policy of trade liberalization and structural reform, and political turmoil was not persistent. This finding is not sensitive to the choice of the model or the estimation technique.

Hassan, & Tufte (2010) examined the long and short-run determinants of Bangladeshi export growth. These are modelled as depending on world trade volume, Bangladeshi and world export prices, and exchange rate volatility. Using two plausible restricted co-integration space of these variables, in which one is export demand and the other one is export supply. Then variables are imposed on an error correction model. In the long run, Bangladeshi export growth is driven by the volume of world trade, which is negatively, and inelasticly related to the volatility of Bangladeshi exchange rates. Once these long-run effects are accounted for, it is found that none of the variables significantly explains any short-run changes in export growth.

Aziz (2008) estimated the effect of exchange rate on the balance of trade of Bangladesh. Constructed the Nominal Effective Exchange Rate (NEER) and Real Effective Exchange Rate (REER) for Bangladesh by applying Engle-Granger and Johansen techniques to investigate the long run co integration relation between 'trade balance' and REER, and finally employed the Error Correction Mechanism (ECM) to explore the short-run linkage. She found that the REER has a significant positive influence on Bangladeshi trade balance in both short and long run. The Granger Causality test suggests that the REER does Granger causes the trade balance. The focus was also on examining the Marshall−Lerner condition in

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Bangladeshi data by using the Impulse Response Function (IRF) which suggests that the J-curve ideal is apposite in response to exchange rate depreciation.

Oskooee, & Payesteh (1993) investigated the response of the trade flows of six less developed countries to exchange rate volatility using quarterly data over 1973-1990 periods. The study used standard estimation method to estimate import and export demand equation. This study found adverse effects of exchange rate uncertainty on the trade volume.

Abeysinghe, & Yeok (1998) showed that in the presence of high import content, exports are not adversely affected by currency appreciation because the lower import prices due to appreciation reduce the cost of export production. Econometric analysis has shown that the higher the imported input content, the less the impact of exchange rate changes on exports. In the case of Singapore, productivity gains had not proved to be sufficiently large to contribute significantly to enhancing export price competitiveness.

Fang, Lai, & Miller (2005) investigated the net effect for eight Asian countries using a dynamic conditional correlation bivariate GARCH-M model that simultaneously estimates time varying correlation and exchange rate risk. This study found that Depreciation encourages exports, as expected, for most countries, but contribution to export growth is weak. Real exchange rate depreciation displays the normal positive estimate. The depreciation effect proves significant for all countries, except Singapore. Real exchange rate risk produces significant estimates on exports for seven of the eight countries studied either positive or negative.

4. Data and method

This study used bi-variate data to examine the association between exchange rate and export in Bangladesh. Different variables such as Export and exchange rate were used to show the relationship. Although Bangladesh maintains foreign trade with most of the country, this paper considers the value of taka against US dollar only because the dollar is considered as the standard currency all over the world. Moreover, almost every foreign transaction is paid in dollar. The study used real exchange rate. It uses the nominal exchange rate and it is defined by the amount of BDT per dollar.

$$Er \text{ (Exchange Rate)} = (BDT/USD)$$

The data of nominal exchange rate were collected from the Bangladesh Bank. Data of export reflects the total value of the export and were collected from the World Bank Data Indicator. This study used bi-variate data series from 1981-2015. As the study used time series data, the series might have unit root problem. At first the unit root problem of the variable is needed to identify. From different tests for identifying unit root problem, the Augmented Dickey-Fuller test and Philips –Peron tests are used mostly.

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This study uses the Philips-Perron test to check the unit root problem which is considered as the modified version of the ADF test. The 1st difference of the variable was used for correct model estimation. After standardizing the export by taking log the data set has been structured for the cointegration test as follows:

$$LXP_t = \beta_1 + \beta_2 ER_t + U_t$$

Where ER indicates real exchange rate, LXP stands for the export log export and U is the stochastic disturbance term.

Among different procedures the Johansen cointegration test was used. The Johansen test uses two statistics; Trace statistics and Max-Eigen statistics.

5. Findings and discussion

Unit root tests for stationarity are performed in level and first differences for all the variables which are found stationary in its first difference. The Philips-Perron unit root tests (Table 1) show the existence of unit roots at level because P-value is more than 5% and therefore non-stationary. However, the first differences of these variables are stationary under the test because p-value is less than 5%. Hence, we conclude that these variables are integrated of order 1.

Table 1. *Estimated Results of Unit Root Test of Bangladesh's Export and Exchange Rate*

Variables	Test pattern	P Value
er (Exchange rate)	Level	0.709
	First Difference	0.000
	Level	0.985
Lxp (log export)	First Difference	0.000

Note: Null hypothesis: The series has a unit root problem

Table 2. *Cointegration between Export and Exchange rate*

Test	Test With	No. of Co integrating Equation	Trace/Max-Eigen Statistics	Critical Value	P Value
Trace	Intercept	None	6.949	15.494	0.583
		At most One	0.042	3.841	0.8362
	Intercept&Trend	None	20.615	25.872	0.1963
		At most One	6.689	12.51798	.3780
Max Eigen	Intercept	None	6.906	14.264	0.500
		At most One	.042	3.841	.8362
	Intercept&Trend	None	13.925	19.387	0.259
		At most One	6.89	12.51	0.378

Note: Hypothesis: Number of cointigrating equation = none / at most *one*

Table one indicates that both exchange rate and the export are I(1) (become stationary after first difference). The result of the cointegration test is summarized in Table 2. The Johansen Cointigration test consists of two statistics: Trace statistic and Maximum eigenvalue (Table 2). This paper test

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the cointigration using 'only intercept' and 'both intercept and trend' separately. Before undertaking the cointegration tests, let's first specify the relevant order of lags (p) of the VAR model. Given the fact that the sample size is relatively small, we select 2 for the order of the VAR (Pesaran & Pesaran, 1997). For selecting the length of lag, the Akaike Information Criterion (AIC), and the Schwarz Criterion (SC) are normally considered. Both SC and AIC criterion suggested accepting lag 2. Using the suggested lag length the Johansen cointegration test provides no cointegration between export and exchange rate of Bangladesh in both options. The null hypothesis is: Number of cointigrating equations is either 0 or 1 at most. One cointigrating equation is also in the null hypothesis as there might have one cointigrating equation even after having no cointigration between the variables. The p value (greater than .05) of both Trace statistics and Maximum Eigen value suggests that there is no cointigration between export and exchange rate. The result is statistically significant at 5% level of significance. Hence, there is no long–run relationship between exchange rate and the export of Bangladesh.

6. Conclusion

This paper does not find any long run effect of exchange rate on Bangladeshi exports suggested by the result of co-integration test. This can be explained by the fact that the import responses first and as most of the export item of Bangladesh is subject to the import. That's why the price of the exported items doesn't become that cheaper to stimulate the exports. The result is consistent with the results of Hossain & Ahmed (2009) and Islam (2010). But it contradicts with the conclusion of Alam (2010). But by increasing uncertainty, volatility of exchange rate that corresponds with depreciation counterbalances the growth in export demand and this result confirms the results provided by Arize (2000), Ozturk *et al.* (2006), Mustafa *et al.* (2004) and Wong (2007) but contradicts with the findings of Kabir (1988). Hence, the policy makers can consider the results before intending to formulate any foreign exchange policy. However, this study is not beyond limitations. The different sector of export might respond differently with the exchange rate volatility. Moreover, the scope of the study is wide enough as it is not only export rather overall trade balance should be taken into consideration.

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References

Abeysinghe, T., & Yeok, T.L. (1998). Exchange rate appreciation and export competitiveness. The case of Singapore, *Applied Economics*, 30(1), 51-55. doi. 10.1080/000368498326137

Ahmed, N. (2010). Export response to trade liberalization in Bangladesh: a cointegration analysis. *Applied Economics*, 32(8), 1077-1084. doi. 10.1080/000368400322138

Alam, R. (2010). The link between real exchange rate and export earning: A cointegration and Granger causality analysis on Bangladesh. *International Review of Business Research Papers,* 6(1), 205-214.

Ali, R.M., & Kamal, M.A. (2012). Examining how exchange rate fluctuations effect trade balances. *Economics 431: International Finance.* [Retrieved from].

Arize, A.C., Osang, T., & Slottje, D.J. (2000). Exchange-rate volatility and foreign trade: Evidence from thirteen LDC's. *Journal of Business & Economic Statistics*, 18(1), 10-17.

Begum, S., & Shamsuddin, A.F.M. (2007). Exports and economic growth in Bangladesh, *The Journal of Development Studies*, 35(1), 89-114. doi. 10.1080/00220389808422556

Bristy, H.J. (2013). Exchange rate volatylity and export of Bangladesh: impact analysis through cointegration approach. *International Review of Business Research Papers*, 4(4), 121-133.

Cheung, Y.-W., & Sengupta R. (2013). Impact of exchange rate movement on exports: an analysis of Indian non financial seector firms. *BOFIT Discussion Papers*. [Retrieved from].

Dawson, P. (2006). The-export-income relationship and trade liberalization in Bangladesh. *Journal of Policy Modeling,* 28(8), 889-896. doi. 10.1016/j.jpolmod.2006.04.005

Doganlar, M. (2010). Estimating the impact of exchange rate volatility on exports: evidence from Asian countries. *Applied Economics Letters*, 9(13), doi. 10.1080/13504850210150906

Fang, W., Lai Y., & Miller, S.M. (2005). Export promotion through exchange rate policy, University of Connecticut, *Economics Working Papers*, [Retrieved from].

Genc, G.E., & Artar, K.O. (2014). The impact of exchange rate on exports and imports of emerging countries. *European ScientificJjournal*, 10(13), 128-141. doi. 10.19044/esj.2014.v10n13p%25p

Hasan, J., Muktadir, D., & Islam, F. (2015). Impact of exchange rate volatility on the export performance of developing country: Evidence from bilateral trade between Bangladesh and the us. *Journal of International Business and Economy* 16(2), 21-39.

Hassan, K., & Tufte, D. (2010). Exchange rate volatility and aggregate export growth in Bangladesh, *Applied Economics*, 30(2), 189-201. doi. 10.1080/000368498325994

Hossain, M., & Ahmed, M. (2009). An assessment of exchange rate policy under floating regime in Bangladesh. *The Bangladesh Development Studies,* 32(4), 33-67.

Kabir, R. (1988). Estimating import and export demand function: The case of Bangladesh. *The Bangladesh Development Studies*, 16(4), 115-127.

Khalid, M., & Mohammed, N. (2004). Volatility of exchange rate and export growth in Pakistan: The structure and interdependence in regional markets. *Pakistan Development Review*, 43(4), 813-828. doi. 10.30541/v43i4IIpp.813-828

Oskooee, M.B., & Payesteh, S. (1993). Does exchange-rate volatility deter trade volume of LDCs?. *Journal of Economic Development,* 18(2), 189-205.

Ozturk, I. (2006). Exchange rate volatility and trade: A literature survey. *International Journal of Applied Econometrics and Quantitative Studies,* 3(1), 85-102.

Rafayet, A. (2010). The link between real exchange rate and export earning: cointegration and Granger causality analysis on bangladesh. *International Review of Business Research Paper*, 5(4), 205-214.

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