

Exchange Rate Movement and International Reserve Position in the Floating Exchange Rate Regime of Bangladesh

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Abstract:

This study has tried to examine the exchange rate performance on the reserve accumulation of Bangladesh in the floating regime. Using quarterly time series data (2003-2018), this paper has attempted to explore the influence of exchange rate on foreign exchange reserves by employing standard econometric techniques in Bangladesh economy. The findings of the empirical analyses reveal that the foreign exchange reserves have no statistically significant response to the exchange rate movements, but the expected positive sign in the coefficient of exchange rate gives some useful insight like that there may be an economic implication. On the other hand, lag inflation has a significant negative interface on reserve growth and foreign direct investment inflow growth has a significant positive influence on reserve growth. The effect of the rest of the other variables on reserve growth is not statistically well justified. In the end, it may be concluded that although the nominal exchange rate changes and reserve growth relationship is not empirically established; however, from the economic point of view, the floating exchange rate regime has an important implication on the macroeconomic behavior of Bangladesh economy.

Keywords: Exchange Rate, Floating Regime, Foreign Exchange Reserves, Bangladesh.

JEL Classification: C22, E31, F21, F24 and F31.

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1. Introduction:

Exchange rate² designates the comprehensive position of the country's economy from the global perspective. Every country's economic development is intimately associated with its foreign exchange system. The foreign exchange rate is a crucial component of the country's economic activities mainly in the foreign trades. Bangladesh has continued the floating exchange rate system³ since May 2003. After that, Bangladesh Bank (Central Bank of Bangladesh) pursued a flexible but managed float exchange rate policy strategy. Under the Floating regime, the exchange rate is basically determined by the country's overall demand for foreign currency and supply of foreign currency and moreover, this demand and supply of foreign currency are also influenced by some other economic factors. By the definition of International Financial Management theoretically, demand for foreign currency is determined by various factors, namely, import payments, service payments, including income payments, debt service payments, and outward foreign investment. The supply of foreign currency is aggregated of export receipt, service receipts, including income receipts, debt service receipts, inward foreign aid, and inward foreign investment.

The de jure (officially) exchange rate regime in Bangladesh maintains a floating exchange rate system. In this floating system, reserves are projected to reveal relatively low volatility with high nominal exchange rate volatility. This has led the nominal exchange rate to linger almost fixed or to move within a very narrow range for the period. Particularly, it is found that in the de facto exchange rate regime of Bangladesh, there was never completely free floating. Rather than this Bangladesh pursued a managed floating system from the early of its transition to the floating regime which is also known as a dirty float. Conceptually, it is similar to a freely floating system, moreover, in that exchange rate, there are no official boundaries and are allowed to fluctuate on a daily basis. On the other hand, it is similar to a fixed rate system in the sense that governments can and sometimes do intervene to prevent their currencies from a sharp fall.

Formally, based on demand-supply interaction the exchange rates of Taka for inter-bank and customer transactions are set by the dealer banks. The central bank is not in the market on a day-to-day basis and undertakes USD purchase or sale transactions with

² Exchange rate refers to the nominal exchange rate in this paper.

³ Floating exchange rate system can be of two types. One is freely/clean floating that means exchange rate is fully determined by the market without any interventions. Another is managed/dirty floating where intervention in the foreign exchange market is undertaken which means the exchange rate is not fully determined by the market.

dealer banks at existing inter-bank exchange rates only as required to maintain systematic market situations. These inter-banks exchange rates that are also regarded by BB for purchase and sale various transactions with the different international organizations including government. However, Bangladesh Bank intervenes in foreign exchange markets in order to reduce instability in the exchange rate of the BDT to other currencies by buying or selling foreign currencies in the domestic market. One example can be placed that during the FY2014, BB packed monthly average exchange rates of the Taka to the USD in a relatively narrow band between 77.63 and 77.75; by purchasing amounted to more than USD 5 billion from the domestic market. Exchange rate policy in Bangladesh is mainly demonstrated by intervention in the foreign exchange market. On the backdrop of the rapid rise of foreign exchange reserves, the central bank feels the pressure of keeping the exchange rate fixed under the managed float exchange rates and, thereby, intervenes in the foreign exchange market.

As per Bangladesh Bank order, 1972, the central bank has been established to manage the monetary and credit system of Bangladesh in stabilizing domestic monetary value and maintaining the external competitiveness of the local currency in enhancing growth and development by productive resource mobilization. According to Foreign Exchange Regulation Act, 1947, to uphold a viable external parity value of the Bangladesh Taka, Bangladesh Bank as the central bank of the country, controls the foreign exchange on behalf of the government. After becoming independent in 1971, at the earlier stage Bangladesh had been upholding various pegged exchange rate⁴ regimes, mainly pegged to the British pound sterling (1972-1979). Over the period 1980-1982, the exchange rate was pegged to a major trading partners' currency basket with the pound sterling as the intervening currency and then for a long period 1983-1999, it was pegged to a major trading partners' currency basket with the US dollar as the intervening currency. After that for a short period, the exchange rate passed an adjustable pegged system (2000-2003). Bangladesh then moved to a floating exchange rate system on May 31, 2003.

Foreign exchange reserves⁵ have been accumulating in Bangladesh for the last couple of years, particularly, since 2010 and now it has crossed US\$ 30 billion. Improvement of current account and financial account balance stemming from the increase in export and remittance inflows, low imports from sluggish investment demand and availability of

⁴ In the pegged exchange rate system, the value of domestic currency is moved in line with the pegged foreign currency. Another exchange rate system is the fixed exchange rate system where the exchange rate remains constant or moves within small bands.

⁵ Foreign exchange reserves mean gross official reserves.

low-cost foreign financing facilities significantly contributes to the pile up of reserves in Bangladesh. Foreign exchange reserves have now reached US\$ 32.94 billion (June 2018) which can meet about nine months of import payment, while in June 2003 it was only US\$ 2.47 billion. Considering the paramount importance of the exchange rate system in the economy, it is required to conduct a comprehensive study in order to unveil the exchange rate movement and reserve accumulation relationship.

2. Literature Review:

Younus and Chowdhury (2006) focused to assess Bangladesh's evolution to the floating regime and its impact on macroeconomic variables. They observed that economic growth in Bangladesh performed well in the transitional and floating exchange rate systems. Inflation is lower in the transitional regime regardless of the larger money supply and exchange rate depreciation. They also emphasized that currency depreciation increased export growth in the floating regime.

Priyo (2009) analyzed whether the floating exchange rate system has any shock on the value of Bangladesh Taka i.e. does it make any drop in the value of the currency. He verifies that switching to the floating regime has no statistically significant effect on the value of Bangladesh currency when the foreign exchange reserve is considered in the regression model.

Yu and Lili (2011) tried to examine the relationship between reserves and exchange rate using monthly data for the period 1994 to 2011 by applying the Johansen test in the case of China. The results of the study focused that there exists a long-term relationship between reserves and exchange rates. They also concluded that the flexibility of the exchange rate of RMB slows down the accumulation of reserves.

Gokhale and Raju (2013) explored to find out the causal relationship between the exchange rate and foreign exchange reserves in India using time series data from 1980 to 2010. This study concluded that no long-term and short-term relationship exists between the exchange rate and foreign reserves.

Tariq et al. (2014) revisited the relationship between reserves and the real exchange rate considering the mercantilist approach using the sample period 1972 to 2008. They indicated that export growth through real exchange rate depreciation boost up reserves and stated that switching to the floating regime also stimulates reserve accumulation.

Bayat et al. (2014) found the causal relationship running from foreign reserves to

exchange rate using monthly data from 2003 to 2014 in Turkey. The findings of the study also concluded that the real exchange rate has been considered by the Turkish central bank under the inflation-targeting regime.

Kalu et al. (2019) investigated the responsiveness of foreign reserves to exchange rate by employing the ARDL model in the Nigerian economy using time series data from 1996 to 2016. This study found reserves show a positive and significant response to the real exchange rate, whereas the reserves and nominal exchange rate association are positive but not significant.

After reviewing the literatures, no prior study is found that attempted to investigate the responsiveness of foreign reserves to exchange rate in Bangladesh. Therefore, a comprehensive study is required that will take a modest effort to examine the reserves and exchange rate relationship for the floating exchange rate regime in Bangladesh.

3. Scope and Objective of the Study:

Transition to the floating exchange regime was a policy reform issue and there were some debates about the competence of Bangladesh Bank from several corners. However, Bangladesh Bank performed remarkably. There was no instability, so that there were no speculations about price and the market behaved rationally. If we consider the market information, we discover that the major macroeconomic indicators have positive movements over the period. Apart from the different studies on the relationship between exchange rate and international reserves, in the context of Bangladesh, there is no proper study conducted that explored the relationship in this ground extensively. Therefore, this analysis is a modest attempt to investigate the stated issue in the floating exchange rate regime of Bangladesh.

The main concentration of this study is to uncover the role of exchange rate in the accumulation of reserves after switching to the floating regime. This paper tries to assess the influence of exchange rate on the foreign exchange reserves movement in the economy. To examine the floating regime performance on the reserves accumulation, this work is implicitly carried out based on the following research question: does exchange rate fluctuation have any significant impact on international reserve accumulation in the floating regime of Bangladesh.

4. Data and Methodology:

To attain the aims of the study, secondary data have been used to examine the influence of exchange rate along with other variables on foreign exchange reserve. The empirical

analysis is conducted using quarterly time series data from 2003 to 2018. The data have been collected from Bangladesh Bank (BB), Bangladesh Bureau of Statistics (BBS) and other organizations. The empirical analysis is performed employing standard time series econometric techniques. The statistical software STATA has been used to carry out the analysis.

The econometric specification is dynamic in nature, and the Arellano-Bond first differences estimator (Arellano and Bond 1991) type specification is modeled for depicting the empirical relationships among the variables of interest. The econometric specification considers the influential variables commonly used in the literature together with the exchange rate and commodity prices, which is given by:

$$Fxr g_t = \alpha_0 + \alpha_1 Fxr g_{t-1} + \alpha_2 Exr_t + \alpha_3 Inf_{t-1} + \sum_{i=0}^1 \alpha_{4i} Remg_{t-i} + \sum_{i=0}^1 \alpha_{5i} Rgdpg_{t-i} + \sum_{i=0}^1 \alpha_{6i} Trbg_{t-i} + \sum_{i=0}^1 \alpha_{7i} Fdiing_{t-i} + \alpha_8 TT + \varepsilon_t$$

Where,

Fxrg = Foreign Exchange Reserve Growth

Exr = Nominal Exchange Rate⁶

Inf = CPI Based Inflation⁷

Remg = Worker Remittance Growth

Rgdpg = Real Gross Domestic Product Growth⁸

Trbg = Trade Balance Growth

Fdiing = Foreign Direct Investment Inflow Growth

TT = Time Trend Variable

ε = Disturbance Term

In time series analysis, the macroeconomic variables often have the non-stationary problem, while the observed relationship does not tell the true relationship. In order to resolve this problem, we can consider a time trend variable for specifying the relationships. This is why, a deterministic time trend variable (TT) is utilized as an explanatory variable in the empirical relationship, and more specifically, a time trend

⁶ Nominal exchange rate is expressed in terms of BDT to US\$.

⁷ Consumer price index is calculated using base year 2005-06=100.

⁸ Quantum index of medium and large-scale manufacturing Industries (Base: 2005-06=100) is used as the proxy of real gross domestic product.

variable (TT) is included to capture any drift in the measure that is not explained by the macroeconomic relationship. The specified model is estimated using Ordinary Least Square (OLS) and Auto Regressive Distributed Lag (ARDL) by fixing lags methods. After estimating the parameters, econometric analyses are also performed employing Breusch Godfrey LM test, White's test, and Skewness/Kurtosis test in order to investigate the autocorrelation, heteroskedasticity and normality assumption respectively.

5. Findings:

In this study, we checked the stationarity property of the variables using time plots instead of using the tests of stationarity. In practice, the shape of the time plot may identify the nature of the time series variable as to whether it is stationary or not. From the time plots of different variables (See Appendix 1), we may state that all the variables are stationary in nature except the nominal exchange rate.

The following table shows the findings of OLS and ARDL estimations of the model.

Dependent Variable: Fxrg		
Regressor	OLS Regression	ARDL Regression
Fxrg (Lag 1)	0.2032 (0.1311)	0.1976 (0.1339)
Exr	0.5264 (0.3203)	0.0238 (0.1462)
Inf (Lag 1)	-1.3364*** (0.4715)	-1.1008** (0.4619)
Remg	0.0127 (0.1003)	0.0480 (0.1005)
Remg (Lag 1)	-0.0529 (0.1026)	-0.0190 (0.1029)
Rgdpg	-0.2081 (0.1547)	-0.2401 (0.1569)
Rgdpg (Lag 1)	0.0508 (0.1618)	0.0375 (0.1651)
Trbg	-0.0090 (0.0156)	-0.0106 (0.0159)
Trbg (Lag 1)	-0.0216 (0.0150)	-0.0223 (0.0153)
Fdiing	0.0135**	0.0134**

	(0.0061)	(0.0063)
Fdiing (Lag 1)	-0.0086 (0.0068)	-0.0092 (0.0069)
TT	-0.2312* (0.1318)	
Adjusted R²	0.2159	0.1823
No. of Observations	59	59

Source: Author's calculation using STATA 14 version.

Note: ***, ** and * indicate the 1% , 5% and 10% level of significance respectively.

In OLS and ARDL estimation techniques, the coefficients of exchange rates are not statistically significant, but show the expected positive sign, which means that to some extent it has economic implications. Inflation and reserve growth relationship show statistically significant inference i.e., a 1% increase in one period lagged inflation is associated with a 1.1 % decrease in reserve growth. FDI inflow also has a significant association with reserve growth i.e., a 1% increase in FDI inflow growth is associated with a 0.013 % increase in reserve growth. All other variables influence on foreign reserve are not statistically well justified. In the ARDL estimation, the estimated residuals are free from autocorrelation and heteroskedasticity problem; moreover, the estimated residuals also follow the normal distribution (See Appendix 2).

In general, there is an economic linkage between exchange rate changes and reserve growth. Although these relationships are not statistically significant, the expected positive sign indicates the economic influence. Conversely, an increase in the percentage of one lag inflation has a negative effect on reserve growth and an increase in the percentage of FDI inflow growth has a positive effect on reserve growth in Bangladesh.

6. Policy Implications:

The evidence from the empirical study shows no significant statistical relationship exists between exchange rate movements and reserve accumulation, while the inflation and reserve association; FDI inflow and reserves association are found to be significant. Based on these findings, the following policy measures could be suggested.

1. Inflationary movements should be controlled in the accumulation of higher reserves. Inflationary pressure can be controlled by the central bank through their monetary policy instruments. In Bangladesh, inflationary pressure comes not only from demand-side factors, but also from supply-side factors; that is why the fiscal authority or the government should take appropriate initiatives parallel with the monetary authority for reducing inflationary movements.

2. Foreign direct investment inflow should be enhanced for stable reserves growth. In order to attract FDI inflows, the country should have political stability, integrated financial system, and well-facilitated special purpose economic zone.
3. Monetary policy should aim at minimizing extensive fluctuations in the exchange rate that may reduce speculative attacks and undermine the stability of the money demand function. Towards this objective, exchange rate policy should aim at the right balance between necessary flexibility to ensure competitiveness and desire stability to increase confidence in the domestic currency and the underlying fundamentals that provide support to the currency's value over time.

7. Conclusion:

The analytical part of this study illustrates that in light of economic performance as well as an economic point of view to some extent the floating exchange rate regime has a positive effect on the macroeconomic behavior of Bangladesh. In fact, due to some other reasons like the unavailability of high-frequency data and the exclusion of some important variables, such relationships are not statistically justified properly. The enduring exchange rate depreciation along with high inflation is fetching a considerable issue for the regulators and government as well. The foreign currency gap due to demand and supply in the market is getting larger in the high inflationary economy, which leads a nonstop mislays in the value of the local currency. Bangladesh has already graduated into the process of becoming a developing country. As we know in the floating regime, Bangladesh has somehow managed its exchange rate within a small band. In light of the impossible trinity (Mundell-Fleming trilemma⁹), for instance, the economy of Bangladesh can be able to manage the two conditions only¹⁰, namely independent monetary policy and free capital mobility (out of the three conditions) because the country has already given up the fixed exchange rate system. Moreover, in order to enter into a full-phased developed nation status, Bangladesh has to ensure a stable exchange rate policy. The current exchange rate mechanism is neither appropriate nor a sustainable one in supporting the financial market openness as well as a sovereign monetary policy, as the existing exchange rate system is not fully determined by market operations. In this regard, the Government, as well as the central bank, should take the necessary steps to adopt a stable exchange rate policy towards achieving the best-performing economy.

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Appendix 1: Time Plots of the Different Variables

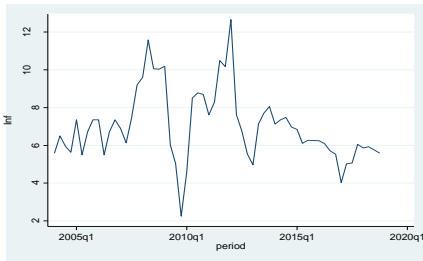


Figure: Time Plots of Inflation

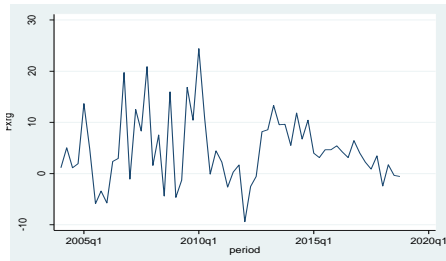


Figure: Time Plots of FX Reserve Growth

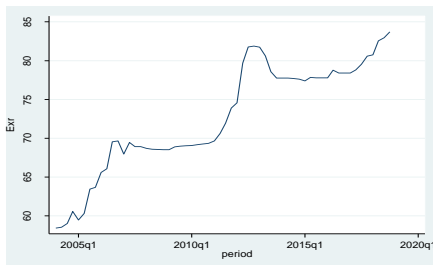


Figure: Time Plots of Exchange Rate

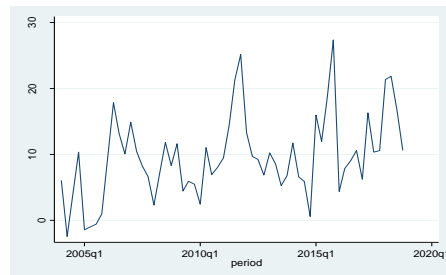


Figure: Time Plots of Real GDP Growth

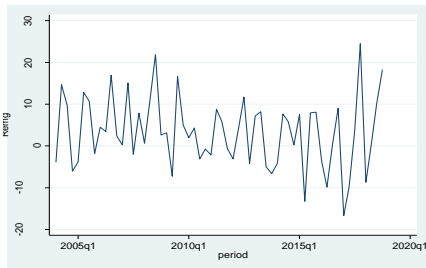


Figure: Time Plots of Worker Remittance Growth

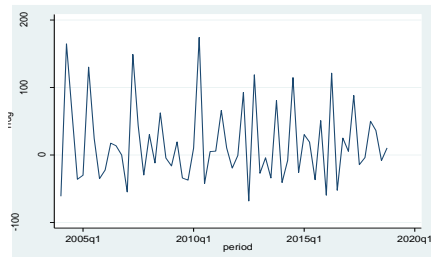


Figure: Time Plots of Trade Balance Growth

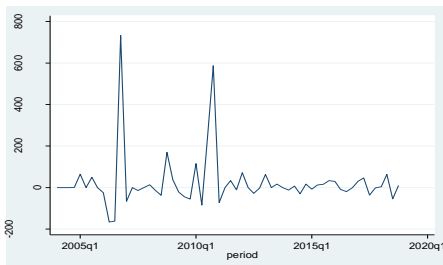


Figure: Time Plots of FDI Inflow Growth

Source: Author's calculation using STATA 14 version.

Appendix 2: Results of Autocorrelation, Heteroskedasticity and Normality Tests

. estat dwatson

Durbin-Watson d-statistic(12, 59) = 2.044728

. estat bgodfrey, lags(1)

Breusch-Godfrey LM test for autocorrelation

lags (p)	chi2	df	Prob > chi2
1	0.702	1	0.4022

H0: no serial correlation

. estat imtest, white

White's test for Ho: homoskedasticity

against Ha: unrestricted heteroskedasticity

chi2(58) = 59.00

Prob > chi2 = 0.4387

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	59.00	58	0.4387
Skewness	4.23	11	0.9628
Kurtosis	1.07	1	0.3007
Total	64.30	70	0.6696

. predict resid, residuals

(1 missing value generated)

. sktest resid

Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	joint	
				adj chi2(2)	Prob>chi2
resid	59	0.2181	0.2720	2.86	0.2399

.