Impact of Financial Development on Exchange Rate Volatility and Long-Run Growth Relationship of Bangladesh

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ABSTRACT: Empirical results show that exchange rate volatility has a negative impact on the economic growth of Bangladesh. In contrast, this paper endeavors to analyze whether level of financial development of Bangladesh has any impact on the exchange rate volatility and growth relationship. To test this, Ordinary Least Square technique has been used considering the interaction between financial development and exchange rate volatility. The findings of the study confirm that growth of this country is adversely affected by exchange rate variability because of the poorly developed financial market of Bangladesh. As the level of financial development is thin, anticipation of exchange rate fluctuations discourages innovation which in turn lowers the growth of Bangladesh. Hence, despite of exchange rate controls have been in place for a long time, those trades oriented policies failed to raise the long run growth of Bangladesh.

1. Introduction

Management of exchange rate is one of the most conventional ways to mitigate internal and external imbalances of the economy of a country. Often policymakers are challenged to choose between fixed and floating exchange rate regime. This is because, according to theory, when exchange rate is fixed, much of the volatility diminishes and when it is allowed to float freely in the market, it becomes unpredictable. However, by the regime choice volatility cannot be reduced (Friedman, 1953; Flood and Rose, 1995). Recent argument is that there is no single exchange rate regime right for all countries (Frankel, 1999) rather level of financial development of a country determines appropriate exchange rate system for that country (Aghion et al., 2009). Perhaps regime choice of exchange rate is one of the most controversial aspects of macroeconomic policy in developing countries.

Inflexible exchange rate has been the subject to intense criticism in China, whereas strong skepticism is voiced against the policymakers of South Africa for not managing the volatile currency. Again, in Bangladesh policy makers have been criticized for maintaining both flexible and inflexible exchange rate policy. Since independence, policy makers of Bangladesh have been managing the currency with the intention of improving balance of payment. Bangladesh has been maintaining various exchange rate regimes, such as pegged to pound sterling (1972-1979), pegged to a basket of major trading partners' currencies (pound as the intervening currency : 1980-1982; dollar as the intervening currency : 1983-1999), crawling band (2000-2003) and finally floating exchange rate (May, 2003- Present). But these endeavors have not only failed to achieve success but made the situation worse. This is because, although well intended, these policies were pursued without required sage and knowledge in the relevant areas of the economy. The main objective of these policies that of shrinking the trade deficit, have met with little success. Prolonged trade deficit, combined with politically directed financial market, prevent Bangladesh from scoring higher rating (currently BB-, rated by Standard & Poor's) in international surveys. Even though exchange rate controls have been in place for a long time, those trade oriented regimes failed to raise the long run growth of Bangladesh but existing literatures provide little guidance on rational clarification of the malfunction of this exchange rate regime.

A key explanation provided by Aghion et al. (2009) is that anticipation of exchange rate fluctuations would discourage innovation which would in turn lower the growth of a country, if the

level of financial development is thin. But institutional structure and behavior of all countries, even which are in same level of development, are not same (Edwards, 1984). Moreover, within a country like Bangladesh liquidity needs for each industry sector are different. Besides, financial market shocks may amplify with the fragile institutional environment of Bangladesh. Taking all these factors into consideration an attempt will be made in this study to analyze whether exchange rate regime or exchange rate volatility has a negative impact on long run growth when a country is less developed financially. The importance of this study includes providing justification to the failure of tailored making exchange rate policy and hence, shedding light on the ongoing debate of exchange rate regime choice.

2. Literature Review

Volatility of real exchange rate is a source of concern among policymakers and researchers. Whether exchange rate volatility is a result of regime choice is analysed by Friedman (1953). According to him, exchange rate unpredictability is a manifestation of economic volatility. By regime choice systematic volatility cannot be reduced rather it only channelled to one locus or another. He argued that instability of exchange rate is only a symptom of instability in the volatility of underlying economic structure. Flood and Rose (1995) agreed with Friedman. They tried to exploit the hypothesis that exchange rate regime is more volatile in floating rate regime rather than fixed regime. According to them, exchange rate model based on macroeconomic fundamentals are unlikely to be successful. Moreover, their work suggested that, there is no trade-off between reduced exchange rate volatility and macroeconomic stability.

Lustig et al. (2011) took an innovative approach and tried to inspect arbitrage opportunity in currency markets. They found that only exchange rate movement is adequate to spoil the gains from the interest rate differentials and suggested that behaviour of exchange rate is more or less identical to the prices of other assets.

According to the optimal currency area (OCA), originally associated with Mundell (1961) and Mckinnon (1963), independent currency and monetary policy are useful stabilization tools, especially when other stabilization instruments are inadequate or lacking. Their viewpoint is if OCA criteria are satisfied, exchange rate will be used for adjusting relative pricing among countries. These criteria include asymmetric shocks among countries, cross border labor flows, inability of cross border labor flows to contribute to smooth employment cycles and existence of no fiscal based methods to stabilize balance of payments or output. Given there exists short run price stickiness and employment adjustment to shocks accompanied by a trade-off between inflation and employment, a depreciating country will elicit improvement in trade balance. This theory suggests that the choice of exchange rate regime is related to geographical and trade aspects and hence, only open and small countries will adopt fixed regime. Moreover, when the probability of real shocks is higher, to minimize the output fluctuation, fixed exchange rate will be preferred. But when real shocks become increasingly important due to growing trade flows and capital market integration, flexible regime will be adopted. Aizeman and Flood (1992) went beyond the earlier study highlighting on labor mobility. They successfully showed that foregoing currency independence with adjustable exchange rate can be welfare enhancing. But doubtful impression, related to the influence of exchange rate on employment and output, was articulated by Goldberg (1999) for the countries which are in early stages of transition. Moreover, strong skepticism was also voiced for selection of particular exchange rate for stabilization. He suggested that transition economies should select exchange rate on the basis of sustainability and consistency.

Rather than considering single large currency, Devereux and Lane (2003) developed a different approach where they focused exclusively on the drivers of bilateral exchange rate volatility. They presented a theoretical model where they used bilateral exchange rate using large cross section data of both developed and developing countries. According to them, in developing economies exchange rate volatility is strongly negatively affected by the financial linkage. But the reverse is true for industrial countries and here optimal currency area plays a pivotal role. Nevertheless, according to Levy-Yeyati et al. (2010) political, social, financial as well as geographical variables better explain the likelihood of adopting a given exchange rate regime. Besides, a key issue, addressed by Broda and Romalis (2011), showed that trade dampens exchange rate volatilities and vice versa. To minimize the

impact of volatility they proposed to control the problem of reverse-causality on trade and concluded that a deeper trading relation can decline real exchange rate volatilities and lead to currency union.

A dynamic equation was estimated by Edward (1988), using pooled data for a group of 12 countries, in which he showed that if there is disequilibrium in exchange rate, autonomous forces will move real exchange rate back to equilibrium. But it will operate very slowly, therefore, for a long period of time countries will stay out of equilibrium. This finding, indeed, indicates that nominal devaluation will speed up real exchange rate realignment if there is imbalance. However, Flood et al. (1996) argued that nominal price fixing of Government will be successful indefinitely if this policy is the highest priority of Government. Other than this, if priority is given on other sectors such as deficit financing or base money targeting then these multiple goals will contradict with each other. Additional duties of monetary authorities will simply accelerate the demise of fixed exchange rate system.

To make inference on the argument that country depreciates currency when they run out of international reserves, Edwards (1984) measured the level of reserves that triggers depreciation in relation to desired level of reserves. According to theory, when countries take depreciation decision, its reserves fall below desired level. But Edwards concluded that countries that follow fixed exchange rate hold more reserve than that of depreciating countries. Bilson (1980) agreed with Edwards that the probability of the change in the exchange rate is related to the ratio of reserve to high powered money. He endeavoured to answer the questions that are asked by private participants in international economies and tried to find out when Government will depreciate currency and by how much. Though he admitted that the question cannot ever be answered exactly but suggested that monetary indicators tend to lead changes in the exchange rate.

Above literatures provide little guidance on rational clarification of the malfunction of customized exchange rate regime. These are tailored to the affluent countries with highly developed financial market. Discussion of financial development, an influential aspect, is almost absent here. Fundamental error of those work lies on the assumption that exchange rate is affected by only exogenous shocks. Besides, in most empirical studies, factors responsible for volatility are addressed making distinction between developed and developing countries. However, identifying the factors and classifying countries according to their degree of economic development do not contribute significantly in reducing exchange rate volatility. Moreover, all countries do not behave in the same way. Hence, the aim of the study is to measure whether exchange rate is affected by poorly developed financial market i.e. the role of financial development in exchange rate regime choice.

3. Methodology
3.1 Data
The research focuses on the exchange rate, financial development and growth data of Bangladesh. The study period spans from 1980 to 2012. Data has been obtained from International Financial Statistics (IFS), World Economic Outlook (WEO) and World Development Indicators (WDI).

3.2 Estimation
Basic hypothesis of this study is whether financially less developed country (Bangladesh) grows faster with a flexible exchange rate. To test this, Ordinary Least Square (OLS) has been used. This technique has been chosen because it provides best linear estimators (Wannott and Wonnocott, 1972). To make inference on the financial development, volatility and growth network the equation used in this study is:

$$Y = \alpha + \beta_1 EV_1 + \beta_2 FD_2 + \varepsilon_{it} \quad\quad\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

$$Y = \alpha + \beta_1 EV_1 + \beta_2 FD_2 + \beta_3 EV_1 * FD_2 + \varepsilon_{it} \quad\quad\ldots\ldots\ldots\ldots\ldots(2)$$

The direct effect of exchange rate on growth is examined by equation (1) and the interaction between exchange rate flexibility and financial development is measured by applying equation (2). Here, Y is productivity growth, α, β_i and ε_{it} denote intercept, beta co-efficient and error term respectively. Explanatory variables include exchange rate volatility (V_2) and financial development (FD_3). Productivity growth is measured by the growth in output (real GDP) per worker. To measure volatility of exchange rate (V_2), this study has used standard deviation of the exchange rate. The formula that is considered by this study is:

$$\sigma_{it} = Ln\sqrt{\frac{1}{n-1}\sum_{k-1}^{n}\left(RER_{ik} - \overline{RER_t}\right)^2}$$

Where σit is the volatility of real exchange rate and *RERik* is the monthly exchange rate of Bangladesh and $\overline{RER_t}$ is the monthly average of real exchange rate.

Finally this study has considered total private credit supplied by all lending organization of Bangladesh as a share of GDP to measure financial development (FD_3) (as in Levine et. al. 2000).

4. Empirical Results

As the study is based on time series data stationary test is needed to perform in order to avoid spurious regressions. To check for non stationary property, unit root test has been employed in this study.

Table 1. Augmented Dickey Fuller Test

	Productivity Growth		Financial development		Volatility	
	Level	1st difference	Level	1st difference	Level	1st difference
Without Trend	-2.39	-5.2	-0.03	-3.4	-1.8	-3.9
With Trend	-2.68	-4.4	-0.99	-3.7	-2.3	-4.4

ADF test suggests that, all the variables are non-stationary. In addition, all the variables are cointegrated to order one I(1). Finally OLS method has been applied to measure the impact of financial development on exchange rate volatility and economic growth of Bangladesh. The result of the estimation is as follows:

Table 2. Outcome of the regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.256	0.190	54.090	0
EV	-0.190	0.051	3.700	0.0479
FD	5.701	1.443	3.950	0.0005
R-squared	0.689	Mean dependent var		9.506
S.E. of regression	0.228	S.D. dependent var		0.280
Sum squared resid	1.458	Akaike info criterion		-0.026
Log likelihood	3.398	Schwarz criterion		0.113
F-statistic	8.667	Hannan-Quinn criter.		0.020
Prob(F-statistic)	0.001	Durbin-Watson stat		2.231

The OLS result for regression 1 reveals that exchange rate volatility has significant negative impact on economic growth. A one standard deviation increase in exchange rate volatility dampens growth by 0.19% point. In addition, financial development is positively related with productivity growth and the result is statistically significant.

Here, 69% of the variation of economic growth can be explained be the variation of independent variables. Durbin-Watson statistics is 2.23 indicates no serial correlation in the residuals. The F-value is 8.67 with a corresponding p-value of 0.001176, which indicates that the overall fitness of the model is good.

The OLS result for regression 2 allows interaction between financial development and exchange rate volatility. The interaction result reveals that the interaction between exchange rate volatility and financial development is positive and significant. It shows that as the level of financial development of Bangladesh is thin so too much exchange rate volatility creates a negative impact on growth of Bangladesh.

R-square 0.71 indicates that 71% of the variation of economic growth can be explained be the variation of independent variables. Durbin-Watson statistics is 2.21 indicates no serial correlation in the residuals. 5.60 of F-value with a corresponding p-value of 0.004030 indicate that the overall fitness of the model is well-justified.

Table 3. Outcome of the regression 2 (with interaction)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EV	-0.068	0.013	-5.269	0.045
FD	5.301	2.174	2.438	0.022
FDEV	0.432	0.073	5.894	0.005
C	10.208	0.271	37.637	0.000
R-squared	0.714	Mean dependent var		9.506
S.E. of regression	0.232	S.D. dependent var		0.280
Sum squared resid	1.454	Akaike info criterion		0.037
Log likelihood	3.434	Schwarz criterion		0.222
F-statistic	5.605	Hannan-Quinn criter.		0.097
Prob(F-statistic)	0.004	Durbin-Watson stat		2.213

5. Conclusion

The purpose of this study is to measure whether exchange rate system is influenced by poorly developed financial market. To measure this, the study applied Ordinary Least Square (OLS) Model with interaction between financial development and exchange rate variability covering the data period from 1980 to 2012.

Our result shows that exchange rate volatility has a negative impact on economic growth of Bangladesh. Level of financial development has the potential of contributing to the economic growth of Bangladesh. The interaction result reveals that the interaction between exchange rate volatility and financial development is positive and significant. As the level of financial development is thin anticipation of exchange rate fluctuations discourages innovation which in turn lowers the growth of Bangladesh. Because of this, despite exchange rate controls have been in place for a long time, those trade oriented policies failed to raise the long run growth of Bangladesh. These findings confirm the recent argument that there is no single exchange rate regime right for all countries (Frankel, 1999) rather level of financial development of a country determines appropriate exchange rate system (Aghion et al., 2009). Prolonged trade deficit, combined with politically directed financial market of Bangladesh, are barrier of scoring higher rating in international surveys.

This research is an endeavor to help the policy makers of Bangladesh and to contribute on the ongoing debate of exchange rate regime choice. However, this study is not beyond limitations. For rigorous study various measures of exchange rate flexibility need to be considered. For future study we also plan to use structural model to measure the trade-off between financial market shocks and thin credit market.

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