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Thoughts on Banking and Finance

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Contents

Editorial Note

Bangladesh Bank Training Academy (BBTA) publishes journal 'Thoughts on Banking and Finance' containing articles which focuses on key economic and financial issues offering substantial insights to policymakers as well as researchers and academicians. The current issue contains 6 articles which sheds light on different economic and financial matters related to Bangladesh and Japanese economy.

The first article 'The Relationship between Financial Development and Economic Growth in Bangladesh: An ARDL approach' examines the pivotal relationship between the financial development and economic growth in Bangladesh using the autoregressive distributed lag (ARDL) approach over the period from 1977 to 2015. Major findings reveal that that the financial indicators such as ratio of domestic credit to private sector by banks (CPS) to gross domestic product (GDP), ratio of money supply (M2) to GDP, and ratio of stock market capitalization (MC) to GDP have statistically significant positive effects on GDP per capita.

The second paper 'Trends, Structure and performance of Exports and Remittance in Bangladesh' analyzes the external sector performance in Bangladesh, especially trend of export earnings and remittances during 1975-2018. The main findings of this paper reveal that export earnings and remittances are the dominating external sector factors of Bangladesh economy during the study period. The paper mentioned that both remittance and migration growth decreased recently. The decreasing rate of remittance and export earnings is a concern for policy-makers on the external sector of the economy.

The third paper 'An analysis of relationship between exchange rate and balance of payment for the Japanese economy' aims to evaluate the impact of yen devaluation on the BOP movements in Japan during the period 1998 to 2016 applying OLS and VAR model. The estimated results reveal that exchange rate is not the main factor in determining the BOP movements in Japan. Japan is an industrialist country, so many economic factors from both inside and outside of the country are vital to determine the BOP rather than just the exchange rate.

The fourth paper 'Financial Inclusion Landscape in Bangladesh: Strengths and Weaknesses' reviews the current state of financial inclusion landscape in Bangladesh in order to find out strengths and weaknesses. The finding of the paper shows that financial inclusion has been broadened and scaled up many-folds over the last ten years. It also finds that the major strengths include the marginal farmers, sharecroppers, and women entrepreneurs who were excluded or underserved can access financial services due to pursuing credit policy of agricultural and CMSMEs, and scale up financial inclusion through agent banking and MFS in rural

areas. The paper also finds out some weaknesses which include 'the missing middle' segment of MSMEs, existing higher interest rates, very low insurance coverage and delays to adopt NFIS which are critical for broadening financial inclusion in future.

The fifth paper 'Foreign Exchange Market Structure and Exchange Rate Volatility in Bangladesh' attempts to measures the volatility behavior in terms of exchange rate returns and volume of daily transactions in foreign exchange market of Bangladesh during July 2014 to June 2018, applying GARCH family models. The results show that the presence of volatility clustering in foreign exchange rate returns as the volatility of risk is responsive to past shocks and the past volatility influences the current volatility of exchange rate returns. Moreover, the return is positively related to its volatility. The existence of leverage effect is also evidenced in the Bangladesh foreign exchange market as positive past shocks increase volatility more than the negative past shocks of the same magnitude. Thus, the appreciation and the depreciation of Bangladesh Taka against USD do not necessarily cause symmetric variation in the exchange rate returns.

The sixth paper 'Impact of Education Level of the Expatriates on Remittances Inflow: Bangladesh Perspective' determines the relationship between inflow of remittances and its micro determinants especially expatriates' human capital represented by the level of education. Besides human capital, the paper also examines the impact of expatriates' age, sex, host country, occupation, number of years spent abroad on the remittance inflow of Bangladesh. The findings of the paper show that a one-year increase in education year causes increase in remittance inflow into Bangladesh by 2.19 percentage. For the age variable, a one-year increase in the age of expatriates, we can expect the remittance inflow to increase by 1.11 percentage.

Finally, I would like to convey my heart-felt thanks and sincere gratitude to authors, reviewers, Editorial Advisory Board, and the members of the Editorial Board of BBTA Journal. Our efforts will be fruitful provided the articles published in this issue prove to be useful to readers. We appreciate constructive criticism and thoughtful feedback for further improvement of the Journal in future.

Md. Golzare Nabi
General Manager &
Executive Editor
BBTA Journal: Thoughts on Banking and Finance

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The Relationship between Financial Development and Economic Growth in Bangladesh: An ARDL approach

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Abstract

In recent years, the effect of financial development on economic growth has been paying attention by policy makers and researchers all over the world due to the development and expansion of financial institution and market. A sound and the robust financial system can accumulate capital from various sources and allocate the capital resources to most productive sector effectively. This study examines the pivotal relationship between the financial development and economic growth in Bangladesh using the autoregressive distributed lag (ARDL) approach over the period from 1977 to 2015. Empirical analysis observe the effect of financial development and economic growth through some regression models, concludes that the financial indicators namely domestic credit to private sector by banks (CPS) to gross domestic product (GDP), money supply (M2) to GDP, and stock market capitalization (MC) to GDP has a statistically significant positive effect on GDP per capita. Among these three financial development indicators, money supply has relatively higher and stock market capitalization has a lower significant effect on GDP. ARDL model used to determine the short-run and the long-run relationship among the variables. Bounds test conferred the cointegration or long run relationship between study variables and the long-run co-efficient of domestic credit to private sector by the bank is seemed have statistically positive significant contribution but the long run coefficient of money supply is appeared to be statistically insignificant. In short run, there is a causality running from financial development (domestic credit to private sector by depository banks (CPS) as a percentage of GDP, broad money (M2) as a percentage of GDP, stock market capitalization (MC) as a percentage of GDP) to economic growth.

Keywords: Financial Development, Economic Growth, ARDL model, Bounds Test.

JEL Classification: C13, C22, C32

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Background of the Study

Economic growth of a country is mainly determined by many factors, the financial sector is one of them. Over the past few decades, the world stock markets have surged, and emerging markets have accounted for a large amount of this boom. A robust and proficient financial system consists of financial intermediaries and financial markets enhance economic growth through capital accumulation, effective use and allocation of capital resources to most productive sectors, boosting the savings and investment rate. According to Levin (1997, 2005) the five key functions of financial system which promote economic growth of a country are (i) produce ex-ante information about possible investments and capital allocation; (ii) monitoring investments and delivering corporate governance after providing financing; (iii) facilitation of trade, diversification and management of risk; (iv) mobilization and pooling savings; and (v) promoting the exchange of goods and services. Financial institutions like commercial banks, stock markets can acquire and produce efficient information about intermediation of savings into potential investments and capital allocation. Capital allocation involves dividing financial resources and capital to the different productive sector. Financial institutions can also support the small and medium enterprises (SMEs). They are labor intensive and create more jobs than big companies which significantly influence the economic growth of a country like Bangladesh.

This study primarily focuses on studying and establishing a statistical relationship between financial development and economic growth in Bangladesh. However, in practice, there is no absolute measurement of financial development due to complexity and dimensions it encompasses. Empirical work done so far is usually based on standard quantitative indicators like the ratio of financial institution's asset to GDP, the ratio of liquid liabilities to GDP, the ratio of deposits to GDP, the ratio of Private sector credit to GDP (World Bank, 2015). In this study GDP (nominal) is used as a proxy variable in terms of economic growth.

The main **objectives** of the study are to investigate the statistical relationship between financial development and economic growth in Bangladesh. Extensively, determine the direction of the relationship, the positive or negative effect of financial development on economic growth as well as the degree of relationship.

Another objective is to examine the existence of short-run & long-run relationship through auto regressive distributed lag model.

The rest of the article is organized as follows. In section 2 the literature review, in section 3 an overview of financial system of Bangladesh, in section 4 data and methodology, in section 5 empirical analysis and results discussion and in the last section conclusion.

Literatures Review

The relationship between financial development and economic growth is a controversial topic. According to Bagehot (1873) and Hicks (1969), financial development had an important role in the industrialization period of England by mobilizing capital.

Schumpeter (1912) concludes that financial development has animportant effect on economic growth. Financial intermediaries support innovation and creativity and there by economic growth by identifying and funding productive investments.

Goldsmith (1969) shows the existence of a positive relationship between financial development and economic growth. King and Levine (1993) use the data for 77 countries over the period from 1960 to 1989 to investigate the relation between financial indicator liquid liabilities and Economic growth and find a statistically significant positive relationship between financial development and economic growth.

Levine and Zervos (1998) find a statistically significant relation between banking development and the stock market with productivity growth by using 47 countries from 1976 to 1993. Beck and Levine (2004) notice the financial institutions measured by stock markets and banks have a significant effect on economic growth by using 40 countries from 1976 to 1998.

Levine, Loayza, and Beck (2000) observe a robust legal origin promote better financial institutions and thereby promote economic growth. They use data for 74 countries from 1960 to 1995.

Godfrey Ndlovu (2013) finds the existence of unidirectional causality from economic growth to financial development in Zimbabwe for the period 1980-2006.

Islam, Habib, and khan (2004) find no evidence of causal direction from financial development to economic growth in Bangladesh, rather growth led financial development for the period 1975-2002.

Md. Habibur Rahman (2007) shows that financial development in Bangladesh has long run effect on income per capita for the period 1976-2005.

Mohsin and Abdelhek (2000) find strong positive and statistically significant relationship between financial indicators such as domestic credit to the private sector, stock market capitalization and economic growth by using data for 159 countries for the period 1960-1999.There is a few empirical evidences does not support the positive statistically significant relationship between financial development and economic growth.

According to Shakhawat (2018), for some MENA countries inflation rate, domestic credit to private sector and broad money have negative impact on GDP growth that might be due to high inflation rates and less stable economies.

According to Van Wijnberg (1983) and Buffie (1984), financial development is anti-growth. Lucas (1988) concludes that finance is an overstressed determinant of economic growth. Therefore, any policies aimed at endorsing financial development would be a waste of resources, as it diverts attention from more relevant policies such as labor and productivity improvement programs, encouragement of exports; amongst others.

Md. Rabiul Islam, Md. Wahidul Habib and Md. Habib-uz-Zaman Khan (2004) find that there is no such evidence of causal direction from financial development to economic growth in Bangladesh. Despite having contradictory empirical evidence on the relationship between financial development and economic growth, it is generally agreed that a robust and sound financial system have a positive impact on economic growth (Apergis, Filippidis, and Economidou, 2007; Jung, 1986; Calderon and Liu, 2003). According to World Bank, financial development plays an important role in economic growth; it reduces poverty by providing access to financing to the poor and improves in income distribution (World Bank, 2001).

Shakhawat (2018) found the inflation rate; import and credit by banking sector for some Latin American countries have negative impact on GDP growth whereas the

rest of the variables, exports, stock market, board money, credit by private sector and interest rate have positive contribution to the GDP growth where only interest and credit by banking sector are significant.

Overview of Financial System of Bangladesh

The financial system of Bangladesh largely consists of Banks, Non-Bank Financial Institution (FIs), Insurance Companies, Capital Market, Micro Finance Institutions (MFIs). These institutions are a part of the formal sector of the financial system of Bangladesh. Banks and Non-Bank Financial Institution (FIs) are regulated by Bangladesh Bank.

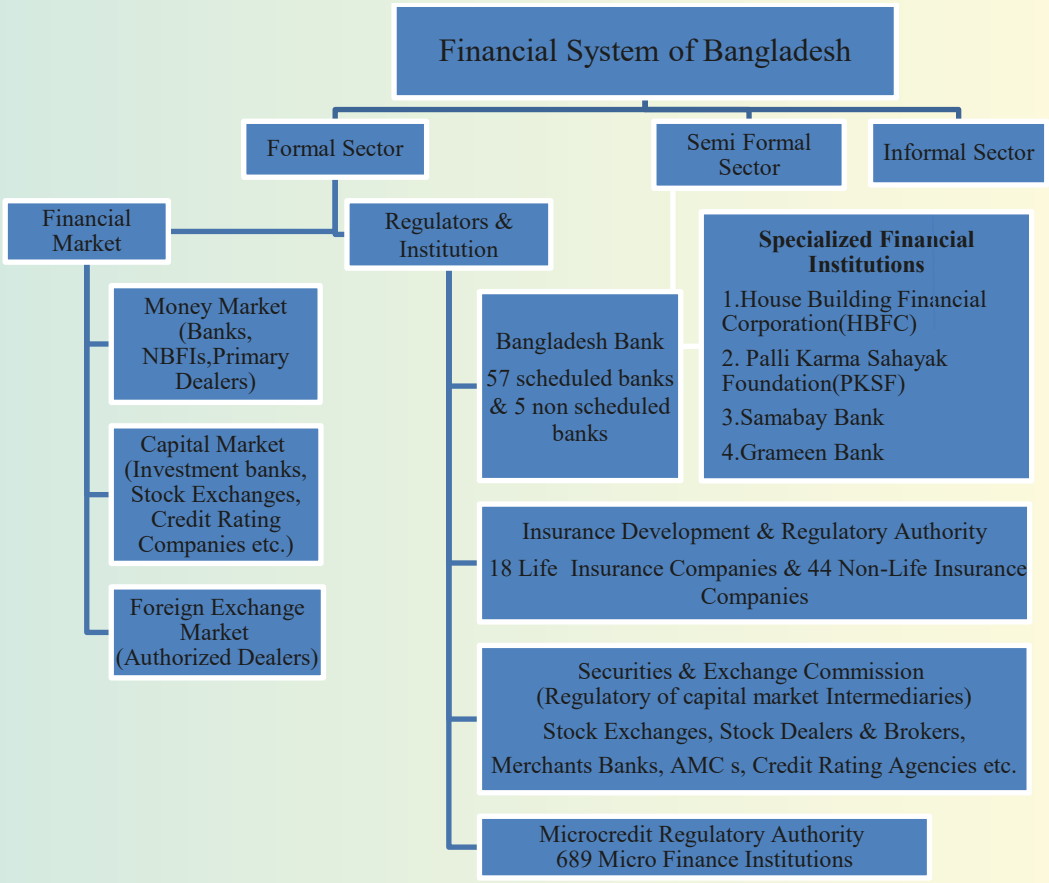
Specialized financial institutions which are regulated but do not fall under the full jurisdiction of Bangladesh Bank are the part of the semi-formal sector. The informal sector includes those private financial institutions which are not completely regulated by any other financial regulator are the part of the informal sector.

Bangladesh Stock Market

Bangladesh has two stock markets, Dhaka Stock Exchange (DSE), established in 1954 where trading is conducted by computerized Automated Trading System and Chittagong Stock Exchange (CSE), established in 1995 which is also conducted by computerized Automated Trading System.

The Dhaka Stock Exchange (DSE) was established as East Pakistan Stock Exchange Association Limited on April 28, 1954. Formal trading of the bourse began in 1956. On June 23, 1962, it was renamed as East Pakistan Stock Exchange Ltd. The name of the stock exchange was once again changed to Dacca Stock Exchange Ltd on May 13, 1964. The service on the stock change continued uninterrupted until 1971. The trading was suspended during the liberation war and resumed in 1976 with the change in economic policy of the government.

Figure 1: Structure of Financial System of Bangladesh



Source: Bangladesh Bank Website.

The Chittagong Stock Exchange (CSE) is a not-for-profit organization, formed and registered with the registrar Joint Stock Companies and Firms in Bangladesh on April 1, 1995 as a public company limited by guarantee with an Authorized capital of 150,000,000 divided into 500 shares of Tk. 300,000 each. The Exchange members are not its beneficiaries since they are not involved in profit sharing and taking dividend.

Data and Methodology

Data

In this study, data is collected from the World Bank Development Indicator online database for Bangladesh. Gross Domestic Product (GDP) per capita at current US dollar over the period from 1977 to 2015 is considered in this study as it is calculated without making deductions for depreciation of fabricated assets or for depletion or degradation of natural resources. Financial development is measured by three widely used financial development indicator. Firstly, domestic credit to private sector by depository bank (CPS) as a percentage of GDP is one of the popular and best used financial development indicators. It refers to financial resources provided to private sector by depository banks except for central bank. Generally, it excludes credit issued to government, government agencies, and public agencies. But for some countries, these claims include credit to public enterprises. Secondly, broad money (M2) as a percentage of GDP is the liquid liabilities of the financial system in Bangladesh consisting of currency plus demand and interest-bearing liabilities of banks and non-banks financial intermediaries. This is the broadest measure of financial intermediation as it covers all banks, central bank, and non-financial intermediary activities. Finally, for the stock market, a commonly used proxy variable is stock market capitalization (SMC) as a percentage of GDP which represents the financial market. Market capitalization is the share price times the numbers of shares outstanding of listed companies

The variables GDP per capita (from 1977 to 2015), domestic credit to private sector by depository banks (CPS) as a percentage of GDP (from 1977 to 2015), broad money (M2) as a percentage of GDP (from 1977 to 2015), stock market capitalization (MC) as a percentage of GDP (from 1993 to 2012), are converted to natural logarithm and represented by lnGDP, lnCPS, lnM2, and lnMC respectively. Due to non-availability of data, the dataset of Stock market capitalization ranges from 1993 to 2012 was used. (The dataset I have used from world bank excel sheet is providing stock market data for Bangladesh after 1993).

Methodology

Primarily, to investigate the relationship between economic growth and financial development, a series of the linear regression model is performed by using lnGDP as the dependent variable; lnCPS, lnM2, lnMC as the independent variable. First, individual financial development indicator is regressed to the dependent variable, GDP per capita.

$$lnGDP = \alpha + \alpha_1 lnCPS + u_1 \dots\dots\dots (4.1)$$

$$lnGDP = \beta + \beta_1 lnM2 + u_2 \dots\dots\dots (4.2)$$

$$lnGDP = \gamma + \gamma_1 lnMC + u_3 \dots\dots\dots (4.3)$$

$\alpha, \beta, and\ \gamma$ are the intercept or constant of their respected model, $\alpha_1, \beta_1, and\ \gamma_1$ are the regression coefficients of $lnCPS, lnM2, lnMC$ and $u_1, u_2, and\ u_3$ are the error term of the model.

Then a model is estimated by including all independent variables except stock market capitalization due to non-availability of data set (1993 to 2012).

$$lnGDP = \delta + \delta_1 lnCPS + \delta_2 lnM2 + +u_4 \dots\dots\dots (4.4)$$

$\delta$is the intercept or constant of the model, $\delta_1\ and \delta_2$ are the regression coefficients of $lnCps\ and\ lnM2$ and u_4 is the error term of the model.

Autoregressive Distributed Lag (ARDL) model has been used for examining the long run relationship and the cointegrating relationship between variables (Pesaran and Shin, 1999). It includes lagged variable of both dependent variable and independent variable as regressors (Greene, 2008). When sample size is small, the ARDL model is more efficient than traditional Johanson cointegration as it requires a large sample. So ARDL model has been used in this analysis for examining the long run and short run relationship between lnGDP and lnCPS and lnM2. But before going to ARDL approach, unit root test has to be performed. Because one of the vital assumptions of ARDL model is that ARDL model can be used in the presence of a mixture of $I(0)$ and $I(1)$ series but cannot be used in the presence of $I(2)$ series (Paul, 2014). Unit root or order of integration of variables is tested by Dickey-Fuller (DF) test (1979) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test (1992). The ARDL approach is a two-step method for estimating long-run relationship (Pesaran et al., 2001). The first step involves

examining the existence of a long-run relationship between dependent variable and independent variable in the ARDL model. And the second step involves estimating the coefficient of the same ARDL model.

Now the basic form of $ARDL\,(p, q_1, \dots\dots\dots, q_k)$ model in terms of lnGDP, lnCPS, and lnM2. The $ARDL\,(p, q_1, q_2)$ model is

$$lnGDP_t = \alpha + \sum_{i=1}^{p} \gamma_i\, lnGDP_{t-i} + \sum_{i=0}^{q_1} \beta_i\, lnCPS_{t-i} + \sum_{i=0}^{q_2} \delta_i\, lnM2_{t-i} + \varepsilon_t \dots\dots\dots (4.5)$$

Where p is the number of lags of$lnGdp$, q_1 is the number of lags of$lnCps$ and q_2 is the number of lags of $lnM2$.The lag order of the ARDL model is determined by the lag selection criteria like Akaike Information Criteria (AIC), Schwarz Bayesian Criteria (SBC), Hannan-Quinn Criteria (HQC).

To test the existence of long run coefficient between dependent and explanatory variable, Pesaran, Shin and Smith (2001) provide a method, the Bounds test. Bounds test model for study variables can be represented as

$$\Delta lnGDP_t = \alpha + \sum_{i=1}^{p} \gamma_i\, \Delta lnGDP_{t-i} + \sum_{i=0}^{q_1-1} \beta_i\, \Delta lnCPS_{t-i} + \sum_{i=0}^{q_2-1} \delta_i\, \Delta lnM2_{t-i} + \rho GDP_{t-1} + \theta_1 lnCPS_{t-1} + \theta_2 lnM2_{t-1} + \epsilon_t \dots\dots\dots (4.6)$$

The Null Hypothesis is

$$H_0: \theta_1 = \theta_2 = 0; no\ cointegration\ among\ variables.$$

Here F-Statistic is used in bounds test to test the existence of the long run relationship. Pesaran (2001) computed two sets of asymptotic critical values for bounds test. If the computed F-statistic falls outside the critical value bounds, an inference can be drawn (Pesaran, 2001). The critical values are lower bound critical value which assumes that all variables are I(0) and upper bound critical value which assumes that all variables are I(1). If the calculated F-statistic exceeds the upper bound, the null hypothesis can be rejected; if fall below the lower bound, the null hypothesis can be accepted. If they fall within the bounds, no inference can be made.

Based on the result of Bounds test that is variables are cointegrated or long run relationship exists among the variables, the long run coefficient and Error Correction Model (ECM) along with short-run coefficient can be estimated by the following cointegrating representation of the ARDL model

$$\Delta lnGDP_t = \sum_{i=1}^{p-1} \gamma_i \, \Delta lnGDP_{t-i} + \sum_{i=0}^{q_1-1} \beta_i \, \Delta lnCPS_{t-i} + \sum_{i=0}^{q_2-1} \delta_i \, \Delta lnM2_{t-i} + \varphi ECT_{t-1} + \epsilon_t \dots\dots (4.7)$$

Where ECT is the error correction term expected to be negative and ranges within $0 \sim 1$. Otherwise, it will be meaningless. φ is the speed of adjustment. Which describes the degree of disequilibrium are corrected from short-run to long-run when system is out of control. $\beta_i' s \; and \; \delta_i' s$ are the short run coefficients describe the short run effect of individual explanatory variable. The long run coefficient of individual variable can be estimated from the model (4.7).

A set of diagnostic tests is performed on selected ARDL model to check the validity and stability of the model. The diagnostic tests are comprised of Breusch-Godfrey serial autocorrelation test, Breusch-Pagan-Godfrey Heteroskedasticity test, Histogram normality test, Ramsey Regression Equation Specification Error test (RESET), cumulative sum (CUSUM) and cumulative sum (CUSUM) of squares test.

Empirical Analysis with Results and Discussion

The relationship between economic growth and financial development is studied through estimating linear regression model $(4.1), (4.2), (4.3)$ *and* (4.4) including economic growth, financial development indicators. Table 1 illustrates the result of regression model:

Table 1: Estimated results of simple linear regression model

Independent Variable	*Dependent variable*: *lnGDP*			
	Model-1	Model-2	Model-3	Model-4
lnCPS	0.770104**			0.228571
	(0.0000)			(0.2142)
lnM2		0.994872**		0.713619**
		(0.0000)		(0.0037)
lnMC			.297461**	
			(0.0000)	
Constant	3.686747**	2.540748**	5.599328**	2.883270**
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Sample	1977-2015	1977-2015	1993-2012	1977-2015
Observations	39	39	20	39
Adjusted R-Squared	0.853428	0.879176	0.616615	0.881100

Note: ** p<0.01, * p<0.05; Note: P-value in parentheses; Source: Authors' estimates

Individually all financial development indicators appear to be positive as well as statistically significant. The direction and magnitude of estimated coefficients is also desirable. But when the bank credit and money supply is used as an explanatory variable, the bank credit appears to be insignificant. Although the financial sector of Bangladesh is mostly dominated by the banking sector, money supply, the measurement of financial depth, appears to have positive and robust significant effect on economic growth than the other two financial development indicators. Stock market capitalization has arelatively lower significant effect on economic growth.

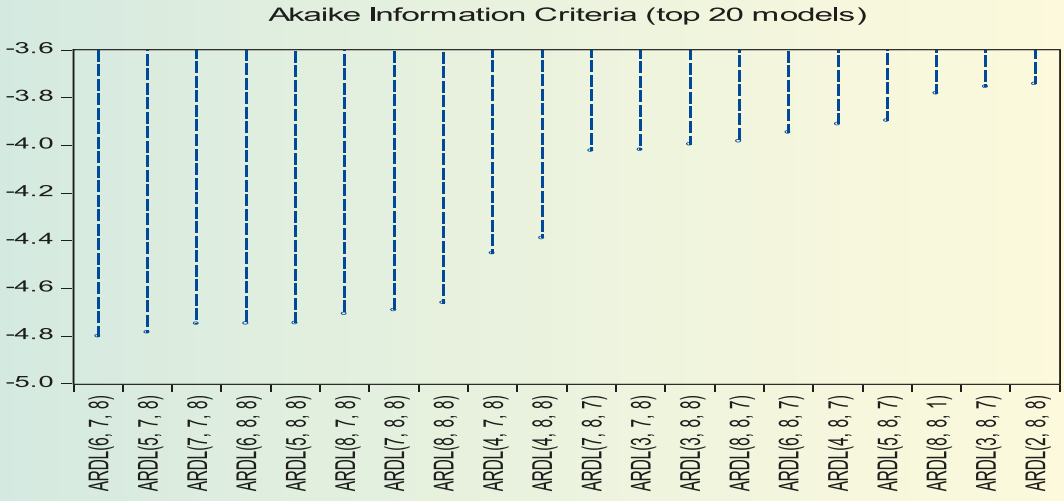
One of the vital assumptions of ARDL model is that ARDL model can be used in the presence of a mixture of $I(0)$ and $I(1)$ series but cannot be used in the presence of $I(2)$ series (Paul, 2014).From table 2, unit root test confirms that all variables are stationary after first difference at 1% and 5% level of significance. These results confirm the further proceed for ARDL method.

Table 2: Unit Root Test

Variable	ADF and KPSS test decision
lnGDP	I(1)
d.lnGDP	I(0)
lnCPS	I(1)
d.lnCPS	I(0)
lnM2	I(1)
d.lnM2	I(0)

The first step of ARDL approach involves determining the appropriate lag order of $ARDL\ (p, q_1, q_2)$ model variable can be obtained by different selection criteria such as Akaike Information Criteria (AIC), Schwarz Information Criteria (SIC), Hannan-Quinn Criteria (HQC).

Figure 2: ARDL model selection based on AIC criteria



The lower the AIC, SIC, and QIC value, the better the model. Based on this assumption, the appropriate lag order for dependent and independent variables is 8. The selected appropriate ARDL model is $\boldsymbol{ARDL\ (6, 7, 8)}$ which is evaluated from 648 model, automatically done by E-views. Figure 2 exhibits the top 20 models based on AIC criteria and$ARDL$ (6,7,8)appears to be best model over the others model.

The existence of a long run relationship or cointegration between study variables is examined by Bounds test. F statistics is used in the bound test which can be estimated by bounds test model (4.6). Table 3 exhibits the results of bounds test.

Table 3: Bounds Test

Test statistics	value	k
F-Statistics	17.92283	2
Critical value bound (Sample Size 30-80)		
Significance	$I(0)$ (lower) bound	$I(1)$ (upper) bound
10%	3.17	4.14
5%	3.79	4.85
1%	5.15	6.36

Since the resulting F statistics at $K = 2$(where $K$is the number of independent variable) exceeds the upper critical bound, the null hypothesis of no cointegration is rejected. That means $lnGDP, lnCPS, and\ lnM2$ has long run relationship or they are cointegrated. Based on the results of cointegration, the long-run and short-run coefficients is obtained by estimating model (4.7).The long-run model of the $ARDL(6,7,8)$ for GDP is given by

$$lnGDP = 2.0351 + 1.3259lnCPS + 0.0953lnM2$$

$$P\text{-}Value(0.0001) \qquad (0.0029) \qquad (0.7581)$$

It is clear from above model that long run coefficient of credit to private sector by banks has a positive and statistically significant effect on GDP. For 10% change in the private sector credit will result in a long-run change of 13.259% in the GDP. But the long run coefficient of the money supply is positive but statistically insignificant at 5% level of significance. The Error correction term or speed of adjustment associated with short-run coefficients is -0.479245, which is expected and ECT is statistically significant. Which means 47.92% of disequilibrium of the previous year is corrected every year. The Wald test for short-run causality rejects the null hypothesis of no causality running from regressors to the independent variable. Which indicates that there is a short-run causality exists, running from CPS & M2 to GDP. In order to check the stability, misspecification, and some other problems that may arise in terms of time series model, some residuals diagnostic tests and stability test are performed on the$ARDL(6,7,8)$ model.The

residual diagnostic tests are comprised of Breusch-Godfrey serial autocorrelation test, Breusch-Pagan-Godfrey Heteroskedasticity test, Histogram normality test. Stability diagnostic test is consisting of cumulative sum (CUSUM), and Ramsey Regression Equation Specification Error test (RESET).

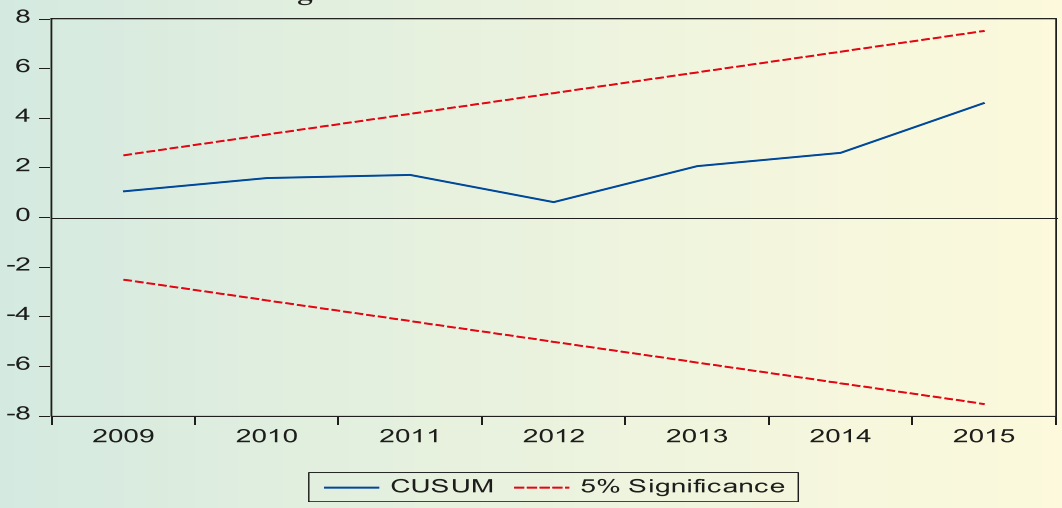
Table 4 reports that residuals are not serially autocorrelated up to order 2, the error variances are constant, and the residuals are normal. Cumulative sum (CUSUM) test is used to test the stability of the parameters of the model.

Table 4: Residuals Diagnostic Test

Residuals Diagnostic Test	P-value	Null Hypothesis
Breusch-Godfrey serial autocorrelation test	0.3451	No Serial correlation in residuals up to specified orders
Breusch-Pagan-Godfrey heteroskedasticity test	0.8899	No heteroskedasticity or error variances are constant
Normality test of residuals	0.0544	Residuals are normal

The theory behind the test is, the parameters are said to be stable if the cumulative sum and cumulative sum of squares fall within the 5% critical lines. CUSUM lines fall within the 5% critical lines. The test indicates the stability in the $ARDL(6,7,8)$ model over time.

Figure 3: CUSUM of recursive residuals



RESET test (Ramsey, 1969) is used to examine the non-linear combination of explanatory variables have any power in explaining the response variable, if there is any, the model is not properly specified.

Table 5: RESET test

Test statistics	Value	DF	p-value
$t-statistics$	0.726428	(6)	0.4949
$F-Statistics$	0.527698	(1,6)	0.4949

The null hypothesis of RESET test is no functional form misspecification. Both $t-statistics$ and $F-Statistics$ accept the null hypothesis at 5% level of significance. There is no functional form misspecification in the model. So, the $ARDL(6,7,8)$ does not encounter any kind of instability or misspecification error as well as overcome all of the residuals test.

Conclusion

The main objectives of this study are to examine the effect of financial development on economic growth and determine the short-run and long-run relationship between financial development and economic growth in Bangladesh for the period 1977-2015. Several time series econometrics tools are used in this analysis such as linear regression, ADF & KPSS test, bounds test, wald test, and some diagnostic test. The first part of empirical analysis, examine the effect of financial development and economic growth through some regression models, concludes that the financial indicators namely credit to private sector by banks to GDP, money supply (M2) to GDP, and stock market capitalization to GDP have a statistically positive significant effect on GDP per capita. Among three financial development indicators, themoney supply has relatively higher and stock market capitalization has lower significant effect on GDP per capita.

The existence of short-run and the long-run relationship is examined by Autoregressive Distributed Lag model. The bounds test confirms the cointegration or long run relationship between study variables and from ARDL Model we can see that the long-run coefficient of credit to private sector by banks to GDP is statistically significant but the long run coefficient of the money supply (M2) to GDP is not statistically significant.

The error correction term associated with short-run coefficients is statistically significant, that the disequilibrium of the previous year is corrected every year. This study also concludes that there exists a short-run causality running from Private credit and money supply to GDP per capita.

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Trends, Structure and performance of Exports and Remittance in Bangladesh: An empirical analysis

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Abstract

The objective of the paper is to analyze the external sector performance in Bangladesh, especially export earnings and inflow of remittances. The main findings of this paper reveal that export earnings and remittances are the dominating external sector factors of Bangladesh economy for decades although, both remittance and migration growth decreased lately. Remittance inflows from different destination have also changed over the period. On the other hand, migration from Bangladesh is concentrated in a few destinations which may generate serious problem if any external shock creates from those destinations. However, the decreasing rate of remittance and outward migration might create severe problem in the economy by reducing employment opportunities and output level. Conversely, export growth has underperformed over the few years. Commodity exports show that Bangladesh is predominantly a manufactured goods exporting country and Bangladesh's export basket is concentrated in a few commodities. In addition, export earnings from Bangladesh are centered in a few destinations. Any fluctuations of the export demand from these regions might seriously affect the external balance of the country as well as expected level of growth. The decreasing rate of remittance and export earnings is a concern for the overall economy as well as for the policy-makers regarding the external sector.

Keywords: external sector performance, remittance, exports.

JEL Classification: B17, F24.

[1] The authors are General Manager and Deputy Director of Research Department, Bangladesh Bank, respectively. The views expressed are authors' own and do not reflect that of Bangladesh Bank. The authors would also like to express gratitude to Dr. Faisal Ahmed for his valuable comments and suggestions which helped improve the earlier versions of this study.

Introduction

Traditionally, Bangladesh's economy heavily depends on external sector. External sector factors such as remittances, exports, imports, foreign aid have always played important role, although the relative importance of various external sector factors has not been uniform and has changed over time. Any change in the international market, either through price of commodities or international demand or changes in domestic macroeconomic policies affects these factors.

In the 1970s, the economy of Bangladesh was mainly dependent on foreign aids and imports. During the period, the country was facing various domestic and international shocks, for example, two consecutive droughts in 1972 and 1973; and flood in 1974, oil price shocks in 1973 and 1979 etc. In the 1980s, the country had started to shift from import substitution policies to export-oriented industrial policies. Towards this the country had initiated important reform in domestic industrial policies. In the 1990s, Bangladesh experienced an accelerated pace of global integration of her economy. During that period, economic reforms gained momentum and the country pursued an export-led growth strategy. As a result, export started to increase. In addition, volume of FDI lifted up gradually. At the same time the migration of Bangladeshi workers also increased in the global market which supported to boost up inflow of remittances.

A buoyant scenario started from 2000s, export earnings and remittances became the dominating external sector factors of Bangladesh economy (chart-1), while 2010s was the decade of steady growth. In FY10 all external sector factors performed highest growth (as percent of GDP) and afterwards it showed declining trend. The changing scenario of these factors also visualized from Table-1. The remittance-GDP ratio touched 5.5 percent in FY18 as compared to 1.4 percent in FY80. During the same period, export-GDP ratio increased to 13.4 percent compared to 5.4 percent in FY80. Similarly import-GDP ratio also increased to 19.9 percent in FY18 compared to 14.4 percent in FY80. The rising trends of export, import and remittance to GDP ratio support the argument that Bangladesh has become a trading nation with its rising dependence on exports and remittances. It may be noted that performance of Bangladesh's external sector such as-robust export growth, high inflow of remittance, the consequent rise in foreign exchange reserves, comfortable current account balance and stable

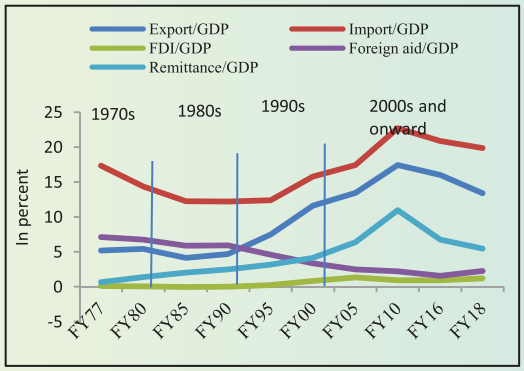
exchange rate helped to maintain GDP growth rate at the expected level (Appendix Table-I).

Table-1 Growth of external sectors variables (% of GDP)

Year	Export/ GDP	Import/ GDP	FDI/ GDP	Foreign aid/GDP	Remittance /GDP
FY75	3.9	8.9	0.1*	6.4	0.2**
FY80	5.4	14.4	0.1	6.8	1.4
FY85	4.1	12.2	-0.03	5.9	2
FY90	4.7	12.9	0.01	5.9	2.5
FY95	7.5	12.4	0.2	4.6	3.2
FY00	11.6	15.8	0.8	3.6	4.4
FY05	13.5	17.4	1.3	2.5	6.4
FY10	17.4	22.7	0.9	2.2	10.9
FY16	16.0	20.9	0.9	1.6	6.8
FY18	13.4	19.9	1.2	2.2	5.5

Source: EPB, Annual Reports, and Economic trends, of Bangladesh Bank, Flow of external resource, MOF, world investment report, 2009 (UNCTAD). *1976-77**1975-76.

Chart- 1 Relative change in external sector variables



Source: EPB, Annual Reports, and Economic trends, of Bangladesh Bank, Flow of external resource, MOF, world investment report, 2009 (UNCTAD).

In this background, the paper examined the trend, structure and changing features of remittances and exports of Bangladesh. The study has been conducted by using secondary data, which have been collected from Annual Report of Bangladesh Bank, Economic Trends of Bangladesh Bank, Export promotion bureau, Foreign Exchange Policy Department of Bangladesh Bank, Bureau of Manpower, Employment and Training, Bangladesh Bureau of Statistics (BBS), Bangladesh Economic Review, World Development Indicator and International Financial Statistics. The remainder of the paper is organized as follows: following the introduction in section I, review of literature is given in section II, section III gives a detailed scenario of remittance inflows of Bangladesh, section IV explains recent development of Migration, section V analyzes the performance and changing features of the export sector and finally, section VI gives the conclusion.

Section II: Literature Review

Presently, significant amount of research have been conducted on external sector performance as well as various aspects of export and remittance in Bangladesh. Some of the relevant studies on these issues are summarized below:

Raja (2015) attempts to analyze the export performance of Pakistan and investigate the weaknesses of export sector. The most distressing feature is reliance on too few exportable items and too few trading partners. This narrow base and lack of diversification of exports have made the country vulnerable to external as well as internal shocks. The paper suggests that to obviate the possibility of such occurrence, Pakistan will have to expand her production base, diversify it on need basis and craft an aggressive long term export strategy. The country also need to rationalize her economic policies with this strategy making concerted efforts to enhance exports by diversifying them, finding new markets.

Nath (2013) attempts to identify the impact of global recession in key sectors, especially in exports and remittances on the Bangladesh economy and how the country could mitigate its possible adverse impacts. The global recession that initially affected the US and EU countries, also affected Bangladesh to some extent. The major affected sectors of Bangladesh economy were exports, remittances and scale of migration. The total export value increased but rates of change decreased drastically. On the other hand, some expatriates from abroad were returning back but foreign remittance did not decline. However, Bangladesh came out very well from the global recession due to nature and extent of its integration with the world economy.

Taslim et al. (2011) examine the export performance of Bangladesh: Global Recession and after. The study find out that world trade was severely disrupted by the global recession of 2008-09 with exports of most countries declining sharply. The economies of both of the major export markets of the world, the USA and the EU, shrank substantially. This reduced their aggregate domestic expenditure, which in turn reduced their import demand for goods from the rest of the world. On the other hand, the export of Bangladesh, especially the export of readymade garments, which constitute more than three-quarters of the total export of the country, did not decrease much despite the fact that most of it is sold to the EU and the USA.

Mamun et al. (2010) analyzes the trends and various aspects of workers' migration and remittances in Bangladesh. It also discusses the micro and macroeconomic impacts of remittances. The paper find out that most remittance transfers have been used by migrant-sending households for consumption and help to reduce poverty in Bangladesh. The analysis presented in the paper further indicates that the remittances may have significant effects on other macroeconomic variables as well.

Adnan et al. (2015) reveals the absolute dominance of RMG sectors in the export earnings over other sectors of the country as its share is almost 81 percent of the export earnings. The study shows that the EU (as a zone) has been the biggest market with 55 percent of the total RMG export earning followed by the United States (as a single country market) holds 23 percent and 14 percent of the total exports of Bangladesh exported to emerging markets such as, Australia, Brazil, China, Japan and South Africa. Both product and market diversification are needed for the sustainability of this industry. New markets such as Japan, Russia, and Brazil can be lucrative destination with both high and low value ended products.

Bhattacharya et al. (2006) has projected the growth prospect and likely behaviour of Bangladesh's external sector under three scenarios: (i) optimistic scenario (8% GDP growth per annum), (ii) business as usual scenario (6% GDP growth per annum), and (iii) base case scenario (4% GDP growth per annum) based on the past performance and changes in the global economy. The study has projected the required level of exports, imports, remittances, foreign aid and foreign investment to attain a consistent GDP growth at the rate of 4%, 6% and 8% up to the year 2020. The report concludes that future growth of Bangladesh will depend on promoting export, sustaining remittances, and triggering export.

The above mentioned studies explain the performance of export and remittance during the global recession. However, there is a dearth of studies to examine the trends, structure and performance of exports and remittance in the context of Bangladesh. To fill up this gap we have taken this study since exports and remittances have played an important role in external sector performance. The findings of the study may give some policy indications to the policy maker in formulating policy for the external sector.

Section III: Developments of Remittance Inflow

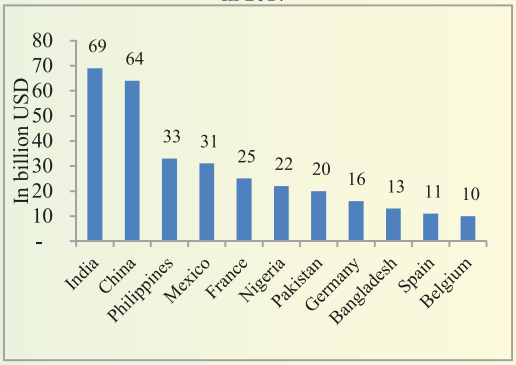
Remittance inflows to Bangladesh have grown rapidly over the last three decades. Remittances as percentage of most key macroeconomic variables showed upward trend over time (Table-2). It is observed that the remittance-GDP ratio touched 5.3 percent in FY17 as compared to 1.9 percent in FY82. According to the World Bank (World Development Indicator 2018), among the top remittance recipient developing countries, India retained the top position as recipient of remittances (USD 69 billion), followed by China (USD 64 billion) and remittances to Bangladesh stood USD 13 billion, making it the 9th largest remittances recipient country in the world in 2017 (Chart 2).

Table-2: Remittances relative to key Macroeconomic Variables

Year	Remit/ GDP	Remit/ Export	Remit/ Import	Remit/ aid	Remit/ FDI
FY76	0.22	4.30	0.3	2.0	
FY82	1.9	53.7	14.2	33.3	5,978.1
FY92	2.7	42.5	24.5	52.6	21,199.3
FY95	3.2	34.5	20.5	68.9	19,960.5
FY00	4.1	33.9	25.8	132.2	509.0
FY05	6.4	44.5	32.4	243.5	8,181.0
FY09	10.8	62.3	47.8	718.9	1,029.7
FY10	11.0	67.8	51.4	503.6	1,727.5
FY11	10.3	51.0	35.4	647.8	1,485.6
FY14	8.1	47.4	38.6	483.5	957.7
FY15	7.8	49.3	37.3	489.0	829.0
FY16	6.8	44.6	37.6	432.7	746.1
FY18	5.5	40.8	27.5	244.5	455.3

Source: Authors calculation based on data from various issues of Economic Trends, Annual Report of Bangladesh Bank and Bangladesh Economic Review, Ministry of finance.

Chart-2 Top remittance recipient developing countries in 2017p



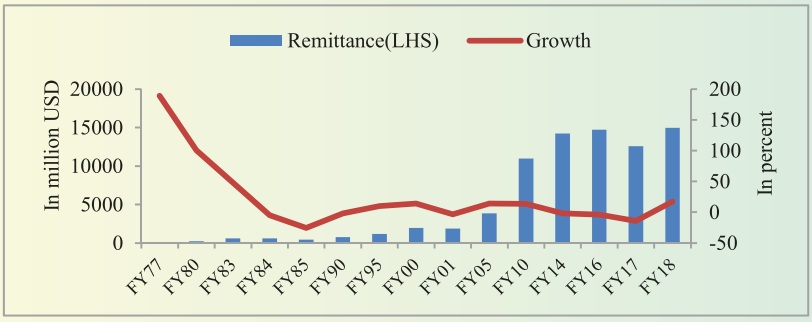
Source: World Development Indicator April 2018, World Bank.
P=provisional

Performance of Remittance

Remittances play a crucial role in the economy of Bangladesh. It helps to relieve our foreign exchange constraint, stabilize the exchange rate movement, and improve the balance of payments. A comfortable foreign exchange reserves can be maintained through increasing growth of remittance which can contribute to overall macroeconomic stability and reduce aid dependency. Besides, remittances are used to pay for imports bills and to repay foreign debt. At micro level, remittance has a beneficial impact on household consumption, poverty reduction and self employment. It also improves country's creditworthiness. However, it is more stable source of foreign earnings than both FDI and foreign aid (Begum, 2012).

Remittance inflow shows increasing trend during FY77-FY18 (Chart 3). During FY84, FY85, FY90, FY01 and FY14, FY16, FY17 the remittance growth was negative. The Iran-Iraq war during 1980-1988, the gulf war during 1990-1991 and nine eleven event in 2001 were some of the possible causes to negative impact on inflow of remittances (Mamun et.al 2010). Remittance growth in FY14 became also negative of 1.6 percent due to 33 percent drop of workers migration. The growth became positive in FY15. In FY16 the growth became negative of 3.9 percent due mainly a result of the prolonged decline in oil prices in Gulf Cooperation Council (GCC) economies. The oil price decline, which was lowest to its historic in January 2016 affected the incomes and subsequently weakened the demand for migrant workers. In FY17 again the growth became negative of 14.5 percent due to decrease of oil revenues, increase of uses digital hundi (using apps and software) and depreciation of foreign currencies against dollar in many labour importing countries. The inflow of remittances jumped by 17 percent in FY18 following higher fuel oil prices in the global market, depreciating of the domestic currency against US dollar has also helped to increase the flow in inward remittance. Besides, the strengthened surveillance of Bangladesh Bank to check 'hundi', the illegal channel used to moved funds, has also contributed to raise the remittance inflow (The Financial Express, 4 July, 2018).

Chart-3 Trends of Remittance inflows



Source: Foreign Exchange Policy Department, Bangladesh Bank.

Country-wise Inflows of Remittance

The remittance inflow from different countries has changed over time. Since FY05 remittance inflow from Kingdom of Saudi Arabia (KSA) shows decreasing trend while United Arab Emirates (UAE) recorded increasing trend. KSA is the

main sources of remittance inflow to Bangladesh in the face of the substantial labour migration demand fall in the country. The country-wise dynamics of remittance flow indicates that the share of remittance from KSA declined remarkably but still highest (17 percent in FY18) destination among the other countries. Besides, contribution from UAE, UK, and USA was 16, 13 and 8 percent respectively in FY18 (Table-3).

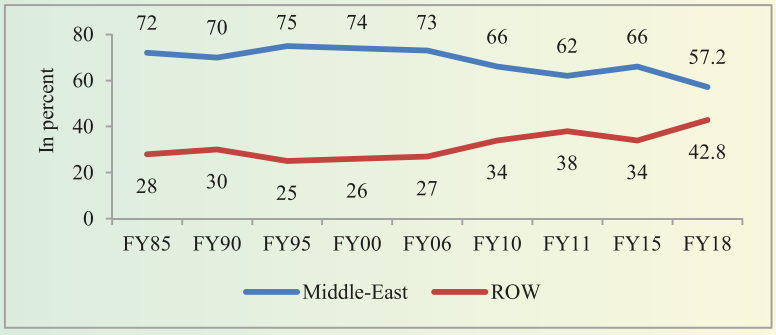
Table-3 Country-wise Share of Remittance Inflow (in percent)

Country	FY00	FY05	FY10	FY16	FY18
KSA	46.99	39.25	31.19	19.83	17.30
UAE	6.66	11.49	17.20	18.18	16.21
UK	3.68	9.76	7.53	5.77	13.34
Kuwait	11.54	10.57	9.28	6.95	7.39
USA	12.38	14.48	13.21	16.17	8.01
Qatar	3.27	3.54	3.28	2.89	6.40
Oman	4.77	3.41	3.18	6.10	7.38
Singapore	0.60	1.24	1.76	2.61	5.64
Bahrain	2.14	1.75	1.55	3.26	4.42
Malaysia	2.77	0.66	5.34	8.87	3.62

Source: Foreign Exchange Policy Department, Bangladesh Bank.

It is mentioned that, there has been a gradual change in the share of remittance inflows by regions over time. During 1980-2006, the inflow of remittances from Middle-East remained above 70 percent. Since 2007, it appears to have been a shift that is taking place with remittances increasingly coming from new sources (Rest of the World), like USA, Canada, UK, Germany, Italy, Malaysia and Japan reflecting considerable diversification of labour flows (Chart -4).

Chart-4 Intensity of Remittance Flow by Region (in percent)

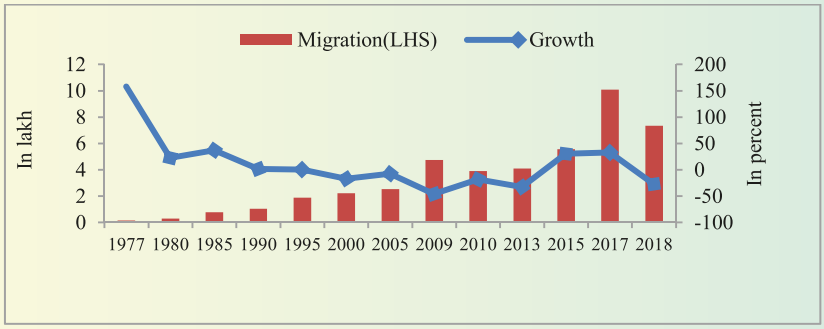


Source: Foreign Exchange Policy Department, Bangladesh Bank.

Section IV: Developments of Outflow of Migration

The growth of migration has been volatile for the last three decades. It increased significantly in 2007, but dropped substantially in 2009, 2010 and 2013. The growth decreased substantially in 2009 and 2010 due to worldwide financial crisis. Moreover, it decreased 33 percent in 2013. A number of factors which causes for dropping migration in Saudi Arabia. Mentionable reasons may be huge expenses made by the Bangladeshi workers in Saudi Arabia for their change of work permit, government-to government (G-G) agreement regarding manpower migration and political uncertainty in Bangladesh as well. However, the growth of migration started to increase after 2013 and it stood 33 percent in 2017 but again dropped 27 percent in 2018 (Chart-5). In 2018, job opportunity in KSA was shrinking. Besides, a significant number of women migrant workers returned due to workplace exploitation, huge number of male workers also lost job and came back (The financial Express, 18 December, 2018). Besides, changes in the global leadership, economic recessions and reforms in the destination countries are the causes of declining the overseas jobs in 2018 (Tasneem et al. 2019).

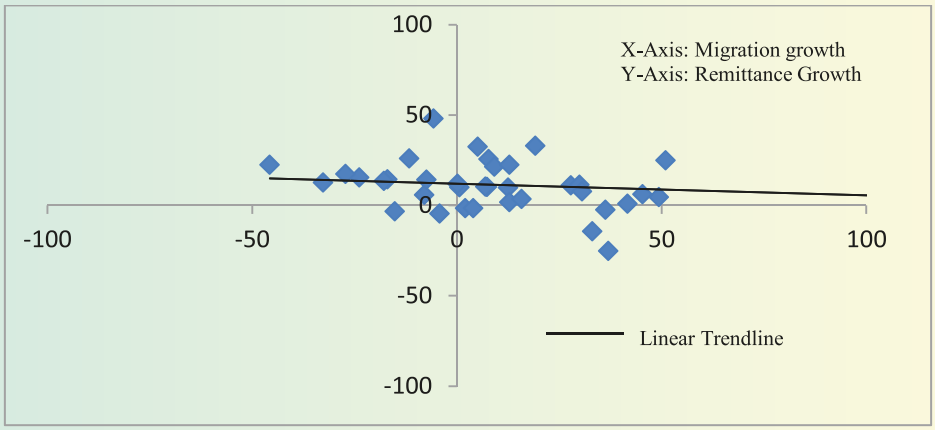
Chart-5 Trends of outflow of Migration from Bangladesh



Source: Bureau of Manpower, Employment and Training (BMET).

From the above analysis it is observed that in the short run there is a puzzle between outflow of migration and inflow of remittance. There exists a negative relationship between migration and remittance growth (Chart-6). Now the question is, in reality what factors influence the remittance inflows. The factors may be: wage rate of the migrants, real exchange rate, appreciation/depreciation of exchange rate, inflation, interest rate differentiation, migration and policy shift in regulatory and institutional arrangement and host countries GDP etc.

Chart-6 Scattered Plot between Migration and Remittance Growth (in percent)



Source: BMET and Foreign Exchange Policy Department, Bangladesh Bank.

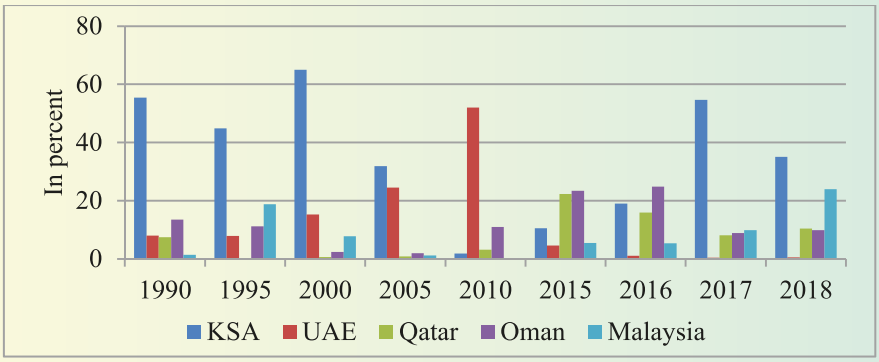
Begum, (2012) examines the determinants of worker's remittance in Bangladesh. The result of the study shows that in the short run there exist a positive relationship between domestic exchange rate and remittance. Moreover, some regulatory and institutional arrangement taken by the government and the Bangladesh Bank may have to bring the flow of remittances from informal to formal channel which contributed to boost up the remittances. According to the study, it is found that domestic inflation have a positive relation with remittance implying that higher inflation at home country, which reduces the purchasing power of migrants' family, induced migrants to send more remittances in Bangladesh. On the other hand, remittance is also very sensitive to the GDP of the host countries.

Destination of Migration

Chart-7 shows that the destination of migration has changed over the last few years. Since 1976 most of the Bangladeshi migrated in Middle East countries. Over time destination of migration has started to shift in developed countries and some Asian countries like Japan, Malaysia and Singapore since 1990 (Appendix Table- II). In 2012, The United Arab Emirates (UAE) imposed restrictions for male labor migrants, as a result number of migration from Bangladesh decreased drastically in 2013 (Etzold et al. 2015). The growth of migration started to increase after 2013 upto 2017 due to both male and female labor migration to Oman and Qatar increased significantly. In 2018, total number of migration dropped by 27 percent

and the number of migration has slowed down remarkably in some countries especially in KSA (-53.3 percent), UAE (-21.8 percent) and Oman (-18.6 percent).

Chart-7 Country-wise share of Migration (in percent)

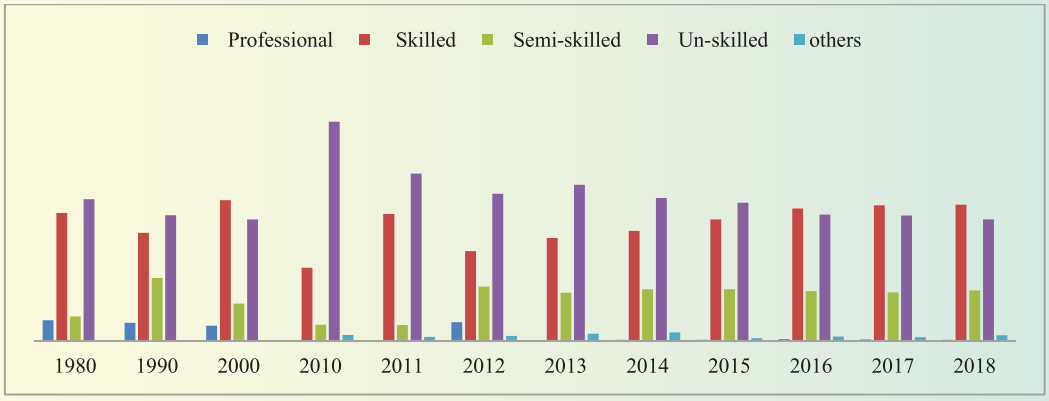


Source: Bureau of Manpower, Employment and Training (BMET).

Category-wise Migration

The analysis of outflow of migration shows that unskilled migrants' are the principal sender of remittance inflows in Bangladesh (Chart-8) although, recently skilled and semi-skilled migration increased. It is observed from Chart-8 that after 2011, share of skilled and semi-skilled migration started to increase due to several initiatives and policy supports focusing mostly on skill development by the government. At the same time, unskilled migrant workers showed downward trend. So, it is imperative for strong diplomatic initiatives to increase skilled migrants which can contribute to boost the remittances inflow in Bangladesh.

Chart -8 Category-wise Share of Migration (in percent)

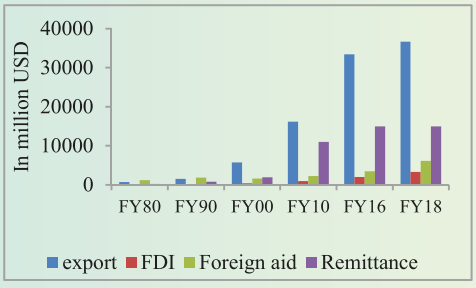


Source: Bureau of Manpower, Employment and Training (BMET).

Section V: Performance and Changing Features of the Export Sector

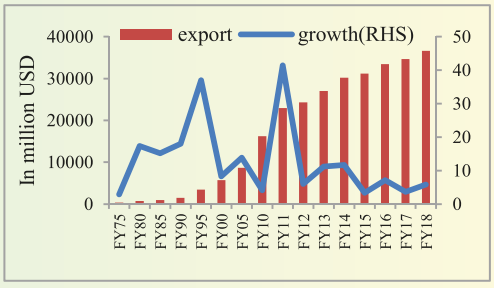
Export sector has been the major driving force of our economy. It has been a more stable source of foreign earnings over time (Chart-9). Export earnings showed increasing trend after 1980s due to pursuing liberal trade policies. For two decades, 1991-2011, Bangladesh's exports increased at double-digit average annual rate of 14 percent. Since FY12, export earnings demonstrate a moderate performance of 7.0 percent average growth. In FY18, total export receipts stood at USD 36 billion with a growth rate of 5.81 percent from 3.6 percent of the preceding year (Chart-10). The contribution of readymade garments (RMG), jute goods and leather was significant in our export earnings. However, the current performance of our export sector is alarming. It may be noted that the two episodes (Rana Plaza collapse and Holey Artisan attack) had a harmful effect on our RMG exports as well as total earnings since 2012. Two more inter-linked factors can be identified as reasons for under-performance of exports, particularly non-RMG: value chain integration and lack of FDI (The Financial Express, September, 2018). FDI inflows into some non-RMG sectors, like footwear, home textile and engineering products, could be an important way to expand exports of these products into foreign markets.

Chart-9 Sources of Foreign Earnings



Source: Annual Report and Economic Trends, Bangladesh Bank.

Chart-10 Trends of Export Earnings



Source: Export Promotion Bureau (EPB).

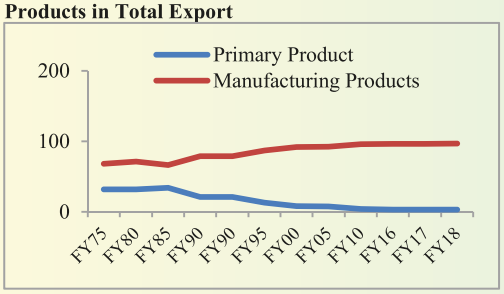
Export Structure

In the early 80s, the country's exports comprised mostly raw jute, frozen food and agricultural products. Meanwhile, the export composition changed dramatically since 1986 and over time share of primary products in the total export declined while share of manufacturing product increased. In our export basket the share of manufacturing product was 96 percent in FY18 while it was 68 percent in FY75.

Chart-11 shows that there was a major shift in the export structure of Bangladesh. Now Bangladesh is predominantly a manufactured goods exporting country.

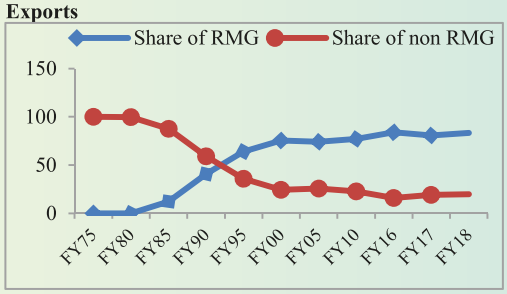
The country achieved a remarkable success in export expansion, mainly because of the outstanding performance of the readymade garments (RMG) industry. RMG emerged as the important export items and at the same time jute export slowed down. Classifying our export basket according to RMG and non-RMG it is also revealed that the share of RMG exports in total export increased significantly over time. Conversely, the share of non-RMG gradually eroded around mid-eighties (Chart- 12). Now Bangladesh's export basket is dependent on a few commodities which is a challenge for export sector as well as threat for any external shock.

Chart- 11 Share of Primary and Manufacturing Products in Total Export



Source: Export Promotion Bureau (EPB).

Chart-12 Share of RMG and Non-RMG in Total Exports



Source: Export Promotion Bureau (EPB).

In FY18 Bangladesh economy has faced some complexity in terms of the external sector dynamics and performance. External sector developments in FY18 have been dominated by import dynamics. Import growth reached a high of 25.0 percent. Current account deficit widened to around 3 percent of GDP, despite a strong and broad-based rebound in remittances growth (17.3 percent) and export growth to around 6 percent, up from 3.6 percent a year ago. Overall BoP declined to (-) 0.3 as percent of GDP. Foreign exchange reserves stood at USD 32.9 billion, around 5 month of prospective imports (Appendix Table-I). BDT's exchange rate against USD has witnessed some depreciation pressure in the secondary market.

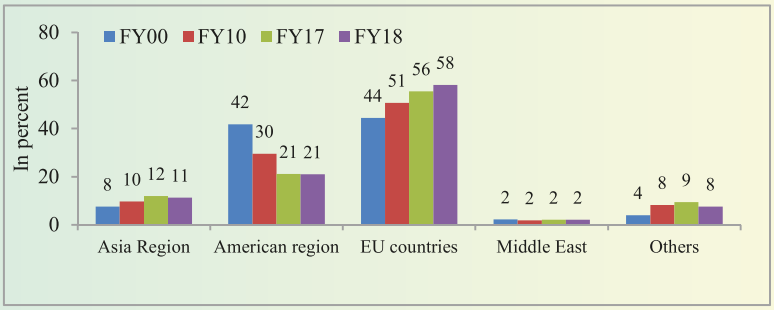
Bangladesh's GDP growth highly depends on external sector such as: (a) Promoting export; (b) Sustaining remittances; and (c) Triggering FDI. If the current trends of external sector performance persist, GDP growth may be slow down. The above

findings also emphasize the urgent need for domestic reforms in all areas such as current structural bottlenecks, manufacturing, fiscal and financial management which may be essential for achieving developments in this sector as well as overall performance of the economy and thereby fostering economic growth.

Geographical Distribution of Exports

One important feature of export diversification is the geographical diversity of export destination countries. Bangladesh's exports are now destined about 200 countries. By looking at the share of different regions, it is observed that over the years Bangladesh's exports to EU and Asia region increased but decreased in USA. Chart-13 reveals that 90 percent of our exports are destined to the EU, USA and Asian region which indicate that Bangladesh's export concentrated in a few destinations.

Chart-13 Region-wise share of export



Source: Export Promotion Bureau (EPB).

Section IV: Conclusion

The paper looks into the trend, structure and changing features of export sector and inflow of remittances of Bangladesh. It is observed that the performance of Bangladesh's external sector such as- export growth, inflow of remittance and reserves has increased significantly over time. Specially, export and remittance to GDP ratio showed rising trend which implies that export earnings and remittances are the dominating external sector factors of Bangladesh economy in recent times. In this regard, the paper analyzed the trend, structure and changing features of exports and remittances.

The findings of this paper are recently both remittance and migration growth show declining trend. Besides, remittance inflows from different region have also

changed over time. Regarding this, Government has undertaken several initiatives (to increase remittances flow in proper channel) and a number of policy supports were announced (focusing mostly on skill development) to mitigate the slowdown of inflow of remittance and migration. Nevertheless, Bangladesh has to try hard to maintain its commendable liaison with the labour-importing countries, especially in the Middle East and Malaysia. The decreasing rate of remittance and manpower exports might cause a serious hamper to the economy by reducing employment opportunities and output levels.

On the other hand, export growth has underperformed over the few years. Commodity exports show that Bangladesh is predominantly a manufactured goods exporting country and Bangladesh's export basket has concentrated in a few commodities. In addition, export earnings from Bangladesh are centered in a few destinations which indicate threat for Bangladesh's export sector. Region-wise and commodity-wise export provides an implication that the country's export earnings are vulnerable due to dependency on a few country and few products. Any fluctuations of the export demand from these regions might seriously affect the external balance of the country and thereby affect the growth of the economy.

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Appendix

Table-I External Sector Indicators

Year	Export growth	Import growth	Remittance growth	Reserve (in million USD)	FDI (in million USD)	C/A % of GDP	GDP growth	Inflation	Exchange Rate
FY80	17	39	101	262	9	-1.2	3.0	18.5	15.49
FY85	15	10.2	-25	426	-7	-1.1	3.0	10.9	25.96
FY90	18	11.4	-2	523	3	-3.6	5.9	9.3	32.92
FY95	37	39.2	10	3070	92	-0.1	4.9	5.2	40.20
FY00	8	4.9	14	1602	383.0	-0.9	5.9	3.4	50.31
FY05	14	20.6	14	2930	800.0	-0.9	6.0	6.5	63.75
FY10	4	5.4	13	10750	636.0	3.2	5.6	7.3	69.18
FY15	3.1	3.0	7.7	25021	2525.0	1.8	6.6	6.4	77.68
FY18	6.4	25.2	17.3	32943.5	3290.1	-3.6	7.9	5.8	82.12

Source: IFS Yearbook 2000, Annual Report BB, Economic trends, BB.

Table-II Country wise Overseas Employment from 1976 to 2018

up to December 2018

Year	KSA	UAE	UK	Kuwait	Libya	Qatar	Oman	Singapore	Bahrain	Japan	Malaysia	Others	Misc. Clearance	Total Employment
1990	57486	8307		5957	471	7672	13980	776	4563		1385	3217		103814
1991	75656	8583		28574	1124	3772	23087	642	3480		1628	585		147131
1992	93132	12975		34377	1617	3251	25825	313	5804		10537	293		188124
1993	106387	15810		26407	1800	2441	15866	1739	5396		67938	724		244508
1994	91385	15051		14912	1864	624	6470	391	4233		47826	3570		186326
1995	84009	14686		17492	1106	71	20949	3762	3004		35174	7290		187543
1996	72734	23812		21042	1966	112	8691	5304	3759		66631	7663		211714
1997	100534	54719		21126	1934	1876	5985	27401	5010		2844	9648		231077
1998	158715	38796		25444	1254	6806	4779	21728	7014		551	2580		267667
1999	185739	32344		22400	1744	5611	4045	9596	4639	7		2057		268182
2000	144618	34034		594	1010	1433	5258	11095	4637	22	17237	2748		222686
2001	137248	16252		5341	450	223	4561	9615	4371	19	4921	5964		188965
2002	163269	25462		15769	1574	552	3854	6856	5421	37	85	2377		225256
2003	162131	37346	166	26722	2855	94	4029	5304	7482	12	28	8021		254190
2004	139031	47012	2055	41108	606	1268	4435	6948	9194	47	224	12448	8582	272958
2005	80425	61978	2793	47029	972	2114	4827	9651	10716	79	2911	16967	12240	252702
2006	109513	130204	1625	35775	104	7691	8082	20139	16355	174	20469	20663	10722	381516
2007	204112	226392	972	4212	1480	15130	17478	38324	16433	164	273201	24489	10222	832609
2008	132124	419355	952	319	5067	25548	52896	56581	13182	133	131762	26222	10914	875055
2009	14666	258348	1253	10	22742	11672	41704	39581	28426	39	12402	35950	8485	475278
2010	7069	203308	173	48	12132	12085	42641	39053	21824	17	919	43873	7560	390702
2011	15039	282739	30	29	89	13111	135265	48667	13996	20	742	50618	7440	568062
2012	21232	215452	17	2	14975	28801	170326	58657	21777	420	804	65826	9509	607798
2013	12654	14241	14	6	7175	57584	134028	60057	25155	41	3853	85221	9224	409253
2014	19657	24232	16	3094	4461	87575	105748	54750	23378	55	5134	85894	11690	425684
2015	58270	25271	4	17472	231	123965	129859	55523	20720	99	30483	89287	4697	555881
2016	143913	8131	11	39188		120382	188247	54730	72167	165	40126	80081	10590	757731
2017	551308	4135	7	49604	1	82012	89074	40401	19318	145	99787	60431	12302	1008525
2018	257317	3235	8	27637	63	76560	72504	41393	811	163	175927	65319	13244	734181

Source: Bureau of Manpower, Employment and Training (BMET).

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An Analysis of Relationship Between Exchange Rate and Balance of Payment for the Japanese Economy

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Abstract

The last two decades (the 90s and 00s) are considered as lost decade in Japan due to the persistent stagnancy in the economic activities. This sluggishness in economic activities proliferated when the global economic crisis hit in 2008. The current Abe government, therefore, introduces 'three arrows' policies to stimulate the economy from this stagnant situation when they came to the power. For this reason, Japanese yen depreciates a lot in recent years to support the government policies. Hence, this paper aims to evaluate the impact of yen devaluation on the BOP movements during the period 1998 to 2016 using OLS and VAR model. The estimated results reveal that exchange rate is not the main factor in determining the BOP movements in Japan. Japan is an industrialist country, so many economic factors from both inside and outside of the country are vital to determine the BOP rather than just the exchange rate.

Keywords: Exchange rate, Balance of Payment, Japanese Economy

JEL Classification: B17, F24.

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1. Introduction

The exchange rate is defined as the price of one country's currency in relation to another's (Iyoboyi and Muftau, 2014). The variation in exchange rate has significant economic implications, especially on some key macroeconomic indicators such as outputs, imports, export prices, interest rate, inflation etc. Therefore, an appropriate policy mix for the stable exchange rate is important to stimulate the economic performance as well as international transaction position of a country. On the other hand, Balance of Payment (BOP) is defined as the systematic record of transaction of a country with the rest of the world. The stability in the BOP movements of a country is very crucial to ensure not only sound economic activities but also an effective connection with the rest of the world. The current, capital and financial accounts balance are the main components of the BOP. Many economists presume the relation between exchange rate and BOP through the current account component (e.g. net export).

In recent years, the Japanese economy is going through ups and downs for both internal and external reasons. The persistent stagnation of the consumption growth, persistent deflation, changing labor force participation, changing investment behavior by the entrepreneurs, and the global economic crisis, all these factors are causing Japanese economy more volatile over the few years (Shimizu and Sato, 2015). Hence, the current government has introduced 'three arrows' policies that widely known as 'Abenomics' such as fiscal stimulus packages, monetary easing and structural change to bolster the economic activities as well as to ensure economic stability since September 2012. Moreover, the government has given a signal to the market to depreciate yen significantly with a view to promoting the effectiveness of current 'Abenomics'. This initiative of Japanese government leads to analyze the effect of yen devaluation on the Japanese economy, through BOP channel. Hence, we attempt to check the relationship between exchange rate and BOP movements in Japanese economy during the period January, 1998 to September, 2016.

The rest of the parts of this paper is proceeds as follows: (2) Theoretical Background and Brief Literature Review, (3) Recent Trends of BOP and Exchange Rate in Japan, (4) Estimation of the Impact of Exchange Rate on BOP of Japan and (5) Conclusion and Policy Implications.

2. Theoretical Background and Brief Literature Review

2.1 Theoretical Background

The traditional school of thought in economics believe that trade balance can be improved by depreciating exchange rate and consequently, mitigate BOP pitfalls and boost up output and employment, provided the Marshall-Lerner conditions are met. The Marshall-Lerner condition assumes that exchange rate devaluation would lead to the expansion in output if the sum of price elasticity of demand for imports and export is greater than unity. Here, depreciation would make export industries more competitive in the world markets; hence, stimulate domestic production of tradable goods and that lead to domestic industries to use more domestic intermediate goods and these cycles of rising production could foster the overall output in an economy.

On the other hand, the monetarists' school of thought claims that exchange rate variability has no impact on real variables in the long run. Based on this hypothesis, **Domac (1997)** noted that exchange rate depreciation affects real variables mainly via real balance effect in the short-run; however, keeps all real indicators same in the long run of an economy. This idea has come from the features of the purchasing power parity, which predicts that depreciation promotes the level of output in the short run; however, the monetary consequence of that depreciation neutralizes the rise in output and improvement in BOP by the increase in prices in the long run.

According to the IS-LM model, exchange rate has no direct effects on output, but indirectly via export, import and the money supply channels. Under this framework, the interaction between exchange rate movements and output growth cannot be determined a priori as its impact can be either positive or negative owing to the exchange rate depreciation effect on the domestic economy's interest rate. As per the IS-LM model, it is expected that depreciation would have positive impact on exports as it makes domestic goods cheaper in the world markets. In contrast, it would diminish the import because of the higher relative prices of imported goods, therefore net export rises vis-a-vis income where the Marshal-Lerner condition is satisfied.

2.2 Brief Literature Review

The investigation of the relationship between exchange rate and BOP movements is ongoing on both developed and developing country perspective. The economists and researchers have drawn very mixed results regarding the pattern of relationship between them. Some studies have observed a negative effect of depreciation on domestic output which consequently affects the BOP position negatively. Conversely, some studies have found the opposite result that is exchange rate depreciation has positive impact on BOP.

Kouri (1976) found a significant different result from the traditional views considering a connection between monetary policy, the inflow or outflow of capital through the effect of interest rate and exchange rate on output and thereby on the current account, which determines the capital account balance. He had drawn his remarks based on the interaction of exchange rate and BOP both in short run and long run period under monetary policy approach.

Imoisi (2012) got a significant relationship between BOP, exchange rate and interest rate in Nigeria. However, Iyoboyi and Muftau (2014) observed a mixed result for the interaction between these two in Nigeria over the period 1961-2012. They found the bidirectional causality between BOP and exchange rate; however, they observed a significant variation in Nigeria's BOP which is not due to change in exchange rate movements based on the variance decomposition analysis.

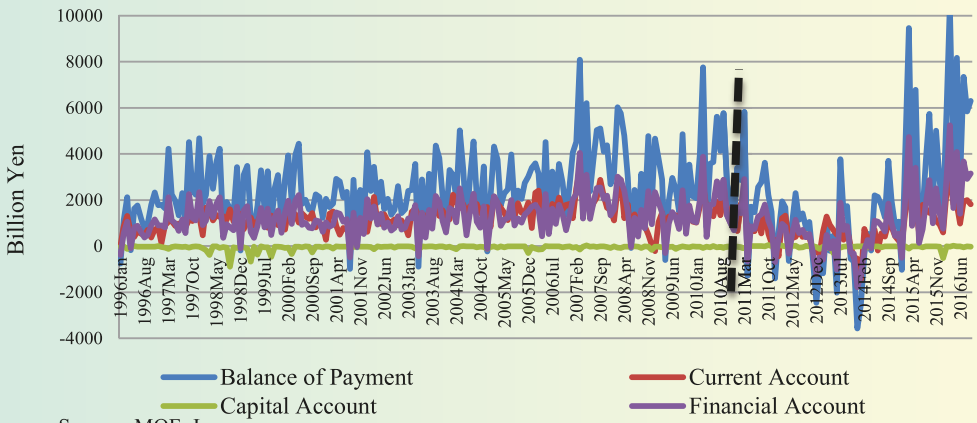
Shimizu and Sato (2015) analyzed the impact of real effective exchange rate depreciation on trade balance in Japanese economy over the period between January, 1985 to June, 2014 by using the auto-regressive distributed lag (ARDL) model and the vector error–correction model (VECM). They divided the data periods into two sub-periods such as January, 1985 to December, 1998 and January, 1999 to June, 2014 respectively. They found the J-curve phenomenon in the Japanese economy during the 1st period; however, they do not find similar impact of exchange rate on trade balance for the later period. Therefore, they stated that the slow recovery of Japan's trade balance in response to the yen devaluation can be explained by the Japanese firms' pricing behaviors as well as the changes in their production and trade structure. This new phase of firms' behavior and international division of labor is likely to hinder the positive effect of yen depreciation on trade

balance in recent years in Japan. Nguyen, & Kiyotaka (2015) employed a threshold vector autoregressive (TVAR) model to analyze a possible asymmetric behavior of exchange rate pass-through (ERPT) or pricing-to-market (PTM) in Japanese exports between the yen appreciation and depreciation regimes. They found that a decline (increase) in PTM (ERPT) in the yen depreciation regime suggests that Japanese exporters tend to lower the yen-based export price and fail to fully exploit foreign exchange gain in response to the yen depreciation, likely due to an increase in export competition in the world market. Although both these two analysis focused on the impact of yen depreciation on trade balance, however, these studies did not consider the recent two important phenomena's i.e. global economic downturn and Fukushima nuclear blasts. In this backdrop, this paper is aiming to identify the impact of yen depreciation on the behavior of BOP in Japanese economy with accounting these two vital issues.

3 Recent Trends of BOP and Exchange Rate in Japan

3.1 BOP and Its Components Movements in Japan

Fukuma, Morishita and Nakamura (2016) identify the following two noteworthy points for Japanese BOP. First, there has been a shift in exports from goods to services. And second, earnings on the accumulated stock of external assets are playing an increasingly important role as a result of an increase in Japan's outward direct investment in recent years. While Japanese firms make more profits from the stock of external assets, the rate of return on outward direct investment remains relatively low compared to the United States and United Kingdom, and depends heavily on the high rate of return in the manufacturing sector, particularly the transportation equipment industry in Asia. Figure 1 delineates the movements of BOP and its components from January, 1996 to August, 2016. It is observed that there is a fluctuation in the overall position of BOP in Japan. This volatility has increased in recent years due to the global economic downtrends and Fukushima nuclear disaster. Consequently, the overall position of BOP became negative just after the Fukushima disaster. The position of BOP was recovering afterward through the current governments' economic stimulus packages ('Abenomics').



Source : MOF, Japan

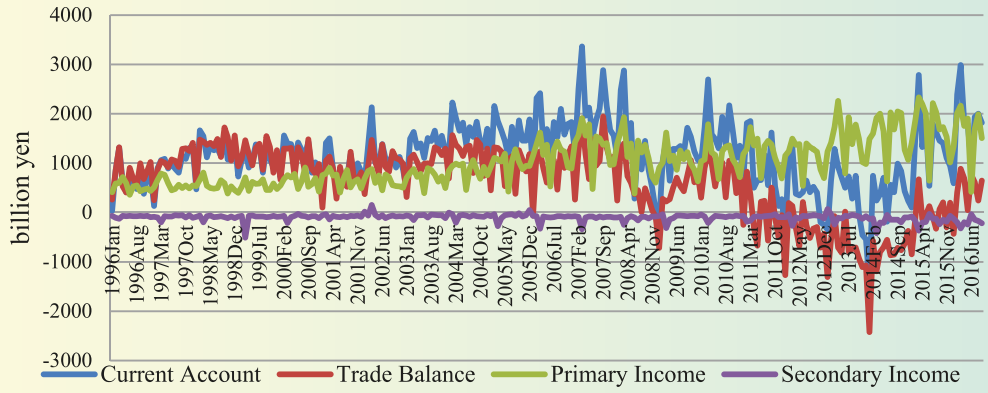
Figure 1: BOP and its Components in Japan

The capital account is stable over the periods. However, it does not have a significant impact on determining the movements of BOP in Japan. On the other hand, both the financial and current account balances follow the similar pattern with the BOP movements.

3.2 Current Account (CA) Balance and Its Components

Japan is normally current account surplus economy because of the positive net export. However, the current account was deficit in January 2009 (221.9 billion yen) due to the economic crisis in 2008 which was followed by the large trade deficit (718.7 billion yen). This trade deficit (TD) and consequently, CA deficit were proliferated when Fukushima power plant blasts occurred due to the earthquake in March 2011 (Figure 2). The large trade deficit was continued in the Japanese economy as it started to increase imports of crude oil to produce power. However, both the CAD and TD are improving in recent years followed by the economic stimulus packages in 2012. The current account surplus rocketed mainly due to a significant decrease in the deficit of goods[5]. Moreover, a reduce in the deficit on services, mainly reflecting an increase in the number of foreign visitors to Japan and heavy flow of net primary income via portfolio investment income which comes from an increase in Japanese-owned assets in abroad.

[5] See BOJ reports and research paper series on Japan's Balance of Payments Statistics for 2015 and International Investment Position at Year end 2015, Prepared by International Department, August 2016, Bank of Japan.

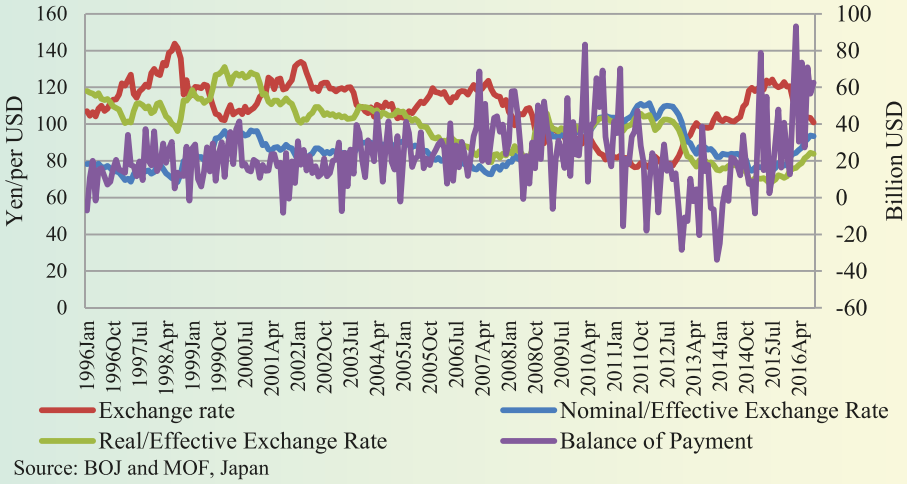


Source : MOF, Japan

Figure 2: Current Account Balance in Japan

3.3 Exchange Rate Movement in Japan

The Japanese yen started to appreciate against USD radically during the post-economic crisis period in 2008. The average exchange rate recorded 80.0 yen against per USD during 2011 to 2012; however, it's reached to record high 76.7 yen in September 2011. Thereafter, the yen again started to depreciate against USD followed by the government initiative to implement three arrows policies at the end of 2012 (Figure 3). The figure also depicts a mixed pattern of movement between exchange rate and BOP in the country. However, theoretically, it is expected that when exchange rate depreciates then the overall position of BOP should improve via stimulation of net export (Marshall-Lerner condition). Nevertheless, it is observed that there is some similar movement between these two after the government new policies in 2012. However, it is difficult to pin-down that they have positive interaction just based on this graphical trends. Hence, some econometric tools will be used to identify their relationship in the later part of this paper. Moreover, the movements of export & import items, exchange rate, and other factors (those have an impact on export and import items) are also need to check before identifying the interaction between exchange rate and BOP in Japan.

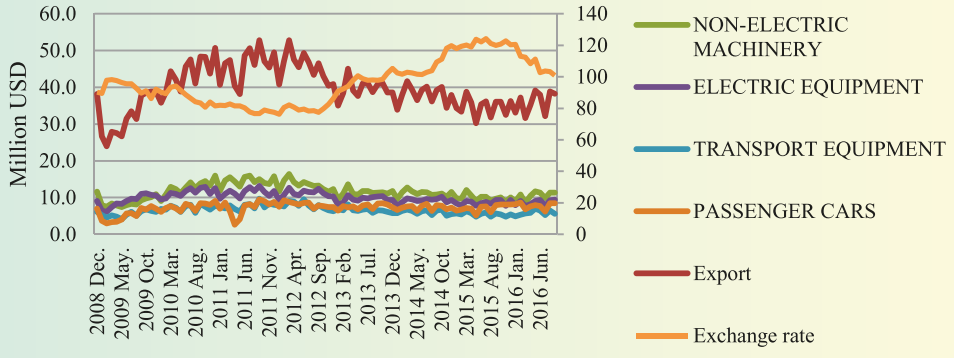


Source: BOJ and MOF, Japan

Figure 3: Exchange Rate and BOP Movement in Japan

3.4 Trends of Major Export Items and Exchange rate in Japan

Figure 4 discloses the interaction between exchange rate and export including major export items in Japan. The figure depicts that when yen depreciates then export was falling down and vice-versa. Moreover, the non-electronic machinery (major export item) was also inversely related to the exchange rate depreciation. Hence, many economists argued that Japan mainly exports heavy industrial goods in the world market. As a result, the exchange rate is not the major factor to foster Japanese export instead foreign economic characteristics is the key (e.g. movements of foreign economies business cycle).

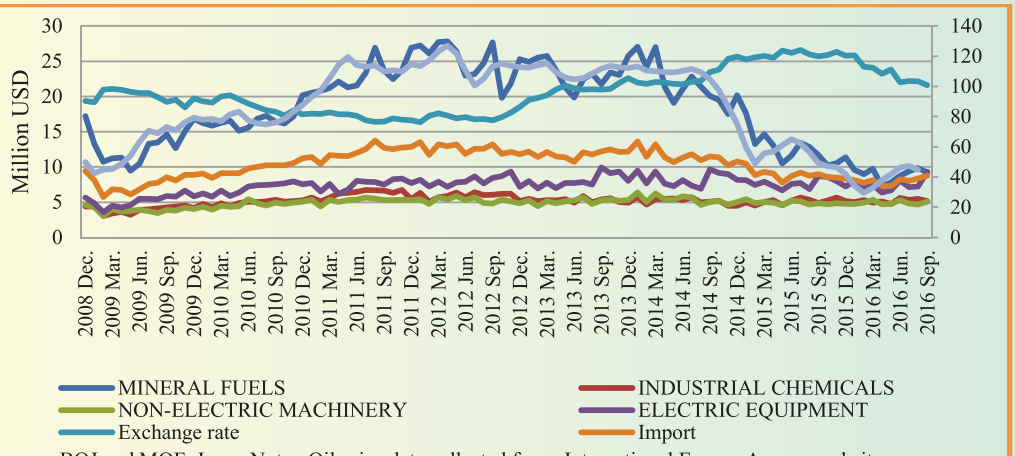


Source: BOJ and MOF, Japan

Figure 4: Movement of Major Export Items and Exchange Rate in Japan

3.5 Trends of Major Import Items, Oil Price and Exchange Rate in Japan

Figure 5 indicates that when exchange rate depreciates then the value of imports falls and vice-versa. The major import item in Japan is mineral fuels and it is observed that it was also inversely related to the exchange rate depreciation. On the contrary, it is evidenced that the value of import of mineral fuels were highly coincided with the oil price changes. So when the oil price increases then the value of mineral fuels import rises and consequently raises overall imports in Japan. Though exchange rate depreciated a lot in recent years and the value of imports decreased significantly, that is occurred by the sharp declining of the oil prices in the world market instead of depreciation of yen. Therefore, the recent hike of trade balance in Japan was not by the exchange rate depreciation rather than it was because of decreasing value of import via large plummeting of crude oil prices. Hence, it cannot be said rigorously the depreciation of exchange rate lead to improvement of BOP in Japan without any statistical analysis.



Source: BOJ and MOF, Japan Note: Oil price data collected from International Energy Agency website

Figure 5: Major Import Items, Oil Price and Exchange Rate in Japan

4. Estimation of the Impact of Exchange Rate on BOP of Japan

4.1 Data and Methodology

In order to identify the relationship between exchange rate and BOP movements in Japan, the monthly exchange rate is considered from January, 1998 to September, 2016. The data on exchange rate was collected from the Bank of Japan. BOP data was collected from Ministry of Finance website which measures

in billion dollars. The industrial production index (IIP) is also considered as Japan is an industrialist country; the BOP can be affected by the movement of IIP. IIP data was piled up from the World Bank online database. Data have been seasonally adjusted by using 3-months moving average to remove the seasonal pattern from all series. To analyze the data, first the Augmented Dickey-Fuller test will use to check the stationarity property of the data. Therefore, the simple OLS estimating technique will run to see the relationship between exchange rate and BOP in Japan. Apart from the exchange rate and IIP, the model will incorporate two dummies as independent variable to capture the impact of Lehman crisis in 2008 and Fukushima blasts in 2011on the BOP. The dummy Lehman crisis=1 from September 2008 to onwards and =0 otherwise. Similarly, Fukushima dummy=1 from March 2011 to onwards and =0 otherwise. Finally, Vector Autoregressive (VAR) methodology will be used to identify the short run relationship between exchange rate and BOP in the Japanese economy. The VAR model will take the following forms:

$$BOP_t = \alpha_0 + \alpha_1 BOP_{t-p} + \alpha_2 EXR_{t-p} + \alpha_3 IIP_{t-p} + \alpha_4 Lehman_{dummy} + \alpha_5 Fukushima_{dummy} + \in_{bop,t}$$

$$EXR_t = \beta_0 + \beta_1 BOP_{t-p} + \beta_2 EXR_{t-p} + \beta_3 IIP_{t-p} + \beta_4 Lehman_{dummy} + \beta_5 Fukushima_{dummy} + \in_{exr,t}$$

$$IIP_t = \gamma_0 + \gamma_1 BOP_{t-p} + \gamma_2 EXR_{t-p} + \gamma_3 IIP_{t-p} + \gamma_4 Lehman_{dummy} + \gamma_5 Fukushima_{dummy} + \in_{IIP,t}$$

Where, subscripts t indicates time and p is lag operator. The optimal lag length in the model will be selected by the minimum value of Akaike information criterion (AIC).

4.2 Estimated Results

4.2(a) Unit Root Test Results

In order to determine the order of integration of each variable, we have used Augmented Dickey-Fuller test statistics, a technique widely employs to check the unit root of time series data. The test statistics delineates that both BOP and exchange rate series are stationary in first difference form. However, the IIP series is stationary in the level form as the null hypothesis (unit root) is rejected by 5% level of significance. Hence, both BOP and exchange rate are integrated of order

one i.e I(1), conversely, IIP is integrated of order zero i.e I(0). Therefore, the first difference form of BOP and Exr and level form of IIP will use to develop both OLS and VAR model to determine the pattern of the relationship between BOP and EXR.

Table1: Augmented Dickey-Fuller Test Results

	Level		First Difference		
	Without Trend	With Trend	Without Trend	With Trend	Order of Integration
BOP	-1.244 (0.6553)	-1.242 (0.8985)	-6.295*** (0.0000)	-6.366*** (0.0000)	I(1)
EXR	-2.751 (0.0672)	-2.654 (0.2569)	-4.297*** (0.0006)	-4.399*** (0.0027)	I(1)
IIP	-3.441** (0.0106)	-3.510** (0.0321)	-5.277*** (0.0000)	-5.275*** (0.0001)	I(0)

Note: The null hypothesis states that the variable has a unit root. P-values are shown in the parentheses following each adjusted t-statistic. *** &** implies statistically significant at 1 and 5 percent level of significance respectively.

4.2(b) Estimated Regression Results

The estimated OLS regression results reveal that exchange rate does not affect the movement of BOP in Japan contemporaneously. The reason may be decision lag by the economic agents of the economy. However, the estimated coefficients of EXR are statistically significant at lag 1 and 2 respectively. The impact of lag 1 of EXR is negative to the BOP but positive in lag 2. Therefore, it is difficult to pin down or draw proposition that exchange rate has a significant impact on BOP movement in the Japanese economy. The optimal lag of each variable in the model has been selected based on the minimum value of AIC. The model is statistically fitted well as the coefficient of determination value (R^2) is 0.54.

$$DBOP = -0.465 + 0.129^{***}DBOP_{t-1} + 0.136^{***}DBOP_{t-2} - 0.599^{***}DBOP_{t-3} - 0.072DEXRt - 1.176^{***}DEXR_{t-1} + 0.830^{**}DEXR_{t-2} + 0.140DEXR_{t-3} + 0.509^{**}IIP_t - 1.305^{***}IIP_{t-1} + 0.994^{***}IIP_{t-2} - 0.193IIP_{t-3} + 0.428Dummy\_Fukushima + 0.269Dummy\_Lehman,$$

$$R^2 = 0.54$$

Note: *** & ** implies statistically significant at 1 and 5 percent level of significance.

4.2(c) Impulse Response Function

Based on the VAR model, generalized impulse response function is generated to identify the behavior of BOP from the short run shock in the exchange rate in

Japanese economy (Figure 6). Figure 6 unveils that the BOP falls immediately after the one standard deviation shock in the exchange rate (depreciation of Japanese yen); however, it increases gradually afterward. From the figure, it can be mentioned that the depreciation of Japanese yen has no persistent impact on the movement (either positive or negative) of BOP. Hence, it can be concluded that the recent noteworthy devaluation of the yen has no significant impact on the overall position of the BOP in Japanese economy.

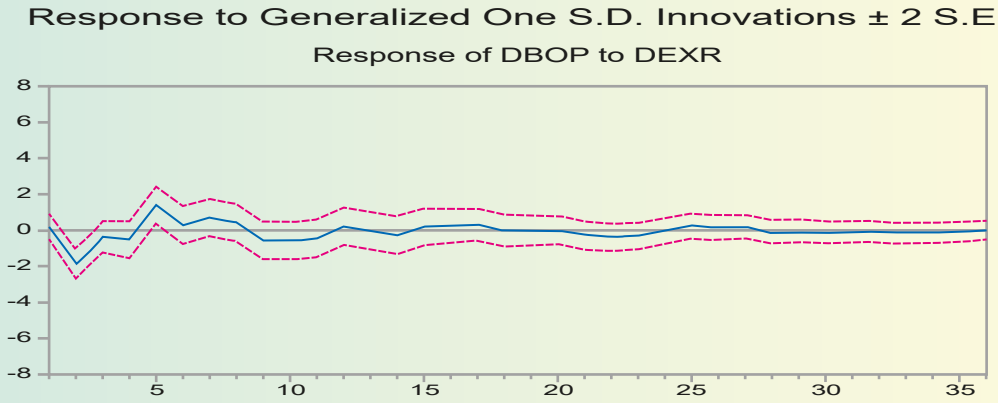


Figure 6: Impulse Response Function from VAR

5. Conclusion and Policy Implication

In this paper, the empirical relationship between Japanese yen depreciation and BOP fluctuation is investigated using time series data from January, 1998 to September 2016. The empirical analysis found a mixed (either positive or negative) impact of exchange rate depreciation on the BOP movements in Japanese economy based on OLS regression model. Moreover, the VAR model is also incorporated to retrieve the short run behavior of the BOP when yen depreciated. The impulse response function indicates that there is no considerable impact of exchange rate devaluation on the BOP. Hence, the estimated OLS regression results and impulse response function are consistent. The recent sharp depreciation of yen has no effect on the BOP because Japan's mainly exports heavy industrial good in the world markets. To this connection, exports also depend on the fluctuation of the business cycle of major Japanese trade partners. And the overall position of the BOP in Japan is improving in recent years as

economies are recovering their economic downturn from the global economic crisis in 2008. In addition, Japan experiences a huge surplus in the financial account in recent years due to the heavy flow of income from portfolio investment in the world market. Consequently, the overall balance of BOP is improving in Japan. For the above reasons, the exchange rate is not the key factor to ensure the sound and stable BOP in Japan. To ensure the stability in BOP, the Japanese government is not only required to implement a prudential policy mix for an effective exchange rate but also need to watch the movement of the business cycle of other countries. In addition, the implementation of structural change policies are urgent as the behavior of both entrepreneurs and labors are changing to the production process and labor force participation over the periods of time.

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Financial Inclusion Landscape in Bangladesh: Strengths and Weaknesses[1]

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Abstract

The paper reviews the current state of financial inclusion landscape in Bangladesh to find out strengths and weaknesses. The analysis shows that financial inclusion has been broadened and scaled up many fold over the last ten years. The study finds that the major strengths are the marginal farmers, sharecroppers, and women entrepreneurs who were excluded or underserved can access financial services due to pursuing credit policy of agricultural and CMSMEs, and scale up financial inclusion through agent banking and MFS in rural areas. The paper also finds out some weaknesses such as 'the missing middle' segment of MSMEs, existing higher interest rates, very low insurance coverage and delays to adopt NFIS which are critical for broadening financial inclusion in future.

Keywords: Financial Inclusion, Financial Services, Financial Accessy

JEL Classification: G10, G20, O16.

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1. Introduction

Promoting financial inclusion is one of the cherished goals in the development agenda of Bangladesh. Accordingly, Bangladesh Bank (BB) has been pursuing financial inclusion strategy since 2010 for inclusive growth and sustainable development. A multipronged financial inclusion strategy has been adopted by the BB and governments to expand financial services to unbanked/underserved adult population, firms, farmers and cottage, micro, small, medium enterprises (CMSMEs).

A growing recognition is that financial inclusion is critically important for development and poverty reduction (WB, 2014, King *et. al*, 1993; Beck *et. al*, 2000, 2004; Levine, 2005, Demirgüc-Kunt *et. al*, 2008, and Islam, 2015). Financial inclusion has been identified as an enabler for seven of the 17 Sustainable Development Goals and which appears to be an enabler for achieving our national goals: to become a poverty-free middle-income country and to be a more inclusive and equitable society.

In order to broaden financial inclusion, BB has adopted a multi-pronged strategy by ushering ideas and policies which are critical for accelerating financial inclusion. The major approaches are to expand credit flows to agricultural, CMSMEs; to bring a large number of un-banked/under-banked, socially disadvantaged people into the ambit of financial services; to adopt mobile financial services by tapping mobile and telephone density; to expand banking services to remote areas through agent banking; and to adopt information and communication technology (ICT) in delivering financial products at an affordable cost.

In accelerating financial inclusion initiatives, BB has enabled regulatory environment for banks and non-bank financial institution (NBFIs). As a result, the role of inclusive finance is gradually being realized: to significantly increase outreach to un-served and under-served households and enterprises. Supported by a sound policy, together with an appropriate legal and regulatory framework, any country should have a continuum of financial institutions that collectively offer appropriate products and services to all segments of the population at an affordable cost (Rahman, 2013).

The financial inclusion drive has been taking place since 2009 and access to financial services has been broadened. To scale up financial inclusion in future,

the paper reviews the current state of financial inclusion landscape and to find out strengths and weaknesses.

The remainder of the paper is structured as follows. Following the introduction, section 2 gives a short summary of the literature on financial inclusion aspect, section 3 reviews the financial inclusion landscape, section 4 analyzes financial inclusion status based on accessibility, availability and usage of financial services, section 5 finds out the strengths and weaknesses of financial inclusion, and section 6 concludes.

2. Literature Review on Financial Inclusion

Ample of studies accomplished worldwide in the arena of financial inclusion by the institutions as well as individual level but review on the specific issue like landscape of inclusion covering strengths and weaknesses like ours for Bangladesh not yet done. This study tries to cover specially the issues on landscape of financial inclusion including current state of financial inclusion landscape, strength and weakness of financial inclusion in Bangladesh. Financial inclusion is vital for sustainable development and economic growth in any developing country like Bangladesh. Similarly, financial inclusion and human development are closely related with each other (Sarma, M. and Paris, J., 2011) in any country. Access to finance is the driver for poverty eradication which facilitates new establishment for small and medium entrepreneur (SME), micro small and medium entrepreneur (MSME) and help to run rural economic activity. Rahman, A., (2009), argue that financial inclusion combats poverty by expansion opportunities for the disadvantaged poor and promoting social inclusion and inclusive socio-economic growth.

In literature, financial inclusion is a process that assures the ease of access, availability and usage of the formal financial sector for all economic agents specially un-served or under-served people who are not connected with formal financial system. The G20 defined financial inclusion as: “A state in which all working age adults have effective access to credit, savings, payments, and insurance from formal service providers”. Another prominent economist Rangarajan committee (2008) has defined financial inclusion as, “The process of ensuring access to financial services and timely and adequate credit where needed

by vulnerable group such as low income groups at an affordable cost". According to Reserve Bank of India (RBI 2012), "financial inclusion is the process of ensuring access to appropriate financial products and services needed by all members of the society in general and vulnerable groups in particular, at an affordable cost in a fair and transparent manner by mainstream institutional players".

In the real economy, the financial inclusion also provide widening financing support to productive SME and MSME enterprises to increase their production on the supply side along with generating employment and income. United Nations (UN) published a milestone report in 2006 as name of "Building Inclusive Financial Sector for Development" known as "blue book" for financial inclusion around the whole world. This report focuses importance of access to financial services for achieving millennium development goals (MDGs) and help policymakers to initiate national policy for building inclusive financial sectors.

Bangladesh Bank (BB) and the Government of Bangladesh (GoB) have taken several initiatives and policy measures to encourage and expand access to financial services for all. Bangladesh Bank's financial inclusion programs have been successful in all respects, especially in relation to the uplift of financially excluded people's socio-economic condition. Rahman. A (2014) identify Bangladesh Bank's efforts to boost financial inclusion will provide solid foundation for an inclusive sustainable growth process for Bangladesh. Islam and Mamun (2011) argue that Bangladesh Bank pursuing priority policy for financial inclusion in formal and informal financial sector to maintain monetary and financial stability. Bangladesh Bank introduces many more financial inclusion strategies with national policy for inclusive growth as reflected in both sixth five year plan and also the perspective plan. Bangladesh Bank took plenty of initiatives including no-frill account, mobile financial services and agent banking to ensure financial inclusion in under-served population and economic agent (Hossain, S.M., et. al 2015). Mobile financial services are a great technical innovation of financial system in Bangladesh. Bangladesh Bank made and circulated a proper mobile financial services guideline for smoothing payment system through mobile financial services. Akhter, N. and Khalily, B., (2017) found that the positive role of mobile financial services on financial inclusion including growth enhancement and poverty alleviation.

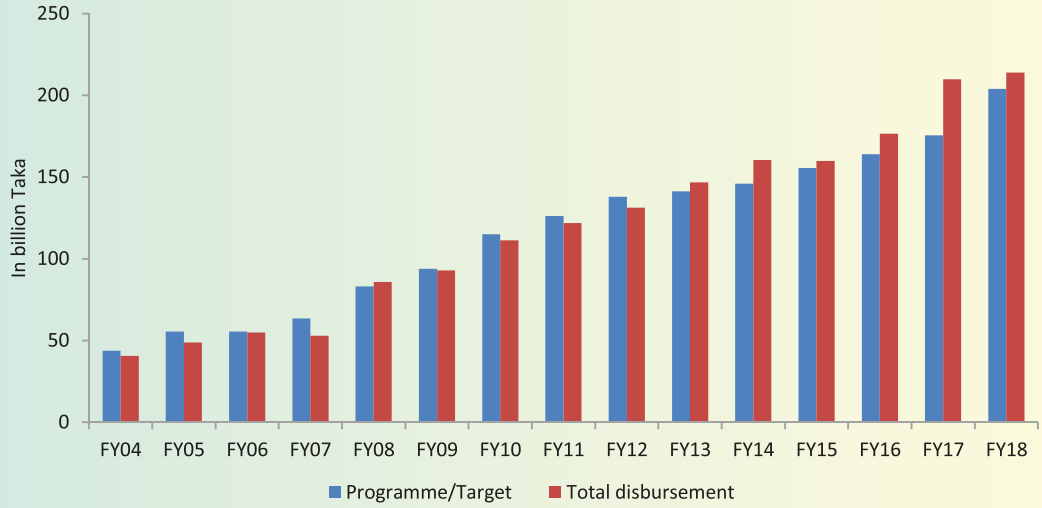
Small and Medium Enterprises (SMEs) and; Micro, Small and Medium enterprises (MSMEs) are priority sector in Bangladesh for manufacturing as well as overall economic growth. In SME financing, BB has kept refinance scheme available to banks against their loans to Small and Medium Enterprises; multilateral development partners such as the IDA and ADB are supplementing BB's refinance scheme with their co-finance. Besides, BB is allowing banks to open SME service booth in areas with no branches of the banks concerned. In 2016, Bangladesh Bank conducted a survey on MSME financial indicators. According to this survey, MSME business has sufficient access to financial services. Almost all (97 percent) of the sample respondents reported that they do not face any difficulties in getting MSME loan. The survey also revealed that a large portion of the respondents (89 percent) reported opening a bank account for the business purposes is not so difficult. On the other hand, on an average, 26 days required to get sanction of the loan. The agricultural credit program is one of the important policies for development of agriculture which announced by Bangladesh Bank for every fiscal year. All scheduled banks operating in Bangladesh participate in lending for sharecroppers to expand rural economic activities and also availing refinancing schemes for rural and agricultural development of BB. Khalily, M.A.B. (2016) showed that both banks and microfinance has contribution to increase intensity of financial deepening and access to financial services in Bangladesh. A lot of initiatives and programs have been performed for uplifting the economic condition of the distressed population of the country through financial inclusion. Now it is time to evaluate the usefulness of the initiatives and current state of financial inclusion landscape in Bangladesh and also find out the strengths and weaknesses. BB also continues all along efforts to enhance financial inclusion and revisiting guidelines and polices regularly based survey impact. In this regard, a Survey on Impact Analysis of Access to Finance in Bangladesh in 2019 conducted by BB (BB, 2019). According to this survey, majority of the banked respondents reported that they were induced to do savings after establishing relationship with the financial institutions. Almost 24 percent banked respondents out of 2872 respondts acknowledged that they borrowed some amount of money from the formal sources within the preceding one year period.

3. The Current Stock of Financial Inclusion Landscape

3.1 Agricultural Financing and Financial Inclusion

BB has adopted a pragmatic agricultural credit policy for extending credit facilities to marginal farmers, sharecroppers, women and landless farmers. Under this agricultural credit policy, a substantial amount has been allocated to the agriculture sector due to its major contributions to employment generation, poverty reduction, food security and sustained economic growth. Chart 3.1 plots agricultural credit targets and actual disbursements for the period from FY04 to FY18. Total agricultural credit disbursement by banks has increased nearly doubled to BDT 213.94 billion in FY'18 from BDT 111.17 billion in FY 10.

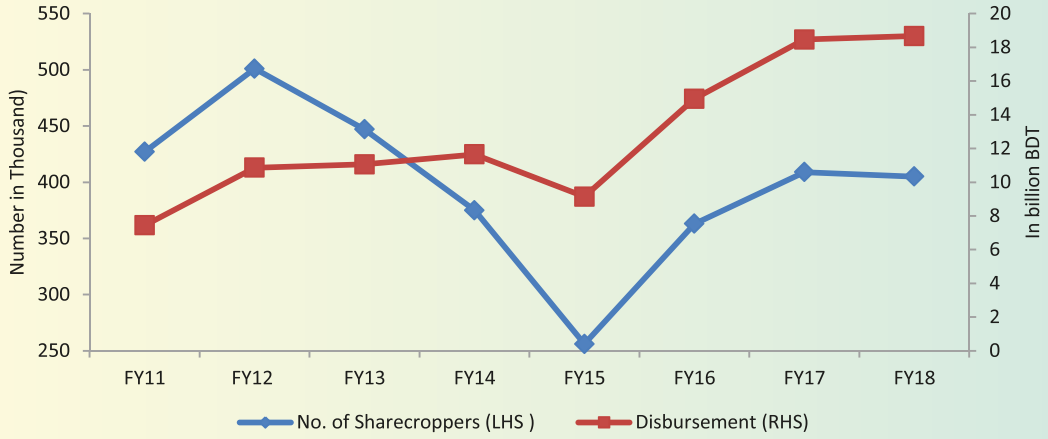
Chart 3.1: Trends in Program and Disbursement of Agricultural Credit during FY04-FY18



Source: Agricultural Credit Department, BB

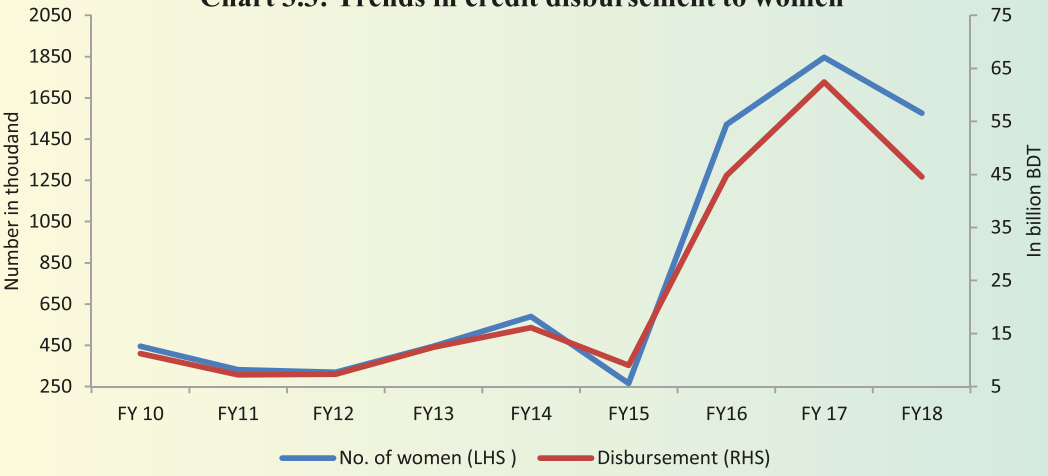
In FY10, the sharecroppers were brought into the agricultural credit program under a revolving refinance credit scheme of BDT 5 billion. It is noteworthy that the sharecroppers now enjoy credit facilities having been previously excluded from bank credit. In FY18 BDT 18.67 billion was disbursed to 375,000 sharecroppers from BDT 4.30 billion to 374,000 farmers in FY10 (Chart 3.2).

Chart 3.2: Trends in credit disbusrsement to Sharecropper



Source: Agricultural Credit Department, BB.

Chart 3.3: Trends in credit disbursement to women



Source: Agricultural Credit Department, BB.

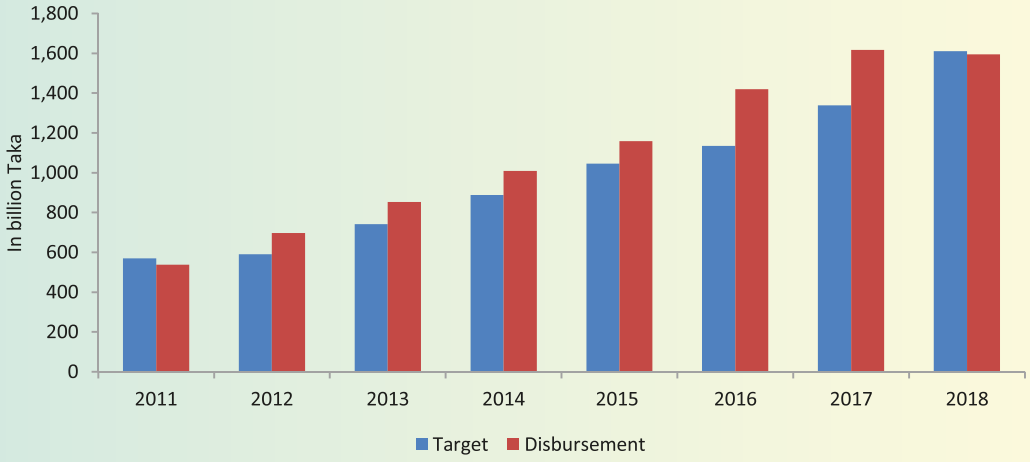
Banks are instructed to extend credit facilities to women for agricultural activities such as gardening, nursery, post-harvesting activities, production and preservation of seeds, bee rearing/apiculture and honey production, food processing, fisheries, the animal resources sector, and many other occupations. In the agricultural and rural credit policy, banks are directed to provide credit facilities to the women on a priority basis. In FY18, 1.57 million women have received BDT 63.09 billion credit which was BDT 11.23 billion in FY10 (Chart 3.3).

BB arranges credit facilities at a 4 percent concessional interest rate to promote production of agricultural import substitute crops**.** Agricultural credit at a concessional 4 percent interest rate is being extended by banks to farmers for growing of pulses, spices, oilseeds, and maize. Banks get a 6 percent interest subsidy from the government through Bangladesh Bank against these loans. Local production of these specialized crops is already contributing significantly towards reduction of import dependence.

3.2. CMSME Financing and Financial Inclusion

BB formulates CMSME credit policy and prudential guideline for increasing financial flow to CMSMEs sectors. The main purposes of the policy are create a window for unbanked/underserved CMSME including women entrepreneur to access affordable financial services offered by banks and Non-bank financial institutions. Reaching the micro, small and medium-size enterprises (MSMEs) are one the major segments of financial inclusion in Bangladesh.

Chart 3.4 : Trend in SME Loan Target and Disbursement



Source: SME & Special Programs Department, BB and Annual Report, 2017-18, BB.

In 2010, a target-based CMSME lending program was initiated. Since then banks and non-bank financial institutions prepare their disbursement target based on CMSME credit policy of BB. Under this credit program, a number of women entrepreneurs can access financial services on simple terms and conditions, some entrepreneurs get loan without collateral, and rural entrepreneurs also can access

to credit facilities. Total loan disbursement to CMSMEs increased many fold during last ten years. In 2018, Banks and NBFIs disbursed altogether BDT 1595.10 billion to 687,522 enterprises in 2018, up from BDT 535.44 billion to 310,000 enterprises in 2010 (Chart 2.4).

In 2018, 135,941 thousand new entrepreneurs (about 20 percent of total entrepreneurs) got BDT 269.77 billion loan from banks and NBFIs. In rural area, 192,116 thousand entrepreneurs received BDT 345.83 billion from banks and NBFIs in 2018. The number of women entrepreneurs who access to financial services has been increasing since CY2010 (Table I.)

Table-I: CMSME credit disbursement to women entrepreneurs during 2010-2018

Year	No. of Women Entrepreneurs	Amount Disbursed (In billion Taka)
2010	13,831	18.05
2011	16,696	20.48
2012	17,362	22.44
2013	41,695	33.47
2014	42,730	39.38
2015	31,242	42.27
2016	41675	53.45
2017	53874	47.73
2018	57571	55.17

Source: SME & Special Programmes Department, BB.

3.3 Mobile Financial Services and Financial Inclusion

To meet the objectives of financial inclusion BB leverages the mobile phone platform. The developments in mobile phone density in Bangladesh, with 116.6 million subscribers, present a unique opportunity. To tap the opportunity, BB published the "Guidelines on Mobile Financial Services for Banks" on 22 September 2011 and revised it in 2018 as the legal framework for a mobile technology based payment system. This event served as a milestone in financial inclusion activities in the country. The activities of mobile financial services have been expanded tremendously since 2011. At the end of December 2018, the number of total agents was 880 thousand and the number of registered customers was almost 67.52 million, of which active accounts were almost 37.32 million.

The number of total transactions was 210.09 million, while the amount of total transactions was BDT 321.06 billion in December 2018 (Table II).

In the banking sector, 28 banks have received permission for providing financial services through mobile technology as an alternative payment channel. Of these, 20 banks are already carrying out activities such as disbursement of inward remittances, financial transactions through agent/bank branch/ATM/ mobile operator outlet, payments of business organizations (such as utility bills) by individuals, payment of individuals by business organization (such as salary distribution) payment of individuals by Government (such as old-age allowance, freedom fighter allowance, etc.), payments of Government by individuals (such as tax payments), individual to individual transactions (from one registered mobile account to another registered mobile account) and other transactions such as microfinance, overdraft facilities, insurance premiums, etc.

Table II: Trends in Mobile Financial Services in Bangladesh

Description	December 2015	December 2016	December 2017	December 2018
No. of Banks currently providing the Services	18	17	18	18
No. of Agents (in thousands)	561	710	786	880
No. of registered clients (in Millions)	31.85	41.08	58.8	67.519
No. of active accounts (in Millions)	13.22	15.87	21.00	37.323
No. of total transaction (in millions)	115	134	166.32	210.09
Total transaction amount (in billion BDT)	161.25	232.14	285.71	321.06
No. of daily average transaction (in millions)	3.83	4.46	5.37	6.78
Average daily transaction (billion BDT)	5.37	7.74	9.22	10.36
Product		**(In billion BDT)**		
Inward Remittance	0.04	0.08	0.05	0.64
Cash In transaction	68.30	100.16	120.28	122.62
Cash Out transaction	59.31	90.46	108.95	122.14
P2P transaction	27.51	33.68	44.25	50.74
Salary Disbursement (B2P)	1.54	2.35	4.0545	6.13
Utility Bill Payment (p2b)	1.09	1.81	1.85	2.85
Merchant Payment			1.30	4.25
Government Payment	-	-	1.28	6.57
Others	3.45	3.58	3.71	5.13

Source: Payment System Department, BB.

3.4 Agent Banking and Financial Inclusion

BB has taken initiatives in agent banking in 2013 to reach out to the unbanked and underserved segments of the society as well as existing bank customers with a range of banking services especially to geographically dispersed locations with comfortable cost. It is an alternative delivery channel of banking services under the financial inclusion strategy program and the regulations and guidelines for agent banking operations were issued on 9 December 2013 and revised in 2017[6]. The activities of agent banking have been expanding rapidly. Presently, 21 banks have been licensed so far for starting agent banking services and 19 banks are in operation. The agent banking system provides a comprehensive range of banking services to the unbanked portion of the society, and provides efficient services to the existing customers[7].The performances of agent banking are given in Table III.

Table III: Performances of agent banking activities

	2017	2018	Change, %
1. No. Agent (in number)	**2577**	**4493**	**74.35**
a. Urban	267	429	60.67
b. Rural	2310	4064	75.93
2. No. of outlet (in number)	**4157**	**6933**	**66.78**
a. Urban	364	601	65.11
b. Rural	3793	6332	66.94
3.Total Account, in million	**1.22**	**2.46**	**101.85**
a. Urban	0.18	0.32	80.43
b. Rural	1.04	2.14	105.49
3. No. of Account (Men), in million	0.83	1.59	92.50
4. No. of Account (women), in million	0.38	0.85	125.52
5. Total Deposit amount (In billion BDT)	13.99	31.12	122.49
a. Urban	4.83	6.57	36.02
b. Rural	9.16	24.55	168.10

[6] As per the guidelines, the aims of agent banking are to serve the non-privileged, underserved population and the poorer segments of society, especially those from geographically dispersed locations. Banks will give much emphasis to the rural areas to cover the lion's share of the target group. The ratio of the numbers of sub-agent/ outlets of a bank will be 2:1 for rural and urban areas.

[7] Through agent banking, a customer can get a variety of banking services, including(1) small value cash deposits and cash withdrawals, (2) collection of foreign remittances, (3) small value loan disbursement and loan repayment in installments; (4) cash payments under the social safety net program of the Government; (5) utility bill payment; (6) fund transfers, (7) account opening, (8) application for loans, and (9) collection of debit/credit cards.

6. Loan Disbursement (In billion BDT)	1.09	1.49	37.05
a. Urban	0.11	0.26	128.85
b. Rural	0.98	1.23	26.41
7. Inward Remittances (in million BTD)	19.81	55.57	180.49
a. Urban	1.99	5.07	154.57
b. Rural	17.82	50.50	183.39

Source: Quarterly Report on Agent Banking, October-December, 2018, BB.

The financial services (deposits, loan and inward remittances) have been reaching to women and rural area through a number of outlets of agents (Table III). In 2018, the outstanding of deposits, loan and inward remittances reached BDT 31.12, BDT 1.49 and BDT 55.57 billion respectively. Out of this, women in rural area are main beneficiary.

3.5 Innovative Account (No Frills Account)

Bangladesh Bank brings socially disadvantaged and financially excluded people into financial services under its on-going financial inclusion program[8]. BB has advised the banks to open bank accounts with a minimum deposit of BDT 10 and BDT 100, with the one step of filling out the KYC (Know Your Customer) form to cover those people. These accounts are free of service charges. Up to 2018, a total of 19.02 million accounts had been opened by the state-owned banks and specialized banks (Table IV). Of these accounts, 9.89 million are BDT 10 farmers' account.

Table IV: Developments in Innovative Accounts as of December 2018

Name of Accounts	No. Account (cumulative), in Million	Outstanding deposit, in billion BDT	Using for subsidy/ salary		For using Refinance/loan from BB's 2 billion fund		Foreign Remittances	
			No. account, in million	0utstanding deposit, in billion BDT	No. Account, in thousand	Disbursement, in billion BDT	No. account, in thousand	Amount, in billion BDT
Farmer's BDT 10	9.89	3.034	2.073	0.612	43.911	1.258	26.749	1.299
Social safety net Beneficiaries	5.09	5.377	1.692	3.661	5.108	0.034	2.553	0.017
Freedom	0.21	2.544	0.979	0.681	9.330	1.787	0.230	0.011

[8] Socially disadvantaged and financially excluded people are farmers, the ultra-poor, freedom fighters, beneficiaries from the social safety net program, small life insurance policy holders, ultra poor women, vulnerable people who are getting grants for rehabilitation under the Ministry of Religious Affairs, cleaners of Dhaka North and Dhaka South City Corporations, and others (vulnerable people who are getting grants from the Hindu Religious Welfare Trust, Tornado (Aila) affected people, etc.).

fighter								
Small insurance policy holder	1.17	0.176	0.005	0.018			0.441	0.017
Others	2.67	6.80	0.13	3.98	6.87	0.22	1.66	0.04
Total	**19.02**	**17.927**	**4.878**	**8.948**	**65.217**	**3.298**	**31.628**	**1.379**

Source: Quarterly Report, December 2018, FID, BB.

3.6 Financial Literacy and School Banking

The level of financial literacy is association with financial inclusion. Financially literate people can manage the financial product risk better than the illiterate people. Subbarao, D. (2010) argues that financial inclusion and financial literacy are twin pillars and while financial inclusion acts from supply side providing the financial products and services that people demand, financial literacy stimulates the demand side – making people aware of what they can demand.

To increase financial literacy, BB introduced school banking in 2010 which is one of the good initiatives in promoting financial inclusion. The goal of the school banking program is to introduce the students to modern banking services and technologies, and to encourage them to participate in financial activities through saving. With this aim, Bangladesh Bank asked all scheduled banks to implement school banking with special priority. The activities of school banking have been expanded rapidly. At the end of 2018, the number of accounts and deposit balances stood at 1818,413 and BDT 15.13 billion respectively under this school banking program (Table V). The outstanding savings of the female students both in rural and area reached BDT 6.44 billion in banks at the end of December in 2018 which was 42 percent of total school banking savings.

Table V: Trends in School Banking Account and amount in Bangladesh

Year	No. of accounts	Balance amount (in BDT billions)
2011	29,080	0.31
2012	132,537	0.97
2013	295,802	3.06
2014	850,303	7.17
2015	1034,954	8.44
2016	1257,370	10.21
2017	1453,936	13.62
2018	1818,413	15.13

Source: Quarterly Report, December 2018, FID, BB.

3.7 Protection of Consumer Right

With the rapid expansion of banking network within the country, demands and expectations for services of the customers are increasing rapidly and therefore, banks are paying more attention to these increasing expectations of customers. As the supervising and controlling authority of banks and financial institutions of the country, Bangladesh Bank has kept a keen eye on the standardization of customer-service along with maintaining stability in the financial market. With a view to ensuring hassle-free smooth banking services for innumerable clients from both home and abroad and to upholding the standard of services of our banks at desired level, a full-fledged department named 'Financial Integrity and Customer Services Department (FICSD)' was established in Bangladesh Bank in 2012. The department has been playing an important role in bringing discipline in the financial sector by resolving various types of complaints of the customers, developing the banker-customer relationship and protecting interests of the customers. Rate of resolution is quite high which indicate that consumer is getting protection under financial inclusion program (Table VI).

Table VI: Complained Received and Resolved during 2014-2017.

Financial Year	Complaints Received	Complaints Resolved	Rate of Resolution
2013-14	4476	4291	95.87
2014-15	3930	3930	100.00
2015-16	4530	4530	100.00
2016-17	3521	3519	99.94

Source: Annual Report, 2016-2017, FICSD, BB.

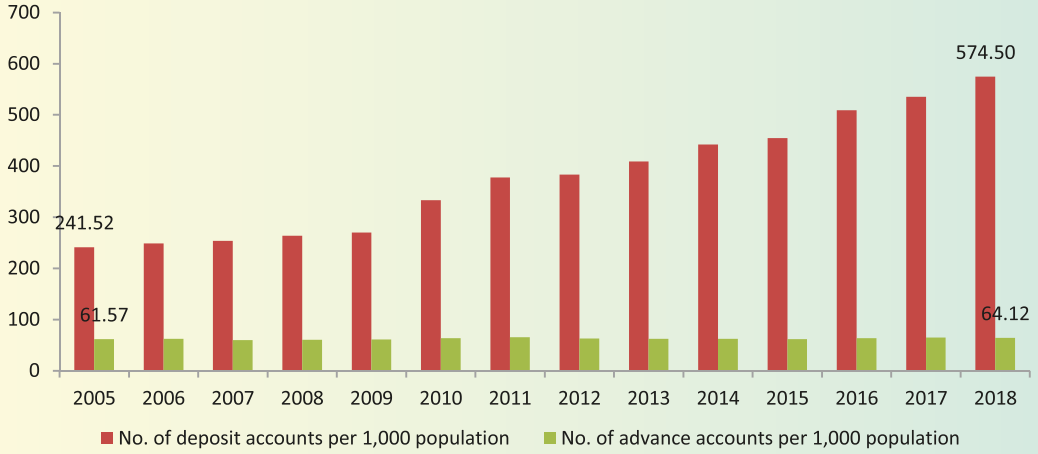
4. Analysis of Financial Inclusion Status

This section review financial inclusion status of Bangladesh based on three basic dimensions of financial inclusion—accessibility, availability and usage of financial services. Accessibility has been measured by the penetration of the banking system proxied by the number of bank accounts (hereafter A/Cs) per 1000 population. Availability has been measured by the number of bank branches and number of ATMs per 100,000 people. The proxy used for the usage dimension is the volume of credit plus deposit relative to the GDP.

4.1 Accessibility of Financial Services

The number of deposit accounts per 1000 population grew sharply to 574.50 in 2018 from 241.52 in 2005. Loan accounts growth, on the other hand, was moderated to 64.12 in 2018 from 61.57 in 2005 (Chart 3.1).

Chart 4.1: No. of deposit and loan accounts per 1,000 population



Sources: Authors own calculation based on data available in scheduled Bank Statistics, BB; Islam and Mamun (2011).

Chart 4.2: Deposit account per 1000 persons

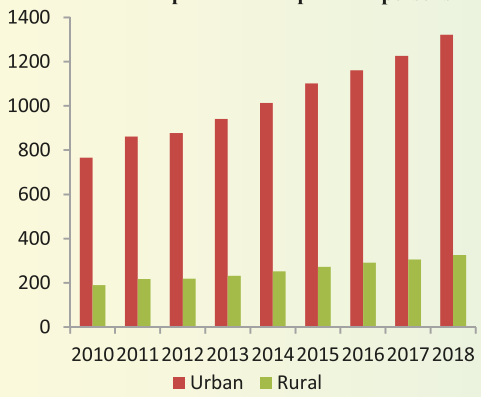


Chart 4.3: Loan account per 1000 persons

Sources: Authors own calculation based on data available in scheduled Bank Statistics, BB; Islam and Mamun (2011).

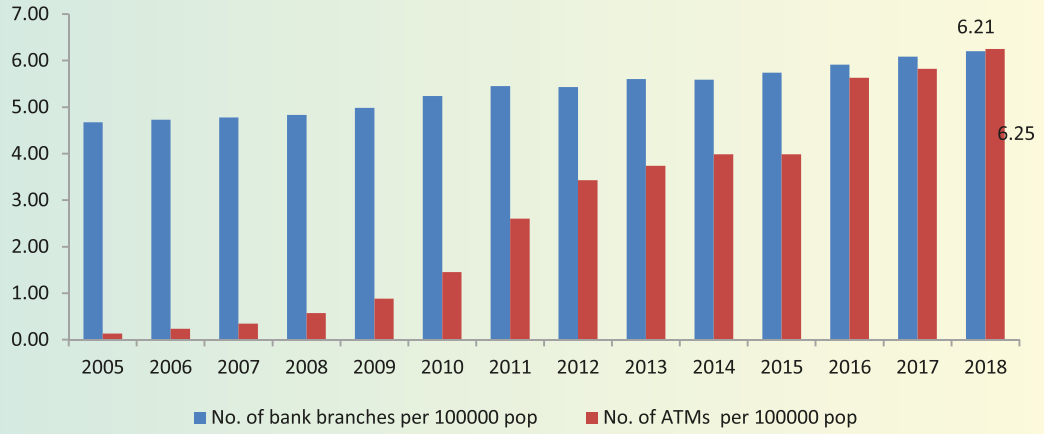
Access to banking services both in rural and urban areas in terms of deposit and credit accounts per 1000 population was quite impressive during 2010-2018 (Chart 3.2 and 3.3). Data on deposit account in rural areas show that number of deposit accounts per 1000 reached 326.61 in 2018 from 189.17 in 2010 due to

increasing deposit account, on average, about 11.91 percent per year in rural areas between 2010 and 2018. Access to banking services in urban area grew faster during 2010-2018. Deposit account per 1000 population increased to 1321.17 in 2018 from 765.25 in 2010. The deposit account in urban area grew by 11.98 percent per year between 2010 and 2018. The number of credit accounts during the same period increased, on an average of 0.22 percent per year in rural areas, compared with 4.37 percent in urban areas during 2010-2018.

4.2 Availability of Financial Services

In term of demographic penetration, the number of branches per 100,000 populations increased from 4.67 in 2005 to 6.21 in 2018. The number of ATMs per 100,000 population increased from 0.13 in 2005 to 6.25 in 2018 (Chart 3.4). Trends in demographic penetration indicate that access to banking is steadily increasing overtime in Bangladesh.

Chart 4.4: Demographic Penetration of Banking Services



Sources: Authors own calculation based on data available in Scheduled Bank Statistics, BB; Islam and Mamun (2011).

4.3 Usage of Financial Services

The deposit growth in rural area increased substantially between 2010 and 2018, up 44.88 percent, on average, per year to BDT 2232 billion in 2018 from BDT 486 billion in 2010. The same in urban area also grew faster during the period and up 21 percent, on average, per year to BDT 8582 billion in 2018 from BDT 3202 billion in 2010. Advances to rural area also increased substantially during the

period, registering by 38.16 percent per year, on average, to BDT 940 billion in 2018 from BDT 232 billion in 2010. Advances to urban area increased by 24.57 percent, on average, per year between 2010 and 2018.

The ratio of total deposit as percent of GDP shows some volatility during the period, increased from 46 percent in 2010 to 48 percent in 2018. Total Banks' advance ratio as percent of GDP increased from 28 percent in 2005 to 38 percent in 2018 (Chart 3.5 and 3.6).

Chart 4.5: Deposit /GDP ratio

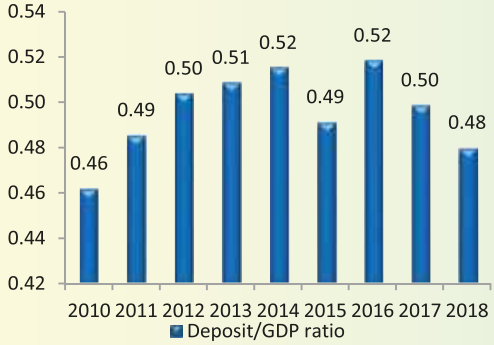
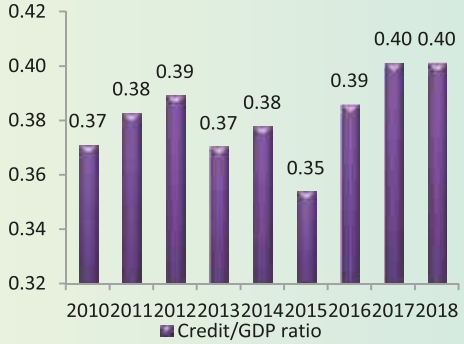


Chart 4.6: Advance /GDP ratio



Sources: Authors own calculation based on data available in Scheduled Bank Statistics, BB; Islam and Mamun (2011).

4.4 Access to MFIs Financial Services

Micro Finance Institutions (MFIs) have expanded their financial services to mostly women in rural area which is remarkable in Bangladesh. The MFIs have diversified their financial service product overtime. The financial products are loan (general micro credit, ultra poor loan, microenterprise loan, and house loan), savings (client compulsory savings and others), and agriculture finance (loan). Agricultural loan varies on their activities, generally off firm activities like house stead agriculture and small food processing activities. The latest data indicate that 806 MFIs operated through 18,088 branches throughout the country (mostly in rural areas)[9].The total number of clients of MFIs, stood at 31.08 million in June 2018 from 24.85 million at the end of June 2009. Total outstanding savings mobilized by MFIs increased to BDT 262.36 billion at the end of June 2018, compared with BDT 50.61 billion at the end of June 2009. Total outstanding loan disbursement reach BDT 671.16

[9] Data are available in NGO-MFIs in Bangladesh, June 2018, MRA, Bangladesh and FSR, 2018, BB.

billion at the end of June 2018, significantly up from BDT261.18 billion at the end of June 2009.

Data show that MFIs disbursed BDT 403.05 billion to 5.1 million microenterprises up to 2018. These microenterprises are mostly excluded from bank financing. To promote innovative finance and financial services for microenterprise, MFIs are maintaining a huge fund to provide them financial services.

4.5. Overall Financial Inclusion

The overall financial inclusion, measured by number of deposit accounts as a percentage of the total adult population, has increased at a modest pace in Bangladesh during the last 10 years. It is observed that financial inclusion by banks, measured by the number of deposits accounts as percent of the total adult population, increased from 42.2 percent in 2009 to 87.0 percent in 2018 due to the opening of a significant number of innovative accounts, including the farmers' BDT 10 account, small insurance policy holder accounts, social safety net beneficiary account, school banking account, agent banking account in the last several years. There are some multiple account holders in deposits accounts.

Global Findex database shows that access to financial services by adult populations, women, adult belonging to the poorest 40%, and adult living in rural area during last ten years[10]. About 50 percent adult populations (age 15+) of Bangladesh have accounts in 2017, up from 31.7 percent in 2011. Adult's women accounts went to 35.8 percent in 2017 from 26.01 in 2011 which reduce gender gap in financial inclusion. Rural people account also sharply increased to 49.9 percent in 2017 from 20.32 percent in 2011 (Table VII).

Table VII: Development Account Penetration in Bangladesh during 2011-2017.

	2011	2014	2017
Account (% age 15+)	31.74	30.99	50.05
Account, female (% age 15+)	26.01	26.45	35.84
Account, in labor force (% age 15+)	39.35	39.16	62.94
Account, income, poorest 40% (% ages 15+)	19.06	23.03	40.08
Account, rural (% age 15+)	29.72	29.63	49.93
Account, young adults (% ages 15-24)	20.32	20.83	40.99

Source: Findex, World Bank, 2018.

[10] The Little Data Book on Financial Inclusion, Findex, World Bank Group, 2018.

5. Strength and Weakness of Financial Inclusion

5.1. Strength

The drive of expanding financial inclusion through various approach such as branch expansion both in rural and urban area; adopting agent banking as an alternative channel for banking service to rural area; creating a digital platform by enabling MFS; and pursuing a pragmatic agricultural and CMSE financial policies for marginal farmers, share cropper and financial excluded entrepreneurs to access financial services is the major strength of financial inclusion.

To bring a vast segment of financial excluded population through innovative account is another praiseworthy strength of financial inclusion. Besides, cooperatives, post office, non-scheduled banks, insurance company, and NBFIs have expanded financial services to unbaked people both in rural and urban areas in the country and they have a potential platform for inclusion drive. Recent data show that 0.17 million cooperatives loan disbursed BDT 45.24 billion to 11.24 million members and collected deposits about BDT 77.52 billion in FY19[11]. NBFIs mobilized BDT 480 billion deposit in 2018.

Coordination among financial regulation is necessary for strengthening financial inclusion strategy. Rahman (2015) argues that since all financial sector regulators (MRA, BB, BSEC, IDRA) are under the umbrella of one government ministry (Ministry of Finance, MoF), which is a factor facilitating coherence and coordination in financial policies. Accordingly, BB ushered in fresh ideas and policies for broadening financial inclusion.

5.2 Weakness

A large number of micro and small firms have difficulties in accessing bank financing because of collateral and lack of proper accounts (documentations). These segments of MSMEs are identified as 'the missing middle' and that firms are also too big to qualifying for loans from MFIs (WB, 2019). This is one of the major weaknesses for broadening financial inclusion.

Banks and NBFIs are charging higher interest rate for CMSMEs loan compare to large and medium industry. Interest rate of microenterprise loan from MFIs is

[11] See Annual Report 2018-19, Department of Cooperative, Bangladesh.

higher than 25 percent. The prevailing high interest rate for CMSMEs loan is another weakness of financial inclusion. The interest rate should be more justified and the loan processing system should be faster and hassle free so that people are encouraged to seek an institutional loan (BBS, 2014).

Microcredit borrowers are facing challenges to mitigate different types of risks due to absence of micro insurance services. The very low insurance penetration (0.60 percent of GDP) compared to India (3.69 percent of GDP) reflecting that the insurance sector is still in nascent stage which is another weakness for financial inclusion during last ten years. The premium for life and non- life, as percent of GDP, has been declining since 2013 (BB, 2018).

Access to financial services has been expanded but usage of financial services is not up to market. Many household depend on family and friend sources for borrowing (WB, 2017 and BBS, 2014). Many accounts are lying in dormant. Another weakness is that there are multiple borrowing and overlapping among the MFIs, banks, and cooperative members.

Many countries are pursuing financial inclusion strategy by adopting national financial inclusion strategy (NFIS). Although financial inclusion has been pursuing since 2009, Bangladesh has yet to lunch the NFIS. To broaden financial inclusion in future, adopting NIFS is necessary.

Lack of proper measurement for safe and secure financial transaction is also hindrance for financial inclusion. To ensure safe and secure financial transaction, a better Coordination among Mobile Network Operator (MNO), financial service provider, and regulators is necessary.

6. Conclusion

The main objective of the paper was to review the financial inclusion landscape and to find out strengths and weaknesses of financial inclusion. The analysis indicates that financial inclusion has been scaled up and diversified significantly since 2009 because BB has ushered in policies and ideas for expanding financial inclusion and adopted pragmatic prudential guidelines and approaches. The notable approaches are to expand credit flow to agricultural, MSMEs; to bring a large number of un-banked/under-banked socially disadvantaged people into the

ambit of financial services; to adopt mobile financial services and agent banking to expand banking services to remote areas, and to tap information and communication technology (ICT) in delivering financial products at an affordable cost have impacted for broadening financial inclusion.

The analysis of geographical and demographic penetration indicates that access to banking is increasing overtime, both in urban and rural area in Bangladesh. The overall financial inclusion, measured by the number of deposit accounts as a percentage of the total adult population, has increased at a modest pace in Bangladesh during the last ten years. The paper shows that number of deposit accounts as a percentage of the total adult population increased from 42.2 percent in 2009 to 87.0 percent in 2018 due to opening a significant number of innovative accounts (no frills accounts) in the last several years. Usage of financial services through MFS has been scaled up many folds.

The paper has identified some strength in financial inclusion such as access to financial services by the marginal farmers, sharecroppers, and women entrepreneurs who were excluded or underserved. The pursuit of credit policy of agricultural and CMSMEs played a critical role for accessing more bank finance in achieving food security, employment generation and poverty reduction, which are considered national priorities in Bangladesh. The paper also finds out some weaknesses such as 'the missing middle' segment of MSMEs, exiting higher interest rates, a very low insurance coverage and delays to adopt NFIS which are critical for broadening financial inclusion in future.

The rapid digitization has opened an opportunity to expand financial inclusion landscape in Bangladesh. Deepening the usages of ICT in financial payment and creating inter operability among banks, NBFIs, and MFIs, may exploit more digital landscape to financial inclusion in future.

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Foreign Exchange Market Structure and Exchange Rate Volatility in Bangladesh

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Abstract

Foreign exchange rate volatility is an important factor involved in the decision making of investors and policymakers. This study attempts to measures the volatility behavior in terms of exchange rate returns and volume of daily transactions in foreign exchange market of Bangladesh ranging from July 2014 to June 2018, applying GARCH family models (i.e. PARCH, EGARCH, and IGARCH). The results show that the presence of volatility clustering in foreign exchange rate returns as the volatility of risk is responsive to past shocks and the past volatility influences the current volatility of exchange rate returns. Moreover, the return is positively related to its volatility. The existence of leverage effect is also evidenced in the Bangladesh foreign exchange market because positive past shocks increase volatility more than the negative past shocks of the same magnitude. Thus, the appreciation and the depreciation of Bangladesh Taka against USD do not necessarily cause symmetric variation in the exchange rate returns.

Keywords: Exchange rate, Volatility, ARCH, GARCH

JEL Classification: C52, C58, E44, F31

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Introduction

Analyzing foreign exchange rate volatility i.e. fluctuation of the exchange rate with respect to time is essential for corporate decision-makers because such unpredictable movement presents uncertainty in the operational environment and increases profit uncertainty. The policymakers, on the other hand, keep an eye on the volatility of foreign exchange rate for making economic decisions as it has effects on capital flows and international trade that are crucial for the balance of payments of a country. Because of its important economic and financial implications, monitoring the exchange rate volatility is gaining greater attention in developing countries like Bangladesh.

The volatility in the foreign exchange (FX) rates result in an increase of exchange rate risk and adversely affects the trade, remittances and investment decisions. Export-oriented countries with the substantial impact of exports on economic growth emphasize more on the exchange rate volatility in their economic policies. Kemal (2006) observes that in the medium term, FX rate can influence the balance of payments and level of the overall economic activity while affecting the local consumers and traders in the short run. In addition, FX rate volatility adversely affects the long-term decisions by stirring the volume of global marketing and decisions to allocate resources for investment, sales and procurement policies of governments as investor's confidence to invest in a particular country is inversely related to high volatilities in the exchange rate.

With significant trade and financial account openness in the last two decades, Bangladesh economy has become considerably more integrated with the global economy. Despite the dominance of domestic demand, the role of foreign flows in conditioning the growth process in Bangladesh has become important over time. The domestic economy now reflects global economic developments reasonably quickly. The deceleration in Bangladesh's growth associated with the current global slowdown is also testimony to the increased global integration of the domestic economy. Recent global developments have significantly transformed the environment in which monetary policy operates. As a consequence, in addition to the usual economic challenges, monetary policy today is faced with the following key challenges like:

- transmission of the uncertainty of global environment into the domestic economy;
- transmission of the volatility of exchange rate and the corresponding adverse impact through the trade, financial, commodity price, and business confidence channels.

The unprecedented momentum in global financial integration in the last two decades has led to an ever-increasing interest among researchers to understand the linkages between exchange rate volatility and monetary policy. In order to curb exchange rate volatility, policymakers and researchers employ quantitative models to determine which macroeconomic and financial factors have important influences on exchange rate volatility.

In line with the above consideration, the objectives of the study are to:

a) analyze the foreign exchange market structure in Bangladesh and the market behavior as well as the responses of exchange rates with changes of major macroeconomic variables and
b) To measure the volatility of exchange rate returns and volatility of transactions in Bangladesh and compare these to India as the neighboring country has multidimensional channels of influences on the Bangladesh economy.

In the era of the financial globalization process, monetary policy authorities have given a high weight to reduce the negative consequences of exchange rate fluctuations on inflation dynamics. To the best of our knowledge, ample studies have been done on the developed markets FX volatility but a few studies have been conducted on Bangladesh. So, this study will also further contribute to a literature on Bangladesh FX market volatility. Moreover, this study differs from the studies conducted earlier on Bangladesh exchange rate volatility in that while those studies have some methodological limitations, this study uses updated data along with contemporary econometric tools and techniques. Different GARCH family models have been used in the study to capture the main characteristics of the time series, such as volatility clustering and leverage effect. Moreover, most of the studies on Bangladesh only focus on exchange rate volatility rather than the overall foreign exchange market such as transaction volume. Unexpected events

may affect not only transactions but also volatilities in the FX market as a result; the transaction volume has an impact on exchange rate especially reflected on market demand and supply. Accordingly, this study considers the transaction of the FX market and volatilities together instead of considering them separately.

Rest of the study is organized as follows. Following the introduction in section 1, Section 2 reviews some relevant literature on the exchange rate volatility. Section 3 discusses the features of the foreign exchange market structure and operations in Bangladesh. Section 4 specifies data and methodology used in the study and section 5 highlights the results of the models. Finally, section 6 offers the conclusions.

2. Review of the Literature

In the modern integrated world, the exchange rate plays a vital role not only in foreign trade but also in domestic price stability. Chongcheul Cheong, et al (2006) examine the dynamic interrelations between exchange rate uncertainty, international trade, and trading competitiveness in prices, using UK data. The empirical results derived from vector autoregressive (VAR) models show that a shock to exchange rate volatility negatively affects trade volumes, and such negative effects are greater than the effects on trade price levels. Bhanumurthy (2006) finds that a majority of the dealers feel short-term changes in the Indian rupee/US dollar market are basically influenced by the micro variables such as information flow, market movement, speculation, central bank intervention, etc. One of the findings of his study, which has policy implications, is that the dealers feel speculation would increase volatility, liquidity and efficiency in the market and, central bank intervention reduces volatility and market efficiency. Khullar and Sethi (2011) measure the volatility of foreign exchange market in India found that the exchange rate of EURO is much more volatile than the YEN and US Dollar in the Indian foreign exchange market when comparing their daily volatilities. For all the 3 currencies under this study, they found generally an increasing trend in volatility when volatility is compared along the different time span taken into consideration such as from daily to weekly to monthly.

Among the articles on Bangladesh, Ahmed (2009) analyzes the relationship between exchange rate volatility and international trade growth in Bangladesh.

From the investigation, the result shows that the exchange rate volatility has a negative and major effect on trade both in short run and long run with Western European and North American countries. Alam and Rahman (2012) find that all GARCH type models demonstrate that the past volatility of exchange rate significantly influences current volatility. They measured the volatility of exchange rate using daily data for the period of July 2006-April 2012. However, limitations like excess skewness and kurtosis issues were detected but not properly addressed. Moreover, the lag specification of the mean equation was not properly addressed in their paper. Estimation with these may show misleading findings.

Using monthly data for the period of October 2007 to October 2013, Younus (2014) finds that Bangladesh's export to India is sensitive to India's Rupee depreciation and Bangladesh's imports are very sensitive to the relative price level changes. The study conducted by Rahman &Ghosh (2013), shows that the forecasted rates have not been exactly convergent to the actual exchange rates and the volatility has been mounting. Hossain & Ahmed, (2009) concludes that expansionary monetary policy has a high exchange rate pass-through with high market pressure. Moreover, lowering the REER volatility has positive impact on overall exports.

Uddin et al (2014) investigate the relationship between economic growth and the exchange rate of Bangladesh. They found a positive relationship between the variables which indicates that real depreciation of currency promotes economic growth. Another study by Abdullah et al (2017) examine exchange rate volatility using daily exchange rates for 7 years (January 1, 2008 - April 30, 2015) found that, in contrast with the normal distribution, the application of Student's t-distribution for errors helped the models satisfy the diagnostic tests and show improved forecasting accuracy. This study has also limitations since only the AR process is used in the mean equation but ARMA process may be more appropriate.

3. Features of the FX Market: Structure and Operations

***3.1 Volume of Transactions is increasing over time*:** All types of current transactions (excluding interbank) such as export earnings, import payment, remittance earnings are transected by the authorized dealer banks deal with customers increased over time (chart-1).

At present 57 scheduled banks with 1010 branches and 225 money changers are doing their foreign exchange businesses in Bangladesh. Banks are the dominant player because of countries export and imports are solely operated through banking channel. Mainly two types of transactions take place in Bangladesh FX market namely interbank and other than interbank. Authorized dealer banks are engaged in interbank transactions while both banks and money changers are engaged in transactions with the customers. In addition to the formal markets such as banks and money changers, there are some informal transactions which are called curb market transactions. In spite of major transactions occurred in USD, the interbank market is divided into 'US Dollar' and 'Non-Dollar' segment (includes all currencies other than USD, but calculated in equivalent USD units.

Among the typical foreign exchange instruments such as Spot, Forward and SWAP; the SWAP remained the dominant trading instrument during our sample period in Bangladesh foreign exchange market (chart-2). During FY18 the percentage share of SWAP, Spot and Forward transactions were 88%, 9% and 3% respectively while during FY17 the percentage share of SWAP, Spot and Forward transactions were 75%, 19% and 6% respectively. Decline in transaction of Spot and Forward as reflected in the percentage share of their transactions in FY18 compared to FY17 may be attributable to the higher weighted average exchange rate in FY18 than that of in FY17 (chart-3). So, a relationship between the exchange rate and the transaction type is also observed in Bangladesh FX market.

Chart-1: Trends in Exports, Imports & Remittances (billion USD)

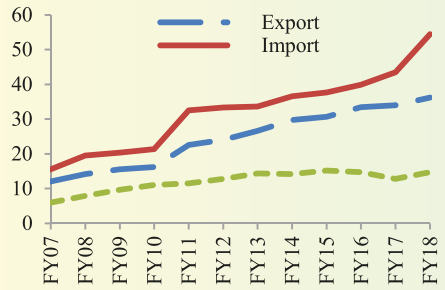
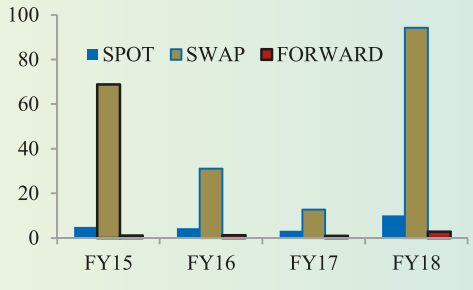
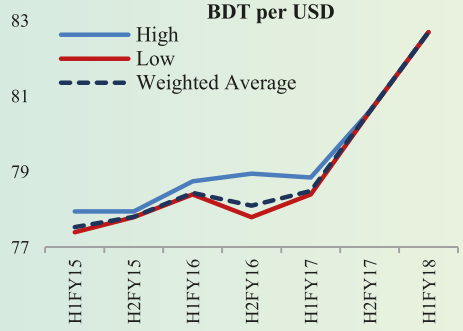


Chart-2: Interbank Foreign Exchange Transaction (billion USD)



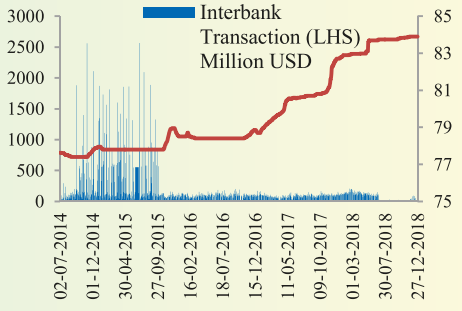
3.2 Exchange rate and transaction volume have the opposite relationship: The exchange rate is broadly determined by the market forces such as the interactions of demand for and supply of the foreign currencies. However, Bangladesh Bank (BB) for the purpose of monetary management oversees the FX market movements vis-a-vis the exchange rate and occasionally intervenes in the market to ensure liquidity and stability of the exchange rate thereby helps build the confidence of the market. In the interbank foreign exchange market the transaction volume has fallen sharply since October 2015, when Taka–USD exchange rate shot up and the transaction further declined after another pick up in the exchange rate since mid-2018. The dominance of the market forces reflected in the negative relationship between the weighted average exchange rate and the volume of interbank foreign transaction is shown in the chart-4. The degree of correlation between them is 0.26 which is statistically significant at the 1% level.

Chart 3: Interbank USD-BDT Exchange Rate



Source: Bangladesh Bank.

Chart 4: Exchange rate movements and daily turnover foreign exchange transactions

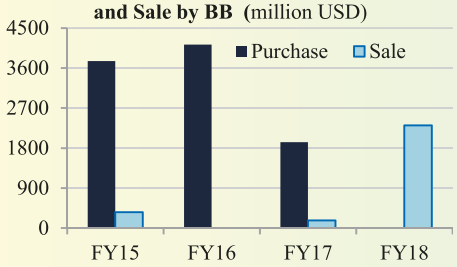


Source: Bangladesh Bank

During FY15-FY16 supply of foreign exchange in the market was adequate putting appreciation pressure on the taka (chart-3) as a result BB purchased US dollar 3,758.45 million, 4,131 million, and 1,931 million during FY15, FY16 and FY17 respectively. On the other hand, from the second half of FY17, it was observed that demand of foreign exchange in the market goes beyond the supply creating depreciation pressure on taka, as a result, BB sold US dollar 175 million and 2311 million during the second half of FY17 and FY18 respectively (chart-5).

3.3 FX market of Bangladesh follows economic fundamentals: The correlation matrix in table-1 shows that the nominal exchange rate is negatively correlated with current account balance and the degree of correlation is 0.60 which is statistically significant at 1% level.

Chart 5: Foreign Currency Purchage and Sale by BB (million USD)



Source: Bangladesh Bank.

Table:1 The Correlation Matrix

Correlation t-Statistic Probability	Exchange rate	Current account balance	Growth in private sector foreign debt	Domestic interest rate
Nominal Exchange rate	1.00			
Current account balance	-0.60 -3.43 0.003	1.00		
Growth in private sector foreign borrowings	-0.08 -0.39 0.70	0.23 1.08 0.29	1.00	
Domestic interest rate	-0.27 -1.28 0.21	0.44 2.27 0.03	0.44 2.22 0.04	1.00

Private foreign borrowing has an off-putting effect on the exchange rate as the data in correlation matrix support this argument. Accordingly, exchange rate shows an expected negative relationship with the domestic interest rate as the interest rate differential moves along with the movement of the domestic interest rate. The business and enterprises increase their borrowing from abroad instead of domestic financial institutes when the domestic interest rate is relatively high. The degree of negative correlation between the exchange rate and the growth of private sector foreign borrowings is 0.08 quietly not remarkable and also statistically insignificant even at the 10% level.

The relationship between the domestic interest rate and the exchange rate is indirect as the high-interest rate attracts more capital inflow which turns down the exchange rate by mounting the supply of foreign currency. Data used in the

correlation matrix rightly demonstrates a negative correspondence with exchange rate by 0.27 degree of association but is statistically insignificant even at the 10% level.

4. Data and Methodology

To explore the volatility in the Bangladesh foreign exchange market, the daily foreign exchange rate of BDT per USD and daily transaction volume for the period of 2nd July 2014 to 27th June 2018 with 979 observations has been collected for the study from Bangladesh Bank. A the same time, to examine the influence of different economic variables on the volume of interbank foreign exchange transaction, yearly data on export, import, remittance, private sector foreign debt, current account balance, the domestic interest rate has been collected from BB website. To compare the volatility of Bangladesh foreign exchange market with neighboring India, data on Indian rupee-USD exchange and daily transaction volume has been collected from Reserve Bank of India (RBI) on a daily basis. Because of the nonstationary property of exchange rate series, the study converted the exchange rate series into the rate of return on the exchange rate by the following logarithmic transformation due to Alam and Rahman (2012) and Abdullah et al (2017) and uses the transformed series in our analysis. The adopted the logarithmic transformation to make the daily returns series stationary by using the following formula:

$$R_t = log\left(\frac{ER_t}{ER_{t-1}}\right) * 100$$

Here, R_t is the return on the exchange rate at period t; ER_t and ER_{t-1} are the exchange of the BDT per USD at period t and $(t-1)$. This formula for return has already been used by other authors for example, Kamal et al (2012).

4.1 Model Specification:

4.1.1 GARCH models: GARCH models are assumed to be appropriate for understanding the dynamic behavior of exchange rate variables and derive variance series for volatility. Volatility is the common feature of the most financial series. To model volatility, Engle (1982) first introduced the autoregressive conditional heteroskedastic (ARCH) model. To predict volatility

the model requires estimating a large number of parameters. To solve the problem Bollerslev(1986) proposed the generalized autoregressive conditional heteroskedastic (GARCH) model which reduces the number of required lags.

Appropriate specification of the mean equation plays an important role in the GARCH model. Any misspecification of the model will not be able to detect the autocorrelation problem in volatility model. So, the study uses three different models for mean equations where the first equation contains only constant, second equation includes p order autoregressive term with a constant and third equation follow an ARMA (p, q) process. Mean Equations are as follows:

$$R_t = \omega + \varepsilon_t \quad \text{(1)}$$

$$R_t = \omega + \varphi_1 R_{t-1} + \ldots\ldots\ldots + \varphi_p R_{t-p} + \varepsilon_t \quad \text{(2)}$$

$$R_t = \omega + \varphi_1 R_{t-1} + \varphi_2 R_{t-2} + \ldots\ldots + \varphi_p R_{t-p} + \varepsilon_t + \theta_1 \varepsilon_{t-1} + \theta_2 \varepsilon_{t-2} \ldots + \theta_q \varepsilon_{t-q} \quad \text{(3)}$$

GARCH_M (1, 1): $R_t = \omega + \lambda e_t + w_t$ where $w_t = e_t \eta_t$ ..... (4)

The general form for the variance equation: $e_t = \sqrt{w_t}\, z_t$ where $z_t \sim iid(0,1)$

Based on the specification of w_t in variance equation several possible models within the GARCH family can be done as different models have aimed to capture different feature of volatility. To specify the variance equation to model volatility presence in the exchange rate returns, following models of the GARCH family have been used to measure volatility in exchange rate returns.

GARCH (1, 1): $w_t = \theta + \propto e_{t-1}^2 + \beta w_{t-1}$ $\theta > 0, \propto \geq 0, \beta \geq 0$ and $\propto + \beta \leq 1$

PARCH (1, 1): $w_t^\rho = \theta + \propto (|e_{t-1}| - \mu e_{t-1})^\rho + \beta w_{t-1}^\rho$ $\rho > 0$, $|\mu| \leq 1$

EGARCH (1, 1): $lnw_t = \theta + \propto \left|\frac{e_{t-1}}{\sqrt{w_{t-1}}}\right| + \mu \left(\frac{e_{t-1}}{\sqrt{w_{t-1}}}\right) + \beta lnw_{t-1}$

IGARCH (1, 1): $w_t = \propto e_{t-1}^2 + (1 - \propto) w_{t-1}$ $\{\alpha + (1 - \alpha)\} = 1$ and $0 < \alpha < 1$.

$\propto$ is the coefficient that measures the extent to which a volatility shock today feeds through the next period volatility, while $\propto + \beta$ is usually considered to be a

measure of the persistence of volatility shock and it measures the rate at which this effect dies over time.

The PARCH model is an extension of GARCH with an extra term added to account for possible asymmetries or leverage effect. In the above PARCH model, ρ denotes the power parameter that requires condition $\rho > 0$, and μ is the parameter capturing asymmetry or leverage effect, which requires the condition $|\mu| \leq 1$.

A typical feature of financial data is that negative shocks generate more volatility compared to positive shocks. It has been shown that the symmetric GARCH models may not capture some important features of the data since they assume symmetric response of volatility to positive and negative shocks. The EGARCH is an asymmetric model that specifies the logarithm of the conditional volatility and avoids the need for any parameters constraints. In the EGARCH specification, μ is the asymmetry parameter measuring leverage effect, $\propto$ is the size parameter measuring the magnitude of shocks, and β is the persistency parameter.

5. Results and Discussion

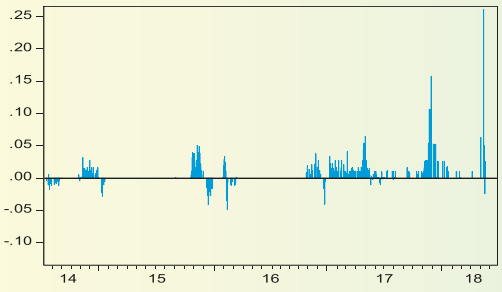
5.1 Measuring Exchange Rate and Transaction Volatility:

5.1.1 Estimation Output Taka-USD Exchange rate: Prior to measuring the volatility of exchange rate return the study estimates the summary statistics and test the stationary of the exchange rate returns. The average rate of return is 0.00335 with a standard deviation of 0.015 which indicates the exchange rate return is highly volatile (table-2). This conclusion is also evident from chart-6.

Table-2: Summary Statistics Taka-USD Exchange rate

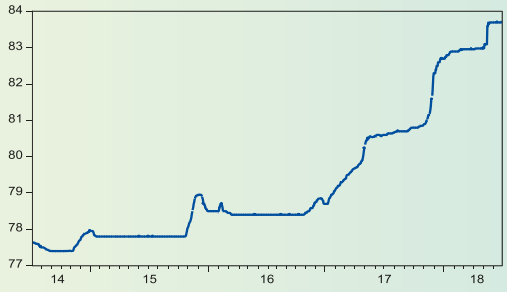
Average	Std. Deviation	Kurtosis	Skewness	JB test	P-value
0.003351	0.014966	108.6001	7.637428	464401.4	0.003

Chart-6
Exchange rate returns



Source: Bangladesh Bank.

Chart-7
Exchange rate



Source: Bangladesh Bank.

Table-3: Unit root test

	Level				First difference			
	ADF test		PP test		ADF test		PP test	
Series name	Intercept	Intercept & trend	Intercept	Intercept &trend	Intercept	Intercept &trend	Intercept	Intercept &trend
Exchange rate	1.349	-1.110	1.871	-0.901	-7.994*	-8.268*	-27.174*	-27.095*
Exchange rate return	-7.933*		-26.858*					

* Indicates significant at 1% level

Table-3 shows the exchange rate of taka/USD is non-stationary at level but becomes stationary at first difference (chart-7). The series of exchange rate return is stationary at level as revealed from ADF and PP unit root test.

In Table-4 the result of the mean equation with five GARCH models has been summarized. Mean equation indicates that the exchange rate return series follow an ARMA(1,1) process with constant. Both AR(1) and MA(1) terms are statistically significant at 1% level, which indicates that the past day exchange rate return and past day shocks significantly affect current day exchange rate returns. Since higher-order ARMA terms are not statistically significant the mean equation was not augmented with further ARMA terms. To measure the effect of volatility on return of exchange rate we estimate the GARCH_M model. The value of the coefficient λ=0.415 which indicates that return is positively related to its volatility and the coefficient is statistically significant. The F-statistic of the model is significant which indicates the presence of ARCH effect in the exchange rate return series. The existence of volatility is also evident from residual series in chart-8.

Table-4: GARCH Models

Dependent variable R_t

Variables/ Coefficients	Mean equation		Model-1	Model-2	Model-3	Model-4
	ARMA	GARCH_M	GARCH	PARCH	EGARCH	IGARCH
ω	0.003 (0.003)		0.003 (0.002)	0.003 (0.002)	0.001* (8.40E-05)	0.006* (0.001)
R_{t-1}	0.901* (0.014)	0.675* (0.087)	0.926* (0.038)	0.930* (0.028)	0.992* (0.001)	0.905* (0.015)
ε_{t-1}	- 0.673* (0.019)	-0.515* (0.131)	-0.528* (0.065)	-0.588* (0.053)	-0.977* (0.001)	-0.194* (0.020)
λ		0.415* (0.031)				
θ			3.24E-06* (1.77E-07)	1.11E-11 (3.05E-11)	-1.011* (0.033)	
$\propto$			0.457* (0.041)	0.393* (0.061)	0.928* (0.037)	0.056* (0.0001)
ρ				4.314* (0.499)		
μ				-0.090* (0.035)	-0.147* (0.028)	
β			0.710* (0.0124)	0.558* (0.0356)	0.954* (0.003)	0.943* (0.0001)
Inverted AR roots	0.90	0.68	0.93	0.93	0.99	0.91
Inverted MA roots	0.67	0.51	0.53	0.59	0.98	0.19
F-statistic	5.385**		0.005	0.009	0.022	3.455**
P-value	0.021		0.943	0.926	0.882	0.063

* Indicates significant at 1% level, ** Indicates significant at 5% level

To capture variance dynamics GARCH (1,1) model has been estimated with the normal error distribution assumption. The Coefficients of the model are ($\propto = 0.457$ and $\beta = 0.710$) statistically significant which imply that the volatility of risk is responsive to past shocks and the past volatility is influencing the current volatility of exchange rate returns by 71%. Since the sum of the coefficients is greater than one (1), the residuals of the model are non-stationary.

To test the presence of asymmetric volatility effects PARCH (1,1) model has been estimated. The coefficients of $\propto$ and β are found to be statistically significant. The coefficient μ is statistically significant which indicates the presence of leverage effect. The negative value of μ implies the existence of a leverage effect

where positive past values of $e_t$increase volatility more than the negative past values of the same magnitude. That is, appreciation and depreciation of taka against USD do not necessarily cause symmetric variation in the exchange rate returns.

Chart-8

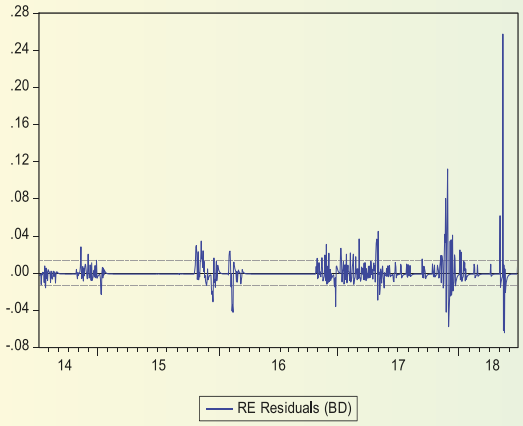
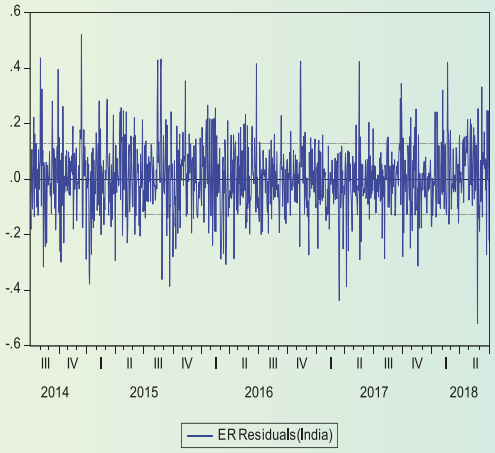


Chart-9



In the variance equation, the constant term of PARCH model is significantly different from zero. Thus the non-negativity restriction does not hold. To solve the problem of non- negativity restrictions, we use the EGARCH model. The ARMA(1,1) terms are statistically significant in EGARCH. In the variance equation, μ is significant which implies the presence of asymmetric behavior on volatility. Since EGARCH supports the PARCH result of the asymmetric behavior of volatility, the study did not estimate the TGARCH model.

In all models, the F-statistic shows that there is no ARCH effect which means no autocorrelation in the residuals.

The sum of GARCH parameters is greater than one in model-2 implies that the variance may not be well behaved. To model volatility by imposing restrictions that the sum of GARCH parameters is one leads to IGARCH specification. The result of the model shows that the restriction is valid and the model overcomes all of the diagnostic tests.

The inverted roots of the AR and MA terms are less than one in all models which imply the stability of the models.

5.1.2 Estimation Output Rupee-USD Exchange rate: Table-5 shows the exchange rate of Indian rupee/USD is non-stationary at level, but becomes stationary at first difference. The series of exchange rate return is stationary at level as revealed from ADF and PP unit root test.

Table-5: Unit root test for Rupee/USD

Series name	Level				First difference			
	ADF test		PP test		ADF test		PP test	
	Intercept	Intercept & trend	Intercept	Intercept &trend	Intercept	Intercept &trend	Intercept	Intercept &trend
Exchange rate	-1.852	-1.900	-1.877	-1.939	-30.261*	-30.253*	-30.262*	-30.253*
Exchange rate returns	-30.217*		-30.220*					

* Indicates significant at 1% level

Table-6: GARCH Models

Dependent variable R_t

Variables/Coefficients	Mean equation	Model-1	Model-3
	ARMA	GARCH	EGARCH
ω		0.004 (0.004)	0.005 (0.004)
R_{t-1}	-0.887* (0.102)	0.345 (2.161)	0.328 (2.702)
e_{t-1}	0.914* (0.090)	-0.357 (2.148)	-0.338 (2.692)
θ		0.008* (0.003)	-1.575* (0.397)
$\propto$		0.118* (0.032)	0.226* (0.046)
μ			0.114* (0.031)
β		0.398* (0.182)	0.661* (0.094)
Inverted AR roots	-0.89	0.34	0.33
Inverted MA roots	-0.91	0.36	0.34
F-statistic	17.50*	0.448	3.50
P-value	0.00	0.503	0.062

* Indicates significant at 1% level, ** Indicates significant at 5% level

In Table-6 the result of the mean equation with GARCH models of foreign exchange returns of Indian Rupee with USD has been summarized.

Mean Equation indicates that the exchange rate return series follow an ARMA(1,1) process with no constant. Both AR(1) and MA(1) terms are

statistically significant at 1% level, which indicates that the past day exchange rate return and past day shocks significantly affect current day exchange rate returns. Since higher-order ARMA terms are not statistically significant the mean equation was not augmented with further ARMA terms. The F-statistic of the model is significant which indicates the presence of ARCH effect in the exchange rate return series. The existence of volatility is also evident from residual series in chart-9.

To capture variance dynamics GARCH (1,1) model has been estimated. The Coefficients of the model for India are ($\propto = 0.118$ and $\beta = 0.398$) statistically significant which imply that the volatility of risk is responsive to past shocks and the past volatility is influencing the current volatility of exchange rate returns by almost 40%. Since the sum of the coefficients is less than one (1), the residuals of the model are stationary.

To overcome the problem of non-negativity restrictions, we use the EGARCH model. In the variance equation, μ is significant which implies the presence of asymmetric behavior on volatility. That is, appreciation and depreciation of the Indian Rupee against USD do not necessarily cause symmetric variation in the exchange rate return.

In both models, the F-statistic shows that there is no ARCH effect which means no autocorrelation in the residuals. Since the sum of GARCH parameters is less than one, the study does not estimate the IGARCH model. The inverted roots of the AR and MA terms are less than one in all models which imply the stability of the models.

5.2 Transaction Volatility for Bangladesh and India

Table-7 shows the unit root test results of the daily turnover of foreign exchange transactions both in Bangladesh and India. The result indicates that the daily turnover of foreign exchange is stationary at level in both countries as revealed from ADF and PP unit root test.

Table-7: Unit root test for Daily turnover

Series name	Bangladesh				India			
	ADF test		PP test		ADF test		PP test	
	Intercept	Intercept &trend	Intercept	Intercept & trend	Intercept	Intercept &trend	Intercept	Intercept & trend
Daily Turnover	-3.920*	-5.095*	-32.54*	-31.234*	-23.97*	-24.261*	-25.94*	-25.78*

* Indicates significant at 1% level

In Table-8, the result of the mean equation with GARCH models of daily turnover of foreign exchange has been summarized. Mean Equation indicates that the transaction volume series follow an ARMA(1,1) process with no constant in case of Bangladesh and with a constant in case of India. Both AR(1) and MA(1) terms are statistically significant at the 1% level, which indicates that the past day turnover and past day shocks significantly affect current daily turnover. The existence of volatility is evident from residual series in chart-10 and 11.

To capture variance dynamics GARCH(1,1) model has been estimated. The Coefficients of the model for Bangladesh are ($\propto = 0.0745$ and $\beta = 0.8929$) statistically significant which imply that the volatility of risk is responsive to past shocks and the past volatility is influencing the current volatility of daily turnover by almost 90%. The sum of the coefficients is 0.96 shows the persistence of volatility shocks. Since it is less than one (1), the residuals of the model are stationary.

Table-8: GARCH Models

Dependent variable: Daily Turnover

	Bangladesh		India	
	Mean equation	Variance Equation	Mean equation	Variance Equation
Variables/Coefficients	ARMA	GARCH	ARMA	GARCH
ω	139.52 (202.35)	84.089* (3.397)	54806.8* (870.38)	51932.3* (645.92)
R_{t-1}	0.997* (0.0016)	0.952 (0.0203)	0.660* (0.072)	0.383* (0.095)
e_{t-1}	-0.957* (0.0077)	-0.905* (0.0336)	-0.452* (0.076)	-0.1031* (0.120)
θ		207.68* (58.83)		824078.62* (61607.34)

$\propto$		0.0745* (0.020)		0.468* (0.067)
β		0.8929* (0.0198)		0.2433* (0.042)
Inverted AR roots	0.99	0.95	0.66	0.38
Inverted MA roots	0.96	0.91	0.45	0.10

* Indicates significant at 1% level, ** Indicates significant at 5% level

Chart-10

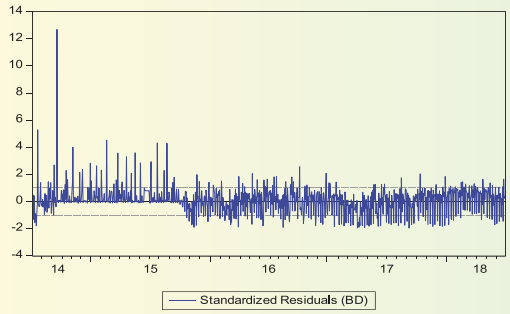
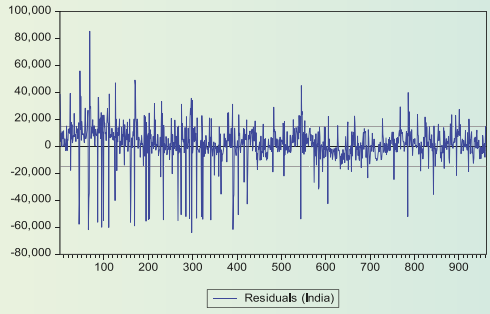


Chart-11



The Coefficients of the GARCH(1,1) model for India are ($\propto = 0.468$ and $\beta = 0.243$) statistically significant which imply that the volatility of risk is responsive to past shocks and the past volatility is influencing the current volatility of exchange rate returns by almost 71%. The sum of the coefficients is 0.711 shows the persistence of volatility shocks. Since it is less than one (1), the residuals of the model are stationary. So, it can conclude that the volume of daily foreign exchange turnover of the Indian foreign exchange market is more volatile than that of the Bangladesh foreign exchange market.

6. Conclusion and Recommendations

The size of the foreign exchange market in Bangladesh is small in terms of volume of transactions and the use of instruments. However, the size of the market is increasing over time. There is a negative relationship between exchange rate movement and the current account balance. This phenomenon indicates that Bangladesh foreign exchange market follows the economic fundamental of the country. The negative relationship between the exchange rate and the growth of private sector foreign borrowing is low and statistically insignificant. Moreover, the relationship between the nominal exchange rate and the domestic interest rate

shows a weak and statistically insignificant that indicates a more indirect relationship between the variables as capital flows are not entirely open in Bangladesh.

The first order auto-regressive behavior of foreign exchange rate returns was evidenced in ARMA process while GARCH (1,1) model support the presence of volatility clustering i.e. the volatility of risk is responsive to past shocks and the past volatility is influencing the current volatility of exchange rate returns. The PARCH (1,1) model confirms the existence of leverage effect i.e. the positive past shocks increase volatility more than the negative past shocks of the same magnitude so the appreciation and depreciation of BDT against USD do not necessarily cause symmetric variation in the exchange rate return. The existence of volatility clustering and the leverage effect in the foreign exchange market of Bangladesh indicates the weak form of efficiency of the market. To make the foreign exchange market more dynamic, vibrant and competitive market size should be expanded with proper management in place.

This study reveals that high importance should be given to both monetary and non-monetary factors in the open-economy framework to detect the possible impacts on trade and capital flows. The empirical findings of this study would guide the monetary authority in formulating and conducting monetary policy and help achieve the ultimate goal of monetary policy.

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Impact of Education Level of the Expatriates on Remittances Inflow: Bangladesh Perspective

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Abstract

The economy of Bangladesh is leveraging remittances as one of the most important sources of foreign currency inflow into the country. The inflow of remittances helps Bangladesh to maintain an economic-shock resilient foreign exchange market leading to a stable exchange rate of the local currency which in turn ensures smooth foreign trade of the country. Exploring the micro determinants of remittance inflow of Bangladesh can be useful to understand the dynamics of remittance inflow better which consequently should guide us to take proper measures for the smooth inflow of remittances. This paper is an effort to determine the relationship between remittances inflow and its micro determinants especially expatriates' human capital represented by the level of education. Besides human capital, the paper also examines the impact of expatriates' age, sex, host country, occupation, number of years spent abroad, etc. on the remittances inflow of Bangladesh. The necessary analysis of this research is based on the Ordinary Least Square (OLS) method. The source of the cross-sectional data is the Bangladesh Bureau of Statistics (BBS) conducted Household Income and Expenditure Survey (HIES), 2010. The final sample size became 1406 after necessary data cleaning. The paper estimates three different models to find the best one to serve the purpose of the research. The finding of the paper shows that given a one-year increase in education year, we can expect the remittance inflow into Bangladesh to increase by 2.19 percentage. For the age variable, given a one-year increase in the age of expatriates, we can expect the remittance inflow to increase by 1.11 percentage.

Keywords: Remittances, Migration, Human Capital

JEL Classification: F22, F24, J24

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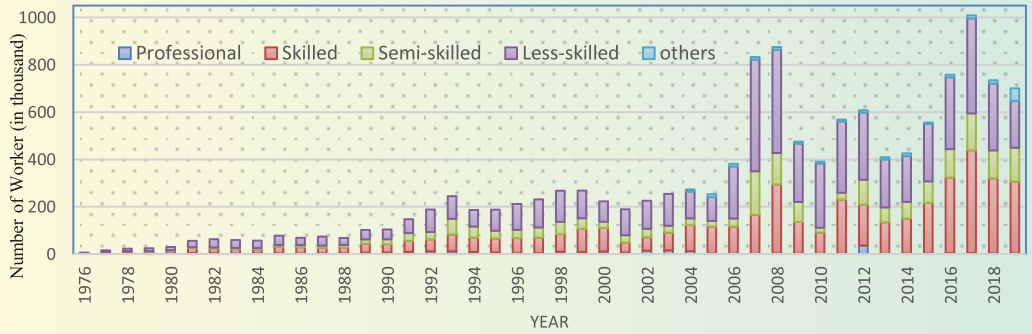
Introduction

Remittance is an important foreign currency earning source for the least developed countries like Bangladesh. Statistics show that Bangladesh is one of the highest remittances earning countries in the world. World Bank ranked Bangladesh as the eighth-highest annual remittance recipient country of the world in 2019 with USD18.36 billion of remittances (World Development Indicator, World Bank). For Bangladesh, remittance is the second highest foreign currency earning source that helps her to maintain an economic-shock resilient foreign exchange market leading to a stable exchange rate of the local currency which in turn ensures smooth foreign trade of the country. The role of remittance has also been crucial for Bangladesh to strengthen its current account balance. The importance of remittance is also evident from its significant share as a percentage of GDP. In the fiscal year 2017-18, remittances as a share of GDP was 11.67 percent for Bangladesh (calculated from *Bangladesh Economic Review, 2018-19*).Apart from this, Bangladesh is expecting to graduate to the club of developing countries from the least developed country (LDC) category in 2024 achieving necessary development in the required indicators. Graduation to a developing country will be an achievement for Bangladesh but the new status may shrink the trade and low-cost fund opportunities of Bangladesh as an LDC. So, the importance of remittance inflow will be much higher as a developing country for Bangladesh to maintain a healthy current account balance and foreign exchange reserve.

Chart-A: Skill based composition of Bangladeshi Expatriates (1976-2019)



Middle Eastern countries are the main source of remittance inflow for Bangladesh. In the fiscal year 2018-19, the country received 18.9 percent of total

remittance from KSA, 15.5 percent from UAE which is followed by 11.2 percent from the USA (*Bangladesh Bank Annual Report, 2018-19*). Despite the huge importance of remittance in the economy of the country, Bangladesh is yet to add enough impetus to remittance inflow into the country because of a large share of unskilled and less-skilled workers in the total expatriates. The picture is evident from *chart-A* which shows that even in 2019, 48.5 percent of workers went abroad from Bangladesh were belong to the group of the semi-skilled and less-skilled worker. This composition is not only a reason for sluggish remittances inflow compared to other remittance earning countries but also making the remittances inflow of Bangladesh vulnerable as the unskilled workers are more likely to lose a job in the world economic crises compared with the skilled labors. Now, it seems to be interesting to see how far the skill of Bangladeshi expatriates affects the country's remittance inflow.

Objective of the Research

Examining the relationship between the education of expatriates and remittance inflow into Bangladesh is the main interest of our research. Here, we are taking the education level of expatriates as a proxy of their skill level. We want to observe how the academic education of expatriates affects the remittance inflow into Bangladesh. So, the prime objective of the research can be summarized as below,

- To identify and measure the change in the remittance inflow to Bangladesh due to change in the years of education of expatriates.

In addition to education, our research will also shed light on the impact of age of expatriates, tenure of abroad stay, sex of expatriates, etc. on the remittance inflow to the country.

Rationale for the Research

This research outcome is likely to come up with a relationship between the education of expatriates and the remittance inflow of Bangladesh. Unskilled labor is still found as a large share of manpower export from Bangladesh. The research can underline the importance of academic education of labor to expedite of

remittance flow into Bangladesh. Besides, we have failed to find any economic literature explaining the micro determinants of remittances inflow into Bangladesh effectively though there are an ample number of researches explaining its macro determinants. So, we hope our research will be able to reduce the dearth of research in the stated area. Any empirical evidence is always very helpful to guide the course of the economic policy of a country. Hence, the research outcome is likely to be useful for the relevant policy formulation for Bangladesh too.

The paper consists of six sections. The next section will discuss the related literature. Section III discusses the methodology of the research. A discussion on the data is given in section IV followed by section V describing the data through graphs before diving into the estimation. Section VI contains estimation and findings which is followed by section VII covering the conclusion of the paper.

I. Literature Review

Many available research papers address the determinants of remittance inflow into a country. A few of the available research papers with the discussion of the determinants of remittance inflow into a country explain Bangladesh perspective. However, the determinants of remittance inflow for a country are broadly categorized into macro and micro determinants. The following literature review of the paper covers some of the most relevant research articles that investigate both micro and macro determinants of remittance inflow,

Bollard et al. (2009) investigate the relationship between remittances and the education level of migrants. Authors use microdata comprising 33,000 immigrants from developing countries from 14 surveys in 11 OECD destination countries which accounted for 79 percent destination of all global migrants to OECD countries in 2000. Authors regress three different measures of remittance (total remittances addressing both extensive and intensive margins, log of total remittances conditional on remitting) on education. Education is also measured by university degrees and years of schooling. All regression in the paper includes country of birth fixed effects and dataset fixed effects. The paper finds a mixed association between education and remittances at the extensive margin, but at the intensive margin, the association is strongly positive. Adding up the two, the

paper concludes that more educated migrants remit more significantly. Being further specific, migrants with university degrees yearly remit $300 more than migrants without a university degree. Hussain and Naeem (2010) also investigate the macroeconomics factors in determining remittance inflow into Bangladesh. They find oil prices, exchange rates, employment abroad every year, and GDP growth as the key determinants of remittance inflow into Bangladesh. This paper also does not shed light on the micro determinants of remittance inflow. Islam and Nasrin (2015) examine the major driving forces of remittances into Bangladesh empirically. The paper finds a significant impact on host country GDP, home country GDP, petroleum price, and skill of labor on the remittance inflow into Bangladesh based on annual data for the period of 1977-2011. The paper says that skilled labor sends less amount of money to compare to unskilled workers. Hasan (2010) examines the macroeconomic determinants of workers' remittances in Bangladesh. The paper finds that the macroeconomic variables such as inflation, interest rate, the exchange rate of the home country (Bangladesh), and GDP of five host countries (Saudi Arabia, United Arab Emirates, Kuwait, Malaysia, and Oman) have a significant impact on remittance into Bangladesh. This paper concludes that inflation rates of the home country has negative, and interest rates and the exchange rate of the home country have a positive relationship with the remittance inflow of Bangladesh. But the host countries' GDP has a positive relationship with the remittance inflow. It is observable that the author did not touch micro determinants of remittance inflow in the paper. Mamun and Nath (2010) investigate workers' migration and remittances in Bangladesh. The paper highlights altruism towards the family left in the country, investment in the home country, insurance against the risk that migrants are exposed to host country, etc. as microeconomic determinants of remittance inflow into Bangladesh. On the other hand, the paper states foreign exchange rate, difference in the interest rate between the home country and host county, business cycle, etc. as macroeconomic determinants of remittance inflow. Barua et al. (2007) investigate the macroeconomic determinants of the inflow of workers' remittances into Bangladesh using a balanced panel dataset of bilateral remittance flows from 10 major host countries (of Bangladeshi migrants') to Bangladesh for the period 1993-2005. The paper finds home country inflation rate as a negative determinant of remittances to Bangladesh when income differentials between the host country

and home country and devaluation of the home country currency as the positive determinants of Remittances to Bangladesh. The paper does not talk about the micro factors behind remittance inflow into Bangladesh. Rahman and Wadud (2014) examine the macroeconomic determinants of remittances in five South Asian countries over the period of 1976-2012 by applying the Arellano-Blundell-Bond Systems of Generalized Method of Moments (SGMM). The paper identifies home and host countries' income, the number of migrants abroad and financial deepening, domestic inflation, and domestic political rights as the important determinants of remittance inflows in this area. The altruistic nature of human beings also affects the remittance inflows. The researchers found that when the domestic economic condition is worse off the altruistic nature influence to remit more. This paper finds a significantly positive impact of 9/11, 2001 on remittance inflows. Schiopu and Siegfried (2006) discuss mainly the macroeconomic determinants of remittance inflow in the European Neighboring Region. In discussing this they seek the answer to the question of whether remittances behave like capital flows or like altruistic transfers. To do so, the researcher created a new dataset containing information on bilateral remittance flows from 21 European countries to 7 ENR countries. They investigate which factors affect the average remittance per migrant. According to them the difference in GDP between the host and home country increases average remittances which the researchers interpret as an indication that altruism is important for remitting. While they conclude that the effect of the interest rate differential does not appear to be significant i.e. the investment motive to remit is weak. This paper also found that migrant's skill level has a positive impact on the average remittance per migrant. Rapport and Docquier (2005) discusses economic literature on migrants' remittances from both theoretical and empirical point of views. Discussion of the paper from the microeconomic point of view underlines the importance of migrants' education but due to lack of information on the issue, the discriminative test of migrants' education on remittance inflow is unavailable in the paper. Niimi, Ozden, and Schiff (2008) examine whether remittances to origin countries increase with migrants' education level. The paper concludes that remittances decrease with an increase in migrants' overall level of education. The reason for this is that the educated migrants' come from better-off families. So, these families don't need money like a poor family. Another factor is that the

skilled migrants' can bring their family member along with them. The researcher also shows that per capita income and expected economic growth in the home country is inversely related to total and per capita remittances. Pfau and Long (2008) investigate the role of gender in the dramatic growth in remittance flows into Vietnam since 1990s, from the perspective of both receiving and sending remittances. The study uses the Vietnam Living Standard Survey 1992/93 and 1997/98 and finds evidence that women have a higher likelihood to both send and receive remittances. Ahmad et al. (2007) studies the determinants of international workers' remittances in Pakistan. The paper concludes with positive relation between real remittances, and real GDP, real growth rate and unemployment rate when real wage rate, literacy rate and spread rate of banks are found affecting real remittances negatively. Karunarathne and Gibson (2013) examine variation in financial literacy amongst two actively remitting immigrant groups in Australia – Sri Lankans and Samoans. The paper shows there are large gaps in the level of financial literacy of the two groups, which are due especially to differences in educational attainment. The Sri Lankans are either skilled migrants or tertiary students, whereas the Pacific Islanders are almost family migrants who entered Australia. The paper finds that the Sri Lankans remit more money in their homeland than the Pacific Islanders do from Australia. The paper also finds that both of them cost more to remit due to a lack of full information about all the options for remitting. The conclusion of the paper underlines the importance of education in case of inflow of remittance.

It is evident from the brief literature review that most of the academic literatures in the area underline the macro determinants of remittance inflow. Although the issue of expatriates' skill i.e. level of education is addressed as a micro determinant by a very few literature where the role of expatriates' skill in remittance inflow is mixed. The literature review unveils that there is no available research paper to explain the micro determinants of remittance inflow for Bangladesh. Thus, in the case of Bangladesh, the void is very clear, and our research is likely to contribute to filling up the void to some extent.

II. Methodology

Education boosts human capital which has a positive impact on productivity (Benos and Karagiannis, 2016). So, Education can play important role in enhancing the productivity of the workers. Thus, an increase in education should affect the earning of the expatriate workers of the recipient country like Bangladesh and consequently is likely to increase the remittance (*remit*) flow into the country. Here, education is taken as the proxy for the skill of migrant workers in Bangladesh as we found it as the best measure of skill subject to data availability. In addition to education (*educyr*), age of the expatriates (*age*), length of stay at abroad (*tenure*), gender (*sex*), expatriates' occupation (*occup*), host country (*country*) etc. also are likely to have impact on the earnings of expatriate workers. So, our model will also try to address these factors. Hence, the economic model for our research becomes as below,

remit=f (*educyr, age, sex, tenure, occup, country*)---------- (i)

We have applied the simple Ordinary Least Square (OLS) technique to investigate the impact of explanatory variables on the output variable remittance inflow i.e. *remit*. So, our functional form of the economic model is likely to take the following form,

$remit_{icj} = \beta_0 + \beta_1 educyr_{icj} + \beta_2 age_{icj} + \beta_3 sex_{icj} + \beta_3 tenure_{icj} + \beta_4 country_c + \beta_5 occup_j + \varepsilon_{icj}$-----(ii)

Considering the values of remittance inflow compared to other variables in the above model, we found it appropriate to take the natural log of remittance inflow as the outcome variable from the perspective of the convenience of interpretation of the estimation output. Thus, the final form of our model turns out to be as below,

$lremit_{icj} = \beta_0 + \beta_1 educyr_{icj} + \beta_2 age_{icj} + \beta_3 sex_{icj} + \beta_3 tenure_{icj} + \beta_4 country_c + \beta_5 occup_j + \varepsilon_{icj}$ ----------(iii)

This paper has estimated equation (iii) using STATA 15 for the data set described in the next section.

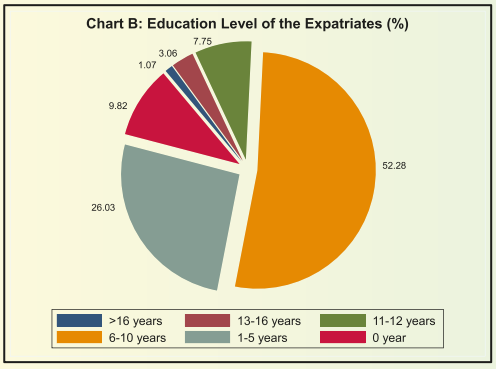
III. Data

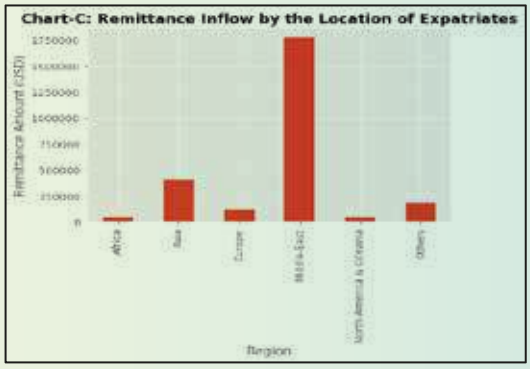
The paper uses cross-sectional data on Bangladeshi expatriates collected from Household Income and Expenditure Survey (HIES) 2010. Bangladesh Bureau of Statistics (BBS) conducts HIES, the primary data source of this paper. The survey was based on a two-stage stratified random sampling technique in drawing samples under the framework of Integrated Multipurpose Sample (IMPS) design which was developed based on a sample frame built on the Population and Housing Census 2001 in Bangladesh. There was 1000 Primary Sampling Units (PSU) throughout the country under IMPS design. Remittances information was collected from 356 PSUs. The survey collected information on any member of the family who migrated within the country or abroad in the last five years. It is a sample of 2100 respondents, but according to the design of the questionnaire, the respondents reported remittance receipt from their family members located in both abroad and within the country. Our research interest is to examine the remittance inflow from abroad only. So, we dropped the observations related to the remittance generated from within the country and our sample size comes down to1443 after the adjustment. The dependent variable for the research will be remittance, which is given as money amount, so, we prefer to use a logarithmic form of the variable to magnify the changes in the variable. The remittance amount was the amount sent in the last 12 months which allows the possibility of sending zero amounts during the period. Since, we are using a logarithm of remittance, we lost 36 more observations which are with zero remittance amounts and our sample size becomes 1407.Then we lost one more observation due to one missing value for the variable tenure and hence, the final sample size reaches 1406. The survey collected information on education in terms of degree attained, but for the comprehensive interpretation, we have recoded the degree of education into the year of education. For example, expatriates completed Secondary School Certificate (SSC) are given 10 years of education as it takes 10 years of education to complete the certificate and so on. As a result, the regression output will allow us to measure the magnitude of change in remittance inflow resulting from one-year increase in expatriates' years of education. The survey has a list of 26 countries, and we have grouped the countries according to geographical location. There are 6 groups of host countries in our sample which are North America &

Oceania, Europe, Middle East, Asia, Africa, and Others. Time spent in the host country by an expatriate who is defined as tenure in the paper is given in two units in the survey: years and months. For the convenience of analysis, we have aggregated both variables into years. As a result, the analysis should allow measuring the change in remittance inflow due to one-year increase in abroad stay. In addition, we will control for occupation though the labels for the codes used under occupation is unavailable.

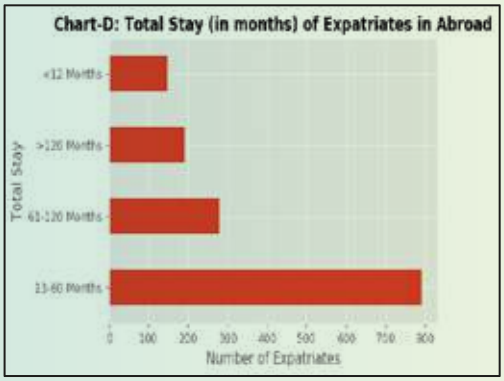
IV. Graphical Observations

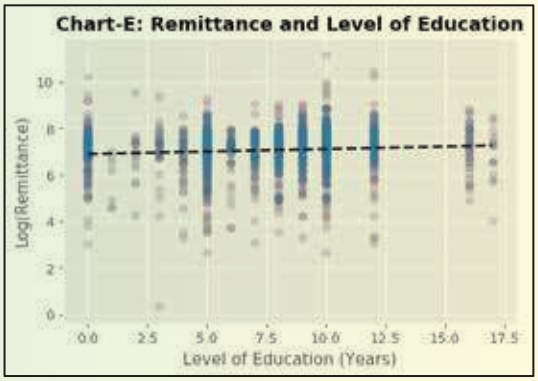
Before diving into the econometric analysis, we can explore the relevance of these determinants to the remittance inflow through visualizing these variables from a different perspective. Firstly, we can look at the distribution of the expatriates' level of education. Chart-B shows that 52.28 percent of the expatriates had 6-10 years of schooling when 9.82 percent had no schooling. So, the education level of the expatriates is very diverse which may influence their earnings.





The host countries of the expatriates (by region) may impact the remittance inflow of a country. Chart-C sheds light on the sample Bangladeshi expatriates' residing countries in 2010. The chart shows that expatriates located in the Middle East account for the highest amount of remittance to Bangladesh in 2010. The distribution also tells that after the Middle Eastern countries followed by the Asian countries contribute most in remittance inflow. These two regions are followed by European Countries, North America and Oceania countries, and African countries which adumbrate the importance of expatriates' location in determining the remittance inflow of Bangladesh.





Expatriates' length of stay can be a useful covariate to explain remittance inflow to Bangladesh. So, the distribution of Bangladeshi expatriates' total stay in abroad is something of our interest. Chart-D portrays the distribution of our sample expatriates' abroad total stay. Though we are going to use the year as a unit for econometric analysis, here, the month is taken for better visualization of the data. The chart shows that most of our expatriates in the sample stayed 13 - 60 months abroad which is followed by the number of expatriates stayed 61-120 months, >120 months, and <12 months.

Now, we can use a scatter plot to get a crude idea on the relationship between the sample expatriates' level of education and remittance inflow in Bangladesh in 2010. Chart-D portrays the scatter plot between remittance inflow (log) and level of education. Though the scatter plot does not show a strong relationship between the factors, the line of best fit comes up with the possibility of a positive relationship between remittance inflow and expatriates' level of education.

Table 1: Summary statistics of the model variables

Variable	Sample	Mean	Std. deviation	Min	Max
Lremit	1406	11.24	1.08	4.79	15.42
Educyr (year)		7.32	3.79	0	17
sex (male, female)		0.98	-	-	-
age (year)		32.64	9.55	14	83
tenure (year)		5.08	4.83	0.08	35

VI. Estimation and Findings

Before jumping to econometric estimation, we wanted to have a closer look into our data set using the summary statistics of the model variables. The summary statistics of the model variables (Table 1) show respective variables' mean, standard deviation, maximum-minimum value, and sample size. Here, it is evident that about 98% of our sample expatriates are male which highlights the total composition Bangladeshi expatriates. The share of female expatriates is still very low for Bangladesh. The sample average age of the expatriates is 32.64 years. The maximum age of the expatriate is 83 years when the minimum is 14 years. Expatriates spent about 5.08 years on average abroad according to the sample with a maximum of 35 years and a minimum of 0.08 years.

Table 2: Estimation output

Dependent Variable: Lremit			
Control Variables	***Model 1***	***Model 2***	***Model 3***
Constant	10.18033***	10.3228***	10.78164***
	(0.3800162)	*(0.4483569)*	*(0.4813226)*
Educyr	0.0179324*	0.0142294	0.0219491**
	(0.0092734)	*(0.009572)*	*(0.0102192)*
Sex	0.52127*	0.5215628*	0.2483621
	(0.3125107)	*(0.3112266)*	*(0.3078042)*
Age	0.0091087**	0.0098451**	0.0110797***
	(0.0042621)	*(0.0042865)*	*(0.0042287)*
Tenure	0.0230085***	0.0249841***	0.0267064***
	(0.0075409)	*(0.0074118)*	*(0.0071401)*
Country Fixed Effect	-	Yes	Yes
Occupation Fixed Effect	-	-	Yes
R^2	0.0328	0.0418	0.1370
Cluster size	356	356	356

****statistically significant @1%, **statistically significant @ 5%, *statistically significant @10%*

The average years of education of expatriates is 7.32 in the sample with a minimum zero and a maximum 17 years of education. The estimation output (Table 2) shows the estimation results for three models. All the models are clustered based on the PSU to get robust standard error. Variables show expected signs in all three models though their statistical significance varies across the models. First model includes first four variables education, sex, age, and tenure.

The result for model 1 shows that education year and sex are statistically significant at 10% level of significance when age is significant at 5% significance level and tenure is significant at 1%. As discussed in the section V, the host countries of the expatriates in our sample are distributed across different continents. So, host countries may have role in the remittance inflow of Bangladesh. Hence, Model 2 controls for country by addressing the country fixed effect which shows that sex, age, and tenure remain statistically significant at 10%, 5% and 1% level of significance respectively but education year becomes insignificant.

In addition to the variability in the host countries of the expatriates of Bangladesh, the type of occupation of the expatriates is also heterogeneous which may also affect the remittance inflow of Bangladesh. From this token, model 3 controls for both country and occupation which results in statistically significant education year at 5% level of significance, but the sex of the expatriates becomes insignificant when both age and tenure remain statistically significant at 1% level significance. Our research result indicates that model 3 has the highest explanatory power among all the models. According to model 3, given a one-year increase in education year, we can expect the remittance inflow into Bangladesh to increase by 2.19 percentage. For the age variable, given a one-year increase in the age of expatriates, we can expect the remittance inflow to increase by 1.11 percentage. The variable sex is found insignificant as the number of female expatriates is very small compared to the male expatriates in our sample which do reflect the gender composition of total expatriates of Bangladesh. Tenure is also a highly significant variable in model 3 which supports the theoretical idea of the variable. Given the one-year increase in the tenure i.e. time spent in the host country, we can expect the remittances inflow to increase by 2.7 percentage.

VII. Conclusion

Education develops human capital which in turn raises productivity. This basic economics is also true for the remittance inflow of a country. Well trained skilled expatriates can send more money compared the unskilled expatriates. This research brings up evidence that additional education year can significantly increase remittance inflow for Bangladesh. The result essentially has noteworthy

policy implications for Bangladesh. Our research outcome outlines the necessity of skill development of potential expatriate workers which should help the policymakers realize the importance of developing an infrastructure ensuring proper training of expatriate workers before leaving for abroad. In a nutshell, the result of this result statistically ratifies the importance of education for the expatriate workers. So, relevant authority may be attentive to introduce policy measures to confirm the minimum level of education of an expatriate worker for starting his/her journey in the host country. Higher education of expatriates not only encourages higher remittances inflow but also a sustainable inflow of remittances. In addition, the government may attenuate the investment shortfall through stimulating remittance inflow of Bangladesh which consequently plays a significant role to create domestic employment opportunity. So, Bangladesh has a potential opportunity to raise its remittance inflow significantly through raising expatriates' education level before leaving for the host country. Besides, the research result argues that the age of the expatriates affects remittance inflow significantly too which implies that adult people can send more money than teenagers. The outcome of the study also finds that duration of stay abroad i.e. tenure significantly affects remittance inflow. Finally, our research is not free of flaws too, especially this research would be more interesting if the overtime change could be examined. As we did not have any relevant longitudinal data, we could not examine the time dimension of the variables. So, future research on the micro determinants of remittances inflow of Bangladesh may consider doing an economic analysis using longitudinal data.

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BBTA Journal

Thoughts on Banking and Finance

Thoughts on Banking and Finance is a half-yearly peer reviewed journal of Bangladesh Bank Training Academy devoted to the examination and critical analysis of economic, banking and financial issues. The journal publishes original empirical, methodological, policy and theoretical papers, contemporary and historical case studies, conference reports, and book reviews that address the topical issues of the relevant areas. The journal seeks to serve a broad range of economists, banking and finance professional in academia and industries. While the journal welcomes divergent views on economic, banking and financial topics, the journal also publishes views from research scholars on other disciplines such as law, management studies, public policy, ethics, information science, environmental and societal challenges concerning sustainable development and sustainable future.

Submission of Manuscripts

Submissions of Manuscripts are invited on significant, original, and previously unpublished research on all aspects of economic, banking and financial issues from both within Bangladesh and overseas. BBTA will not accept any paper which, at the time of submission, is under review for or has already been published, or accepted for publication in a journal or to be presented at a seminar or conference. Papers will be subject to blind peer review. Selection criteria include accuracy and originality of ideas, clarity and significance of results and quality of presentation. Papers will be judged based on the usual measures of quality with consideration of the relevance to the theme. For complete instructions for authors, please see the following guidelines.

Authors should submit manuscripts of papers, 'Book Reviews' or 'Case Studies' to the following postal and e-mail address : Executive Editor, Thoughts on Banking and Finance, & General Manager, Research and Publications Wing, Bangladesh Bank Training Academy, Mirpur-2, Dhaka-1216, Bangladesh. E-mail: bbta.respub@bb.org.bd

Guidelines for the Paper Contributors

BBTA Journal Thoughts on Banking and Finance is published twice in a year by Bangladesh Bank Training Academy (BBTA), Mirpur, Dhaka. It is a referred journal and publishes articles in the areas of economics, central banking, commercial banking and

finance as well as problems of economic development, in particular of Bangladesh and also other developing countries. While sending papers for publication in the Journal, the contributors are requested to follow the following rules:

Submission Criteria

1. Articles should be typed in double space on one side of A4 size paper with generous margin and should not usually exceed 6000 words (including footnotes, tables and graphs). Each article should have an abstract within approximately 150 words. The hardcopy of article should be sent in duplicate, along with a soft copy in MS word.
2. The author should not mention his name and address on the text of the paper. A separate sheet bearing his full name, affiliation, mailing address and telephone number should be sent along with the main paper.
3. Articles submitted for publication in the journal must not have been accepted for publication elsewhere.
4. Tables, graphs and maps may be used in the article. The title and sources of such tables, etc. should be mentioned.
5. If the Editorial Board is of the opinion that the article provisionally accepted for publication needs to be revised, shortened. or particular expressions therein need to be deleted or rephrased, such requested to recast any article in response to the comments made thereon by the reviewers.
6. The numbering of the footnote will be consecutive, and the footnotes themselves will be placed at the end of the article.
7. Articles, not accepted for publication, will not be returned to the author.
8. A token honorarium of BDT 10,000.00 will be paid for each published article.

References

References should be furnished according to APA style of citation and referencing.

Page Setup

Paper size: A4, top & bottom margin: 2" (two inches), left & right margin: 1.5" (one point five inches), header & footer: 1.6"(one point six inches), font name: Times New Roman, font size for the title of the article: 16 bold, font size for the caption of the paragraph: 12 bold, font size for general text: 11 and font size for the abstract, footnote and references: 10

Book Review

New books (on economics, central banking, commercial banking and finance and as well as recent economic development) will be reviewed in the journal on request. Authors/ publishers may send two copies of each book to the editor for the purpose of review.

All communications should be addressed to the following:

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Introduction to Bangladesh Bank Training Academy (BBTA)

Bangladesh Bank Training Academy (BBTA) is a training wing of central bank of Bangladesh, Bangladesh Bank pursues tasks of capacity building and human capital development in order to prepare skilled human resources in central bank as well as for commercial banks. BBTA organizes different training courses, training workshops, conferences, seminars and other related activities on main topics of economics, banking and finance, financial sector development, human resources development and macroeconomic management. It was established in 1977.

BBTA's Mandate

The purpose of the Academy is to undertake training activities for enabling the officials of central bank and the banking sector to perform their jobs efficiently well-equipped with the latest knowledge of economic, financial and banking developments. To this end, BBTA extends its all-out efforts to facilitate training to personnel engaged in the financial sector. It also works to modernize its library and information center to collect, systematize and disseminate information in the financial arena. Recently, a plan has been adapted to reorganize BBTA library as a Knowledge Management Centre (KMC). This new role puts more weight on BBTA for knowledge creation and application. Since information is important to create new knowledge for educating staff and professionals, we hope that it would contribute to the creation of knowledge and disseminate knowledge for use by others.

BBTA's Strategic Objective's

Bangladesh Bank has adopted its 5-year Strategic Plan 2020-2024 and bestowed responsibilities upon BBTA (Strategic Goal # 7) to adopt all-out efforts to enhance professional excellence and grooming of the officers of Bangladesh Bank. To fulfill the target of the plan document, BBTA has been employing its full capacity to provide need-based training to the officials both from central bank and commercial banks; continuously striving to diversify the contents of its courses in order to ensure their consistency with evolving training needs; facilitating the practical application aspects of knowledge of economics, banking and finance; and developing training as a scientific discipline.

In order to achieve the above mentioned strategic objectives, BBTA has introduced the following initiatives.

1. Building and enhancing training capacities of the trainers;
2. Improving quality, efficiency, impact and cost-effectiveness of training programs;
3. Linking training with real-world cases and experiences;
4. Building training partnership programs with the public and private sector domestic and overseas training institutions;
5. Building and maintaining the BBTA financial institutions information system,
6. Utilization of the Internet for dissemination of the Academy's biannual Journal 'Thoughts on Banking and Finance';
7. Building a database on trainers and training institutions in the field of banking and finance; as well as
8. Facilitating the digitization of BBTA documents.

Organization

The Executive Director is the head of the Academy. There are seven wings to look after the administration, training and research programs of the Academy.

Location

The Academy is located in Mirpur2, Dhaka1216, Bangladesh.

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