Unveiling the Potential of PPP Theory: A Practical Approach to Short-Term BDT-USD Exchange Rate Forecasting in Bangladesh

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ABSTRACT

This study explores the viability of the PPP (Purchasing Power Parity) theory in predicting short-term exchange rate movements in Bangladesh. We aim to construct a forecast model, exclusively based on PPP theory, to accurately estimate the 30, 60, and 90-day forward exchange rates of BDT-USD (Bangladeshi Taka - US Dollar) with minimal error. Drawing from approximately 9 years of monthly data, we utilize monthly nominal CPI values from Bangladesh and the USA to compute six inflation differentials across various periods (30, 60, 90, 120, 150, and 180 days). To determine the lagged impact of inflation on exchange rates, we employ a straightforward correlation matrix with associated p-values. Among these sets, the one exhibiting the highest correlation (along with the lowest p-value) with the percentage change in the 30-day forward rate is identified as the very variable having the highest impact on the next 30-day forward rate. This process is repeated for the 60 and 90-day forward rates, leading to three distinct equations for forecasting each duration. Finally, error-adjustment variables are incorporated in these equations. Our model relies on five readily available data points to forecast forward exchange rates. Results indicate that this model accurately forecasts the 30-day forward exchange rate with a ±0.58% error margin and 98.84% accuracy, with statistical robustness at a 5% significance level across the sample period. However, the performance diminishes when forecasting 60 and 90-day forward exchange rates. This study underscores the effectiveness of PPP theory in predicting up to 30 days of forward exchange rates in Bangladesh, highlighting its practical applicability in economics and finance.

Keywords: Purchasing Power Parity (PPP); Exchange Rate Forecasting, BDT-USD Exchange Rate, Inflation Differential, Short-Term Currency Prediction, Statistical Modeling in Finance

JEL Classification: C20, G15, G17

INTRODUCTION

There are various techniques for forecasting the exchange rate. At one end of the spectrum, there is technical forecasting, which involves the observation of market movements and the reliance on time series. On the other hand, there are market-based and fundamental forecasting methods, including PPP or purchasing power parity methods, econometric methods, relative economic strength methods, and many others. Among these models, PPP-based models are popular. The popularity of the PPP approach may be due to the reason that it is well-written in textbooks and its implementation in developing the well-known Big Mac index (Nguyen, 2011).

This paper tests the applicability of PPP theory in forecasting the short-term exchange rate in Bangladesh. The objective of this study is to develop a forecast model solely based on the PPP theory that will estimate the 30, 60, and 90-day forward exchange rate of BDT-USD with minimal error.

This paper is organized into several sections. The subsequent sections present the theoretical background, literature review on this area, study methodology, data analysis, and calculations. Based on this analysis and calculations, a working forecast model is developed without error correction mechanics. Next, we attempt to detect forecast errors and develop error adjustment variables. Then, this variable is incorporated into the forecast equations to increase the model's accuracy, followed by a graphical evaluation of forecast performance. After that, we summarize our findings and present a discussion on what we have found. Finally, a conclusion is drawn.

A Brief History of the Exchange Rate System in Bangladesh

From 1971 to 2003, Bangladesh adopted various exchange rate systems, such as pegged with British Sterling, pegged with a basket of currencies, pegged with the US Dollar, adjustable pegged system, and finally, managed float system. Below is a timeline that briefly presents the history of the exchange rate system in Bangladesh.

1971: Following the independence of the country, the Bangladeshi Taka (BDT) was pegged to the British Pound Sterling (M. Hossain, 2009; Younus & Chowdhury, 2006).

1980: Bangladeshi Taka (BDT) was pegged to a basket of currencies of major trading partners, and under this system, the Pound Sterling was the intervening currency (M. Hossain, 2009).

1983: BDT was pegged to a basket of currencies of major trading partners, but unlike 1980-1982, this time with US Dollar as the intervening currency (M. Hossain, 2009).

1985: The government started pegging BDT to the US Dollar. According to Younus and Chowdhury (2006), the main reason for shifting from Pound Sterling to the US Dollar was that most of Bangladesh's official trade was performed in the US Dollar.

2000: Bangladesh has adopted an adjustable pegged system (M. Hossain, 2009).

2003: In May 2003, the Floating exchange rate was adopted officially (Hasanuzzaman, 2012; M. Hossain, 2009; Younus & Chowdhury, 2006). According to a research paper by Younus and Chowdhury (2006), the foremost reason for adopting a floating exchange rate system is to avoid overvaluation of BDT. Note that, even though officially (de jure) Bangladesh has been maintaining a floating system from this period, in practice, it was (and it still is) a managed float system (M. Hossain, 2009).

PPP (Purchasing Power Parity) Theory

PPP, or Purchasing Power Parity, is a theory that attempts to establish a relationship between inflation and the exchange rate. As this paper is solely based on this theory, it is appropriate to introduce it briefly.

The underlying philosophy of the PPP theory is "the law of one price" (A. M. Taylor & Taylor, 2004, p. 137). Investopedia (2013) explained that "*the exchange rate adjusts so that an identical good in two different countries has the same price when expressed in the same currency.*" According to PPP theory, the exchange rate between two countries is determined by the price level of identical goods in those two countries.

For instance, if the price of an apple is BDT 20 in Bangladesh and US$ 0.25 in the USA, then according to this theory, the exchange rate between BDT-USD will be 20/0.25 = 80.00. Two or three years later, for example, due to 20% inflation in Bangladesh, the price of that exact apple costs BDT 24. In the USA, the inflation is 10%, and that same apple costs USD 0.275. At this point, the exchange rate between BDT and USD will be 24 / 0.275 = 87.27.

Here, the inflation differential between Bangladesh and the USA is 9%, found by [(1+ 0.20) / (1 + 0.10)] -1. On the other hand, the exchange rate of BDT-USD has also changed by 9%, found by (87.27 / 80.00) – 1. According to PPP, the Inflation differential between two countries determines the exchange rate between the currencies of those two countries.

As Madura (2006, p. 239) mathematically explained in his book, the percentage changes in the value of foreign currency (e_f), according to PPP theory, will be:

$$e_f = \frac{(1+I_h)}{(1+I_f)} - 1$$

Where I_h is the inflation in the home country, and I_f is in the foreign country.

In this paper, we attempt to develop a forecast model based on this PPP theory to estimate the 30-, 60-, and 90-day forward exchange rate between BDT and USD.

Literature Review

As Exchange rate forecasting using PPP theory is a significant topic of interest in financial research, many research papers are now available on the accuracy, applicability, and other aspects of a PPP-based exchange rate forecast model. In the first part of this section, several evidences are presented suggesting that this theory does explain exchange rate movements. However, there are also many opponents of this theory, which are present in the second part of this section.

PPP Theory in Explaining Exchange Rate Movements

There is strong evidence to support that the PPP theory successfully explains exchange rate movements in the long run. For example, Fayad, Fortich, and Velez-Pareja (2009), who conducted a study on the Columbian exchange rate, found the PPP model well-suited for forecasting the long-term nominal exchange rate. Similarly, as stated by M. P. Taylor and Sarno (2001), the PPP theory fits long-run exchange rate movements in industrial countries.

It is revealed from much finance literature that PPP theory works well not only in the context of some specific countries but in many countries. For example, Kamin (1997) demonstrated that the exchange rate and inflation relationship prevails in Mexico as well as in other Latin

American countries (however, this relationship is much higher in Latin American countries than in Asian countries). Hargreaves and Brook (2001) found a stable PPP relationship in New Zealand using a long sample period (even though they stated that the PPP relationship in the USD/NZD exchange rate does not hold for the long run). Moreover, according to Qayyum, Arshad, and Zaman (2004), the PPP theory explains long-term exchange rate movements to some degree in Pakistan. However, the same authors also wrote, "*The speed of adjustment is rather slow*."

The findings of several research papers suggest that the basic theme of PPP theory is also prevailing in Bangladesh. According to M. Hossain and Ahmed (2009), the depreciation of the Taka and the increase in inflation are positively related in Bangladesh, suggesting that the PPP theory works here. Similarly, A. Hossain (2002) found that inflation generally causes the devaluation of Taka in Bangladesh, although the impact is insignificant. Similarly, the study by Ahmed (2012) also revealed that an increase in inflation depreciates the exchange rate, showing support for PPP. Interestingly, the same study also found that the relationship between inflation and the exchange rate is one way, and therefore, although the increase in inflation depreciates BDT, the depreciation of BDT will not increase inflation.

According to Ball and Reyes (2012), there is a relationship between inflation and exchange rate. Interestingly, the relationship between inflation and depreciation of the real exchange rate is negative in a fixed regime, whereas it is positive in a flexible regime. Some researchers also pointed out that the PPP model in forecasting exchange rate works when some complex components, for instance, double truncation, autoregressive, and moving average error terms, according to Tsurumi and Chen (1998), are incorporated in the regression analysis.

Evidence against PPP Theory

In many cases, the relationship between exchange rate and inflation is weak, which proves that the PPP theory does not apply in all situations. Many experts, for example, Antweiler (2011), believe that the PPP relationship between exchange rate and inflation does not occur in the short term and that this theory is only applicable in the long term.

However, sometimes, even in the long term, this theory does not work well. For instance, the findings of Bask (2006) and Hargreaves and Brook (2001) clearly show that in many cases, PPP cannot explain exchange rate movements even in the long run. Although Hargreaves and Brook (2001) found some evidence of PPP when the sample is significant, he noticeably wrote: "*Data are unsupportive for long run PPP relationship*." Moreover, in the long run, models like "no-arbitrage" or "real business cycle" work better than the PPP model (Apte, Sercu, & Uppal, 2002).

The PPP theory is not universal. It works in some economies, whereas it does not work in other economies. To support this view, Kamin (1997) acknowledged that the relationship between inflation and exchange rate is not strong in Asian countries (although it is strong in Mexico and Latin American countries). By giving the example of the UK, Allsopp, Kara, and Nelson (2006) stated that a country's monetary policy sometimes explains why the relationship between inflation and the exchange rate is weak.

Occasionally, the relationship between inflation and exchange rate is exactly opposite to what the PPP theory says. For example, according to the evidence provided by Clarida and Waldman (2007), in those countries where the central bank has an inflation target policy coupled with the "Taylor Rule," the increase in inflation will appreciate the nominal exchange rate. This is totally opposite to what the PPP says, and this evidence directly challenges the PPP theory.

Sometimes, minor modifications or revisions in the same research can favor or oppose the PPP theory. For example, at the early stage of research, Schnabl and Grauwe (2006) found a positive association between stable exchange rate and low inflation in a period between 1994 and 2004 in South Eastern and Central European countries, which initially favored the PPP theory. Later, when the authors removed some specific samples from the observations, this positive association declined.

According to Qayyum et al. (2004), PPP theory does not explain short-run exchange rate movements in Pakistan. Similarly, Suthar (2008) found that the main factors behind India's monthly exchange rate movements are bank rates, interest differences, interest yield differences, and foreign reserves. Note that he did not view inflation as a prominent factor in determining the exchange rate in India.

In Bangladesh, too, the PPP theory applies only partially. For example, A. Hossain (2002) found that the relationship between exchange rate and inflation in Bangladesh is weak, and this weak relation robustly prevailed throughout the study's sample period.

Why Doesn't PPP Theory Explain All Exchange Rate Movements?

Academicians have already given the reasons behind the partial failure of PPP theory. Inflation is not the only factor that determines the exchange rate. Many other factors (besides inflation) are responsible for exchange rate movements (Hasanuzzaman, 2012; Madura, 2006, p. 245). This is one reason why PPP cannot explain exchange rate movements efficiently. Another reason behind the failure of PPP, as Madura (2006, p. 246) mentioned, is its unrealistic assumption that there are always domestic substitutes for all foreign goods.

Too much reliance on the PPP theory may threaten an economy, especially if policymakers rely on this theory without realizing its limitations. As Zanna (2009) warned, if governments of developing countries try to intervene extensively in the exchange rate using the PPP principle, that might cause "*macroeconomic instability*."

METHODOLOGY

In this paper, we attempt to develop a forecasting model for estimating the 30-day, 60-day, and 90-day forward exchange rate of BDT-USD. The model is based on the PPP theory and a sample of approximately 9 years (106 months, to be precise) of data. The procedure that we followed is briefly discussed next.

Overview of the Research Method

Monthly CPI data of Bangladesh and the USA are used to calculate inflation for the last 30, 60, 90, 120, 150, and 180 days of each month. The difference between inflation in Bangladesh and the USA, which we refer to as *Inflation differentials*, is also calculated for the same set of durations. The main reason for calculating Inflation differentials for these multiple durations is to detect the appropriate lag, which will be discussed later.

The dependent variables in this study are the percentage changes in the 30-, 60-, and 90-day forward-looking BDT-USD exchange rate from the spot (or current) rate. As we are interested in forecasting only 30, 60, and 90-day forward rates from the assessment date, looking at the historical forward rate up to 90 days of duration is sufficient. However, to detect the appropriate independent variables, up to 180 days of looking at Inflation differentials from each month are calculated for the analysis.

The challenging part of this study is *detecting the appropriate lag between inflation differentials and percentage change in the forward rate*. For this purpose, we follow the correlation matrix approach suggested by Sayal (2004, p. 8). Among the six sets of inflation differential with varying durations (30, 60, 90, 120, 150, and 180-days), the one that exhibits the highest correlation with the percentage change in the 30-day forward rate is identified as the very variable having the highest impact on the next 30-days forward rate. The same approach is repeated to detect the most substantial variable affecting the 60 and 90-day forward rates. We also observe p-values to determine whether the highest correlations are robust. In this way, we identify the three most substantial variables causing the highest impact on the 30, 60, and 90-day forward rates, respectively. These three variables are used later as independent variables in the relevant regression analysis.

Next, we develop three separate regression equations to estimate the percentage changes in the 30-, 60-, and 90-day forward exchange rates.

To detect forecast errors, we follow an approach suggested by Madura (2006, p. 281). Absolute differences between the forecasted and realized value, as a percentage of realized value, are considered *error*s for a particular forecast. The arithmetic mean of all these errors in the whole series is labeled as the *Error Adjustment Variable*. These variables are incorporated in the regression equations to construct the forecast mode.

Finally, to make the equations easily accessible, we break down the critical variables of the equations so that it is possible to forecast the exchange rate by plugging in only five readily available variables to the equations.

Data and Source

Seasonally adjusted nominal monthly data of the CPI in Bangladesh and the USA are used to calculate inflation and inflation differentials.

The historical BDT-USD monthly exchange rate data that we used are actually in *period-average* form, meaning that these data reflect the value of the average monthly official BDT-USD exchange rate of a particular month instead of month-end point-to-point value.

All these data are collected from *the Global Economic Monitor* published by the World Bank (2012). Using all data from this single source eliminates any disparity in the measurement and compilation that may cause slight changes in values.

Time Frame and Sample Size

In May 2003, Bangladesh adopted a floating exchange rate (Hasanuzzaman, 2012; M. Hossain, 2009; Younus & Chowdhury, 2006). For this reason, our sample starts in May 2003. However, it is not possible to use the first 180 days of data (from May 2003 to October 2003) for the final analysis because we also need to compute 180 days backward-looking Inflation and Inflation differential. Therefore, for the final correlation and regression analysis, the sample period starts from November 2003 (instead of May 2003).

Our sample ends in November 2012. However, in this case, we need to calculate the percentage increase in the forward-looking exchange rate over 30, 60, and 90 days from the spot rate. Therefore, it is also not possible to use the last 90 days of data (from September to November 2012) in our analysis. That's why, for the final analysis, the sample period ends in August 2012.

Thus, this study is based on monthly data from November 2003 to August 2012, which gives us 106 months of samples for final analysis.

Limitations

The PPP theory itself is a foremost limitation of this study. This theory assumes that the inflation differential is the only factor affecting the exchange rate. However, in reality, several factors determine the exchange rate. For instance, Madura (2006, p. 245) and Hasanuzzaman (2012) mentioned some of these factors: interest rates, national income, government controls, current accounts, trade balance, political environment, inflation, etc. As the PPP theory is based solely on one factor (inflation) among many, this theory cannot explain exchange rate movement accurately. Moreover, PPP assumes that domestic substitutes are always available for all foreign goods. As this is an unrealistic assumption, PPP theory often fails fully or partially (Madura, 2006, p. 246). Because of these reasons, our forecast model, which is also solely based on the PPP theory, may fail to forecast the exchange rate smoothly.

Another major limitation is Bangladesh's exchange rate system. Although Bangladesh officially maintains a floating exchange rate system, in practice, it is actually a managed float system (M. Hossain, 2009). Almost all forecast models, including those based on PPP, are suitable for estimating exchange rates in freely floating systems but not in a managed float system like Bangladesh's. As we are applying our PPP-based model in a managed float system, the chances are that it may not explain all the movements in the exchange rate.

DATA ANALYSIS AND CALCULATIONS

This section deals with the technical aspects of this study. First, the detailed computational procedure for four major variables, namely INFBD, INFUSA, DifINF, and %RealER, is discussed. This is followed by an explanation of how the lag is detected and how the most appropriate independent variables are selected from the lagging behavior. Finally, regression equations are constructed, and their interpretation is also given.

Inflation (INFBD and INFUSA)

The first step is to calculate the inflation in Bangladesh and the USA. For this purpose, monthly data on CPI in Bangladesh and the USA from May 2003 to August 2012 are used. We start from May 2003 because this is the very occasion when Bangladesh adopted a floating exchange rate (Hasanuzzaman, 2012; M. Hossain, 2009; Younus & Chowdhury, 2006). In our calculation, the CPIs of Bangladesh and the USA are labeled as CPIBD and CPIUSA, respectively.

There is a chance that relying only on 30-day inflation may not be enough to explain the exchange rate movement. To overcome this problem, we calculate inflation for the last 30, 60, 90, 120, 150, and 180 days of each month in the sample, both for Bangladesh and the USA. This ensures that our study will be able to detect any lagging effects on the exchange rate caused by inflation.

As we need to calculate 180-day inflation, we cannot use the first 180 days (6 months, from May 2003 to October 2003) of data in our sample for final analysis. That is why, for the final analysis, the sample period starts from November 2003 (instead of May 2003) and ends in August 2012. Thus, we have a total of 106 samples for analysis.

The inflation in the last 30 days in Bangladesh and the USA, from the assessment date, is calculated as,

$$INFBD_{(30d)} = \left(\frac{CPIBD_{(d)}}{CPIBD_{(d-30)}} \right) - 1$$

$$INFUSA_{(30d)} = \left(\frac{CPIUSA_{(d)}}{CPIUSA_{(d-30)}} \right) - 1$$

CPIBD and CPIUSA are the CPI of Bangladesh and the USA, respectively. d is the assessment date, and (d-30) means 30 days prior to the assessment date. For example, according to this calculation, in November 2003 (the first month in our final sample), it was 1.04% in Bangladesh and only 0.07% in the USA. A similar approach is used to calculate inflation in longer durations (i.e., 60, 90, 120, 150, and 180-day inflation).

Inflation differentials (DifINF)

PPI theory requires that the inflation of two countries cannot be directly included in the calculation. Instead, differences between the inflations of the two countries have to be used. There are two ways to calculate this difference.

One way is to directly deduct one country's inflation from the other country's. To clarify further, we have to deduct $INFBD_{(30d)}$ from $INFUSA_{(30d)}$, for example, to get a 30-day inflation differential between Bangladesh and the USA. However, as Madura (2006, p. 240) mentioned, this simplified approach only works when the difference in inflation is small.

The second approach, which is more accurate and recommended by Madura (2006, p. 240), is to use a specific formula to get the inflation differentials. We follow this approach for our calculations. According to this approach, the 30-days inflation differential between Bangladesh and USA is calculated as

$$DifINF_{(30d)} = \left(\frac{INFBD_{(30d)} + 1}{INFUSA_{(30d)} + 1} \right) - 1$$

It is 0.97% for the first month (November 2003) in our sample. The same approach is used to calculate inflation differentials for 60, 90, 120, 150, and 180 days.

Percentage Increase in Forward Exchange Rates (%RealER)

As our goal is to estimate the 30, 60, and 90-day forward exchange rates from the assessment date, we need to calculate the percentage increase in historical forward rates over those same time spans for each month in the sample.

Note that although the sample for final analysis ends in August 2012, exchange rate data up to November 2012 are included for calculating the percentage increase in 30, 60, and 90-day forward-looking exchange rates. If we do not have exchange rate data up to 90 days from August 2012, it will not be possible to perform the calculations when the assessment date is June 2012 or later. This hitch is solved by including exchange rate data up to November 2012, although data on these last three months are not used for final analysis.

If the assessment date is d, then the percentage increase in the forward exchange rate after 30 days from the assessment date (that is, on the date $d+30$) will be

$$\%RealER_{(d+30)} = \left(\frac{RealER_{(d+30)}}{RealER_{(d)}} \right) - 1$$

Where $RealER_{(d)}$ is the spot rate on the assessment date, and $RealER_{(d+30)}$ is the forward exchange rate after 30 days from the assessment date. In November 2003, for instance, its value was 0.19%, meaning that the exchange rate increased by 0.19% from November 2003 to December 2003.

The same technique is used to calculate the increase in exchange rate after 60 and 90 days from the assessment date. For example, if the assessment date, d, is November 2003, the 60-day and 90-day increases in the forward exchange rate were 0.71% and 0.75%, respectively. This means that the exchange rate increased by 0.71% from November 2003 to January 2004 (in 60 days) and 0.75% from November 2003 to February 2004 (in 90 days).

Detecting the Lags and Selecting the Most Appropriate Independent Variables

The famous PPP theory can be used to develop an exchange rate forecasting model in many forms. The simplest form only assumes that the current month's inflation differentials will affect the next month's exchange rate. Unfortunately, we may not get highly accurate results if we apply the PPP theory in this straightforward form.

A more realistic way is to assume that there will be some lag time between the changes in inflation differentials and the increase (or decrease) in the forward exchange rate. We rely on this assumption to develop our model. However, the main challenge here is to detect the appropriate lag. That is, how many days (or months) will the inflation differential (changes in DifINF) take to affect the exchange rate (%RealER)?

There are several methods to detect the appropriate lag among variables. One method is to use a correlation matrix, as written by Sayal (2004): "*Statistical correlation between aggregated data points with varying time distances are calculated, and the maximum calculated correlation and the corresponding time distance give us the time correlation information between the compared time-series data streams.*" We follow this method, that is, we used a correlation matrix of DifINF (30, 60, 90, 120, 150, and 180-days Inflation differential between Bangladesh and USA) and %RealER (percentage increase in 30, 60, and 90-days forward exchange rate) to detect the lag. In addition, p-values were also incorporated into the matrix to test the reliability of the correlation. The correlation matrix, based on the sample of 106 months of data (from November 2003 to August 2012), along with p-values, is given below:

Table 1: Time lags and independent variables

		$DifINF_{(30d)}$	$DifINF_{(60d)}$	$DifINF_{(90d)}$	$DifINF_{(120d)}$	$DifINF_{(150d)}$	$DifINF_{(180d)}$
$\%RealER_{(d+30)}$	Correlation	0.071	0.191	**0.232**	0.046	0.029	0.046
	p-value	0.468	0.049	**0.017**	0.638	0.766	0.641
$\%RealER_{(d+60)}$	Correlation	0.151	**0.244**	0.143	0.023	0.026	0.031
	p-value	0.123	**0.012**	0.143	0.818	0.794	0.751
$\%RealER_{(d+90)}$	Correlation	**0.165**	0.130	0.050	-0.032	-0.031	-0.038
	p-value	**0.092**	0.184	0.612	0.744	0.755	0.697

From the above table 1, it is clear that the next 30-days forward exchange rate ($\%RealER_{(d+30)}$) is mainly affected by the last 90-day Inflation differential ($DifINF_{(90d)}$), as evidenced by the highest correlation (0.232). Although a correlation of 0.232 is not considered high in statistics, the p-value of 0.017 indicates that this correlation is statistically robust at a 5% significance level. Moreover, this p-value is substantially smaller than any other p-value in the series, meaning that this is the only robust correlation. Similarly, as the table shows, the next 60-day forward exchange rate ($\%RealER_{(d+60)}$) and the next 90-day forward exchange rate ($\%RealER_{(d+90)}$) are mostly affected by the last 60-day and last 30-day Inflation differentials, respectively.

Besides, the above table also demonstrates that Inflation differentials in the last 120, 150, and 180 days have neither strong (indicated by very low correlations) nor stable (evidenced by high p-values) impacts on the movements of the next 30 to 90 days forward exchange rates. We can draw the following conclusion (Table 2) from these findings:

Table 2: Impact of Inflation Differentials on Forward Exchange Rates

Dependent Variable	The very independent variable that is causing the highest impact on the dependent variable
30-days forward exchange rate, $\%RealER_{(d+30)}$	90-days Inflation differential, $DifINF_{(90d)}$
60-day forward exchange rate, $\%RealER_{(d+60)}$	60-days Inflation differential, $DifINF_{(60d)}$
90-days forward exchange rate, $\%RealER_{(d+90)}$	30-days Inflation differential, $DifINF_{(30d)}$

At this point, we have enough information to develop regression equations to forecast the 30-, 60-, and 90-day forward exchange rates.

Regression Equations

We develop three regression equations for estimating the percentage changes in the exchange rate after 30, 60, and 90 days from the assessment date. As mentioned earlier, although Bangladesh adopted a floating exchange rate system in May 2003 (Hasanuzzaman, 2012; M. Hossain, 2009; Younus & Chowdhury, 2006), we cannot use the first 180 days of data (from May 2003 to October 2003) in our sample, because we also need to calculate 180-days backward looking Inflation differential. Therefore, our sample period ranges from November 2003 to August 2012. Thus, we have 106 months of data to run the regression analysis.

The regression equations, along with the Coefficient of Determination (R^2) and p-values, are given below. We used the statistical software Minitab to calculate these equations.

Table 3: Summary of Regression Equations for Exchange Rate Changes

Regression Equation	R^2	p-value
Percentage increase in the exchange rate after 30 days from the assessment date: $\%RealER_{(d+30)} = 0.00007 + 0.241\ DifINF_{(90d)}$	5.4%	0.017
Percentage increase in the exchange rate after 60 days from the assessment date: $\%RealER_{(d+60)} = 0.00249 + 0.449\ DifINF_{(60d)}$	5.9%	0.012
Percentage increase in the exchange rate after 90 days from the assessment date: $\%RealER_{(d+90)} = 0.00748 + 0.479\ DifINF_{(30d)}$	2.7%	0.092

Forecast Model without Error Correction

Based on the three equations shown in the previous table, the forecast models to estimate the 30-day forward (or expected) exchange rate in Bangladeshi Taka per USD are given below:

$$ExpER_{(d+30)} = RealER_{(d)} \left[1 + \left\{0.00007 + 0.241\ DifINF_{(90d)}\right\}\right]$$

Here, d is the assessment date. $ExpER_{(d+30)}$ is the expected or forecasted exchange rate after 30 days from the assessment date in Bangladeshi Taka per USD. $RealER_{(d)}$ is the exchange rate on the assessment date; hence, this is the spot rate. $DifINF_{(90d)}$ is the Inflation differential between Bangladesh and the USA in the last 90 days from the assessment date.

Similarly, the forecasting model for estimating the 60-day forward exchange rate:

$$ExpER_{(d+60)} = RealER_{(d)} \left[1 + \left\{0.00249 + 0.449\ DifINF_{(60d)}\right\}\right]$$

Finally, to estimate the 90-day forward exchange rate:

$$ExpER_{(d+90)} = RealER_{(d)} \left[1 + \left\{0.00748 + 0.479\ DifINF_{(30d)}\right\}\right]$$

Note that all three forecast models shown above are not incorporated with error-adjustment variables and, therefore, cannot be considered full-fledged models. In the next section, we detect forecast errors to determine the values of error adjustment variables and then incorporate those variables in these equations to make the model more accurate.

Forecast Errors

So far, we have developed regression equations to estimate percentage changes in forward exchange rates. However, as every forecast is subject to error, it is necessary to incorporate error adjustment variables in these equations to reduce the inaccuracy that frequently occurs in forecasting. To detect forecast errors and calculate the error adjustment variables, we follow an approach suggested by Madura (2006, p. 281).

Absolute deviation of the forecasted value from the realized value, as a percentage of the realized value, can be used to detect forecast error, as suggested by Madura (2006, p. 281). All 106 forecasted values in our sample (from November 2003 to August 2012) are compared to the realized values of the respective periods. The absolute difference between these two values is then converted into a percentage of the realized value, labeled as $ERROR_{(d+x)}$, where x is 30, 60, or 90. The arithmetic mean of all these errors (d+x) values is used as error adjustment variables.

To clarify further, the absolute error in forecasting the 30-day forward exchange rate, as a percentage of realized exchange rates, is calculated as

$$ERROR_{(d+30)} = \frac{\left|RealER_{(d+30)} - ExpER_{(d+30)}\right|}{RealER_{(d+30)}}$$

This is the error of only one sample. For example, on the assessment date of November 2003, the forecasted 30-day forward rate was 58.93, and the realized 30-day forward rate was 58.93, which resulted in an error of 0.12%. Similarly, in December 2003, an error was 0.40%; in January 2004, it was 0.55%, and so on. The average of all these error variables in the series is,

$$AvgERROR_{(30d)} = \frac{\sum ERROR_{(d+30)}}{N}$$

Here, N is the number of samples (in our study, N =106). AvgERROR(30d) is the average error in forecasting the 30-day forward exchange rate, and its value is 0.58%. This is the variable that is used as an error adjustment variable for 30-day forecasting.

Similarly, in the case of 60-day forecasting, the value of $AvgERROR_{(60d)}$ is 1.02%, revealing that forecasting a 60-day forward rate is less accurate (alternatively, more difficult) than 30 days. Finally, for 90-day forecasting, $AvgERROR_{(90d)}$ is 1.36%, a relatively large value compared to 30 or 60-day forecasting. The reality is that the longer the forecasting duration is, the higher the error will be.

Forecast Model with Error Correction

In section 0, we developed three models for estimating the 30, 60, and 90-day forward exchange rate but without incorporating error adjustment variables. In this section, we incorporate error adjustment variables in those forecasting models to make them more accurate and less vulnerable to fluctuations.

Equations in Basic Format

In all the following equations, FER is the Forecasted (expected) forward exchange rate, d is the assessment date, $RealER_{(d)}$ is the exchange rate on the assessment date (hence, the spot rate), DifINF is the Inflation differential between Bangladesh and USA, and AvgERROR is the average forecast error (which is already explained in section 0).

Forecasted 30-days Forward Rate

$$FER_{(d+30)} = ExpER_{(d+30)} \pm \left[AvgERROR_{(30d)} \times RealER_{(d)} \right]$$

$$=> FER_{(d+30)} = RealER_{(d)} \left[1 + \left\{ 0.00007 + 0.241\ DifINF_{(90d)} \right\} \right] \pm \left[AvgERROR_{(30d)} \times RealER_{(d)} \right]$$

$$=> FER_{(d+30)} = RealER_{(d)} \left[1 + \left\{ 0.00007 + 0.241\ DifINF_{(90d)} \right\} \right] \pm \left[0.005767 RealER_{(d)} \right]$$

Forecasted 60-day Forward Rate

$$FER_{(d+60)} = ExpER_{(d+60)} \pm \left[AvgERROR_{(60d)} \times RealER_{(d)} \right]$$

$$=> FER_{(d+60)} = RealER_{(d)} \left[1 + \left\{ 0.00249 + 0.449\ DifINF_{(60d)} \right\} \right] \pm \left[AvgERROR_{(60d)} \times RealER_{(d)} \right]$$

$$=> FER_{(d+60)} = RealER_{(d)} \left[1 + \left\{ 0.00249 + 0.449\ DifINF_{(60d)} \right\} \right] \pm \left[0.010186 RealER_{(d)} \right]$$

Forecasted 90-day Forward Rate

$$FER_{(d+90)} = ExpER_{(d+90)} \pm \left[AvgERROR_{(90d)} \times RealER_{(d)} \right]$$

$$=> FER_{(d+90)} = RealER_{(d)} \left[1 + \left\{ 0.00748 + 0.479\ DifINF_{(30d)} \right\} \right] \pm \left[AvgERROR_{(90d)} \times RealER_{(d)} \right]$$

$$=> FER_{(d+90)} = RealER_{(d)} \left[1 + \left\{ 0.00748 + 0.479\ DifINF_{(30d)} \right\} \right] \pm \left[0.013572 RealER_{(d)} \right]$$

Equations in ready-to-use Format

To make the three equations quickly usable, the DifINF variable can be broken down into INFBD and INFUSA, which can further be broken down into CPIBD and CPIUSA. In this way, it is possible to forecast the exchange rate by plugging in five readily available data (variables) into the equation. This is demonstrated below:

Forecasted 30-days Forward Rate

$FER_{(d+30)}$

$$=\text{RealER}_{(d)}\left[1+\left\{0.00007+0.241\left(\frac{\text{CPIBD}_{(d)}/\text{CPIBD}_{(d-90)}}{\text{CPIUSA}_{(d)}/\text{CPIUSA}_{(d-90)}}-1\right)\right\}\right]\pm\left[0.005767\text{RealER}_{(d)}\right]$$ *Forecasted 60-day Forward Rate*

$FER_{(d+60)}$

$$=\text{RealER}_{(d)}\left[1+\left\{0.00249+0.449\left(\frac{\text{CPIBD}_{(d)}/\text{CPIBD}_{(d-60)}}{\text{CPIUSA}_{(d)}/\text{CPIUSA}_{(d-60)}}-1\right)\right\}\right]\pm\left[0.010186\text{RealER}_{(d)}\right]$$ *Forecasted 90-day Forward Rate*

$FER_{(d+90)}$

$$=\text{RealER}_{(d)}\left[1+\left\{0.00748+0.479\left(\frac{\text{CPIBD}_{(d)}/\text{CPIBD}_{(d-30)}}{\text{CPIUSA}_{(d)}/\text{CPIUSA}_{(d-30)}}-1\right)\right\}\right]\pm\left[0.013572\text{RealER}_{(d)}\right]$$

Practical Application: An Example

For example, the assessment date, d, is August 2012. We are interested in the 30-day 30-day forward exchange rate, and we need to know what it will be 30 days 30 days (in September to perform the forecast, we012). We only need the forecast for the following five variables

- The exchange rate on the assessment date, $\text{RealER}_{(d)}$ = 81.51
- CPI in Bangladesh on the assessment date, $\text{CPIBD}_{(d)}$ = 174.6351
- CPI in Bangladesh before 90 days (in May 2012), $\text{CPIBD}_{(d-90)}$ = 172.0986
- CPI in USA on the assessment date, $\text{CPIUSA}_{(d)}$ = 117.6426
- CPI in USA before 90 days (in May 2012), $\text{CPIUSA}_{(d-90)}$ = 117.1055

Thus, on 30 days after d, in September 2012, the BDT-USD exchange rate will be,

$$FER_{(d+30)}=81.51\left[1+\left\{0.00007+0.241\left(\frac{174.6351/172.0986}{117.6426/117.1055}-1\right)\right\}\right]\pm\left[0.005767\times 81.51\right]$$

$$\Rightarrow FER_{(d+30)}=81.71422\pm 0.470068$$

Interpretation: It is estimated that, after 30 days, in September 2012, the BDT-USD exchange rate will be 81.71. However, it may be somewhere between 81.24 and 82.18.

In fact, the realized exchange rate in that period (September 2012) was 81.72, which was close to the forecasted value and within the said range.

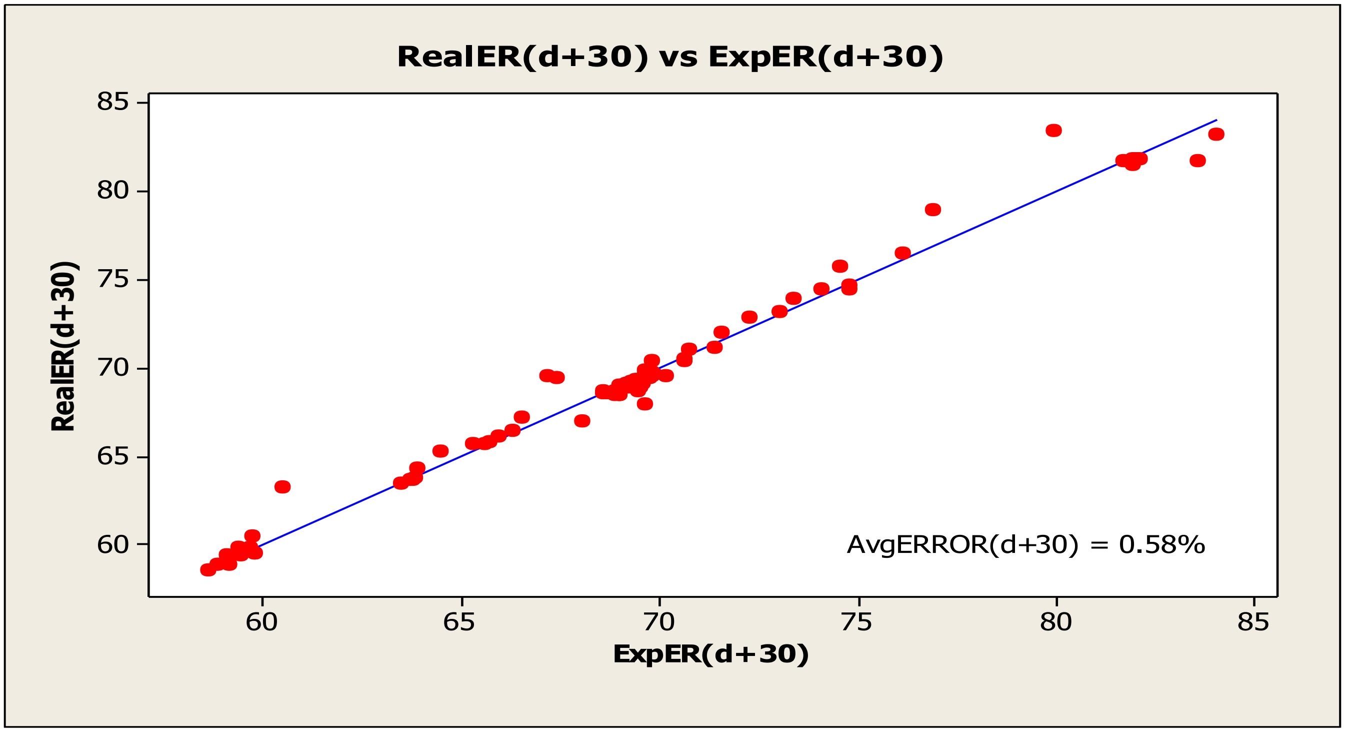
Graphical Illustration of Forecast Performance

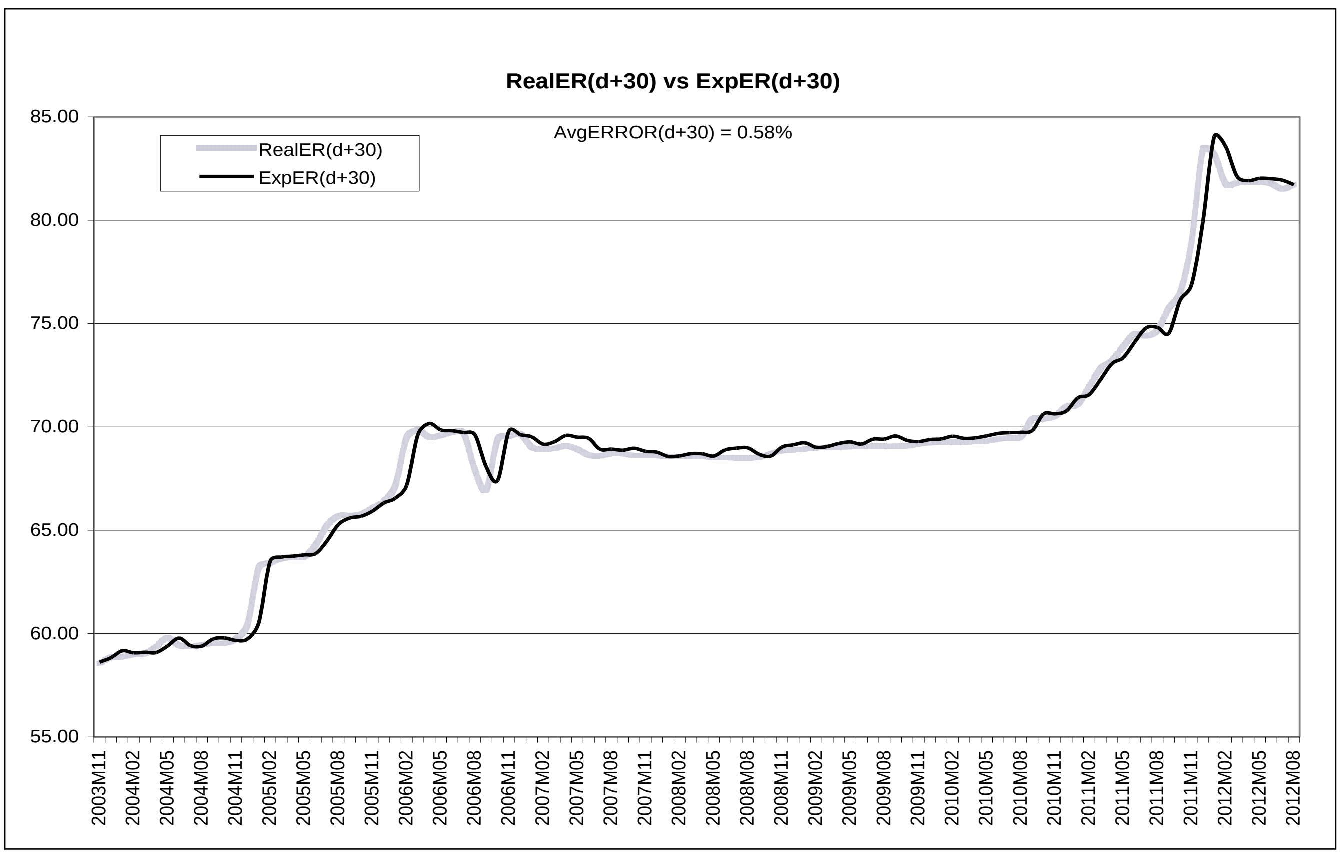
The performance of the forecast model over time can be evaluated graphically. There are two popular ways of evaluating it graphically. One approach is using a scatter plot with a 45-degree line. In this case, the closer the dots are to the 45-degree line, the more perfect the forecast is. Another method is superimposing the forecasted and realized values on two lines on the same graph. The closeness of these two lines represents forecast accuracy. Both approaches are used to graphically evaluate the performance of our model.

Performance of 30-day Forecast

The 45-degree line in the first graph is called the "*Perfect forecast line*" (Madura, 2006, p. 286). The dots are close to this perfect forecast line, signifying that forecasted values are close to the realized values due to the relatively small average error (±0.58% only). Note that the forecast is more accurate when exchange rates are low (between 60 to 75). It becomes less accurate when exchange rates are around 80. The second graph summarizes the same data in a different format. In addition, the second graph also shows the time disparity between forecasted and realized values.

Graph 1 (a & b): 30-Day Forward Exchange Rate Forecast: Scatter Plot and Line Comparison

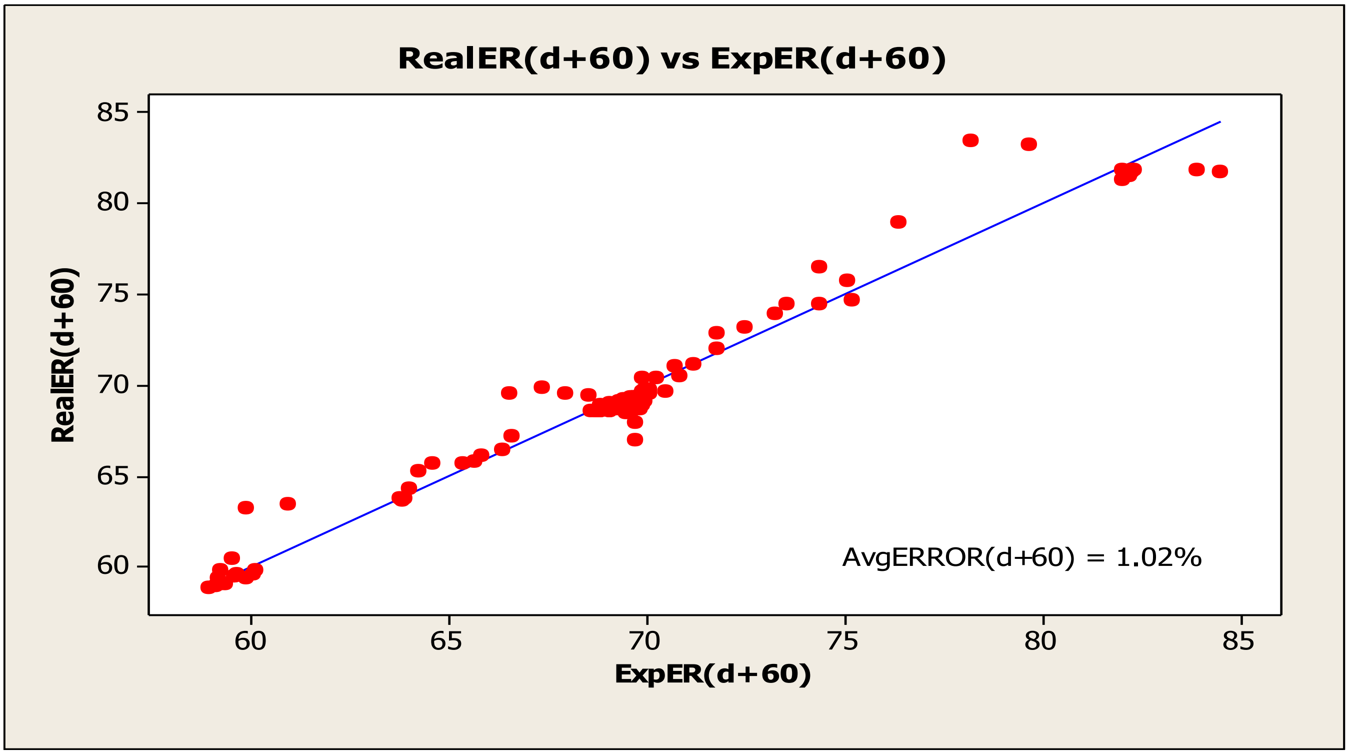


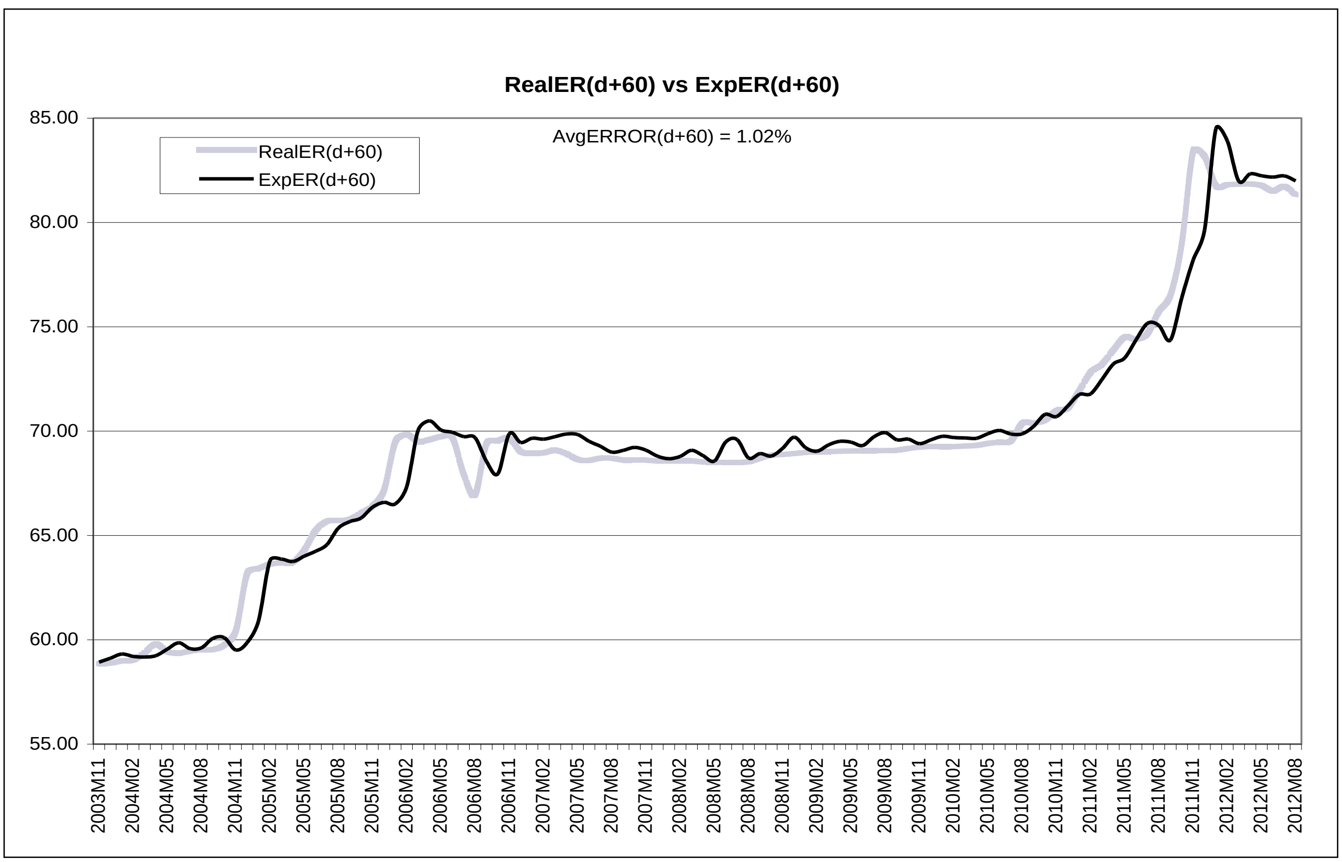


Performance of 60-day Forecast

The average forecast error is ±1.02%, causing the dots to be more scaThe second. The second graph shows that forecasted values and realized values are not as close as the 30-day forecast. Comparing this result to the 30-day forecast reve forecasting a 60-day forward rate is visibly less accurate and more difficult than forecasting a 30-day forward rate.

Graph 2 (a & b): 60-Day Forward Exchange Rate Forecast: Scatter Plot and Line Comparison

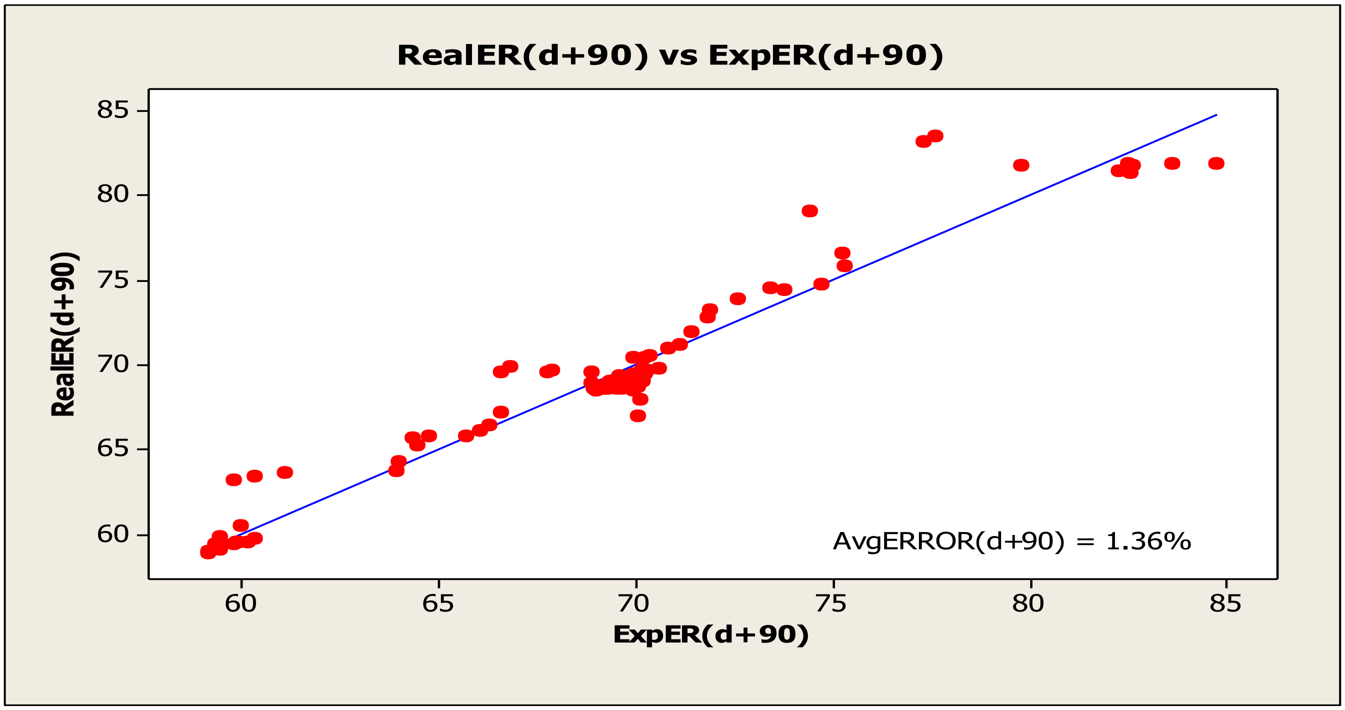


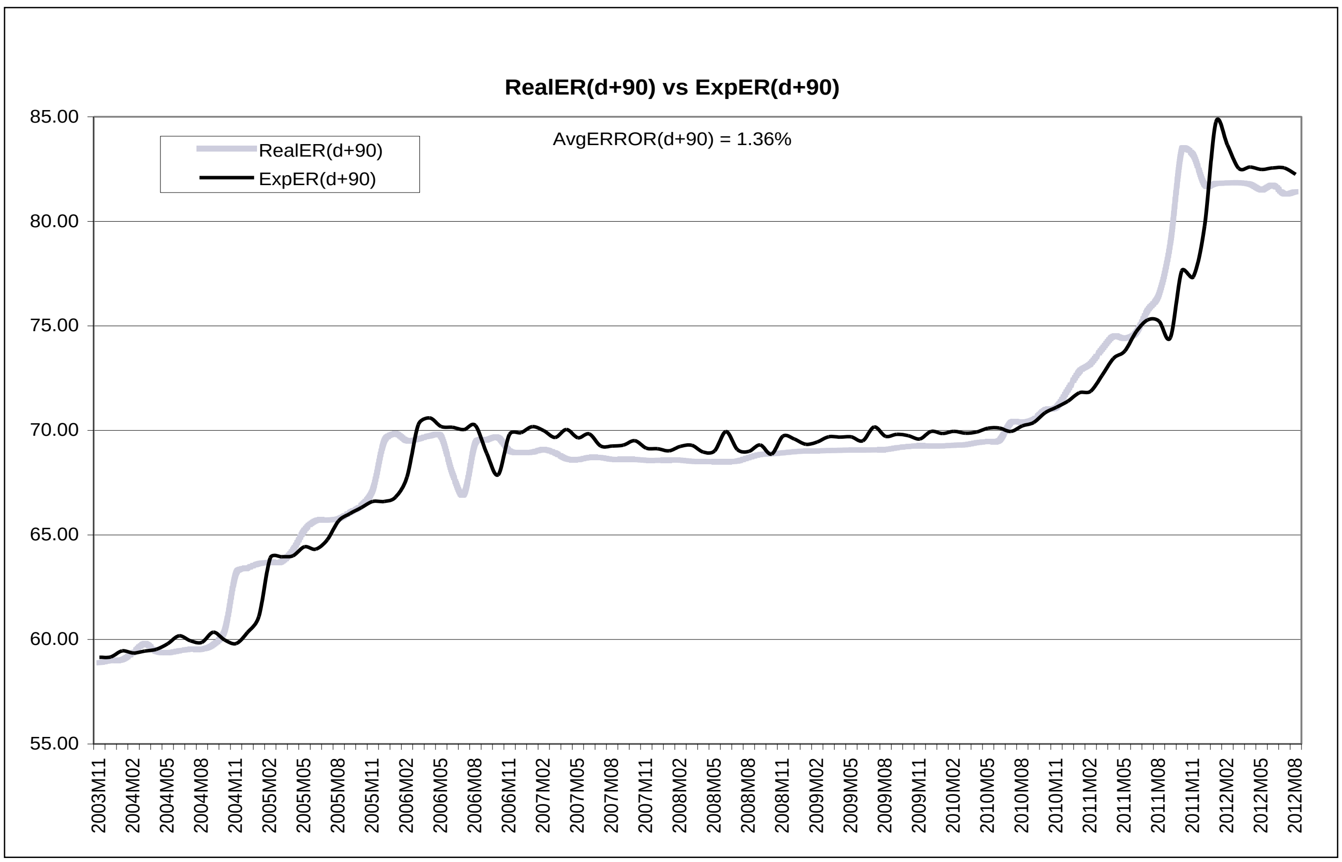


Performance of 90-day Forecast

At an average error of ±1.36%, dots are more scattered from the perfect forecast line on the first graph, and the line representing forecasted values significantly deviates from the realized line on the second graph. This deviation is noticeably visible.

Graph 3 (a & b): 90-Day Forward Exchange Rate Forecast: Scatter Plot and Line Comparison





Summary of Performance Evaluation

All these observations summarize that it is possible to accurately forecast the 30-day forward exchange rate using our model with minimal error (only ±0.58%). However, forecasting the 60-day forward rate is less accurate, and the average error is nearly doubled. Similarly, forecasting the 90-day forward rate using this model is subject to many errors, and noticeable deviation occurs between the forecasted and realized values.

This evaluation concludes that the 30-day version of our model can forecast the exchange rate with an acceptable range of error. However, the 60-day and 90-day versions of the model do not give results within acceptable accuracy and should, therefore, be rejected.

RESULTS AND DISCUSSION

This section is divided into two parts. In the first part, results from this study are given. This is followed by a discussion and interpretation of what we have found so far. In addition, our findings are compared to those of other researchers in the same field whenever appropriate. This section can be considered an extract of various findings from this whole paper.

Results

This study is considered partly successful in fulfilling its objective. To clarify, although a 30-day forecasting model is developed with sufficient accuracy, the 60-day and 90-day versions of our model yield a large degree of errors and are therefore considered inaccurate. This result is explained next.

30-days Forecast Model

$FER_{(d+30)}$

$$=RealER_{(d)}\left[1+\left\{0.00007+0.241\left(\frac{CPIBD_{(d)}/CPIBD_{(d-90)}}{CPIUSA_{(d)}/CPIUSA_{(d-90)}}-1\right)\right\}\right]\pm\left[0.005767RealER_{(d)}\right]$$

A p-value of 0.017 indicates that the result is robust at the 5% significance level. However, the coefficient of determination warns that only 5.4% of variations in the 30-day forward exchange rate can be explained by the 90-day Inflation differential. There is only ±0.58% error in the forecasted value, meaning that the forecast is 98.84% accurate. Overall, this model is considered moderately accurate in forecasting the 30-day forward exchange rate.

60 and 90-day Forecast Model

Although the forecast result of our 60-day version is statistically stable at a 5% significance level, it produces an error of ±1.02%, which is practically too high to accept the model. In the case of the 90-day version, the error is as high as ±1.36%, and the forecast result of this model is also not robust at a 5% significance level. Due to these reasons, the 60-day and 90-day versions of our model are considered unreliable and inaccurate.

Discussion

In this study, we attempt to develop a short-term forecast model for estimating the BDT-USD exchange rate, and at this point, it seems that we are partly successful in that.

In the case of a 30-day forward rate, our model can forecast the exchange rate with an error of only ±0.58%, meaning that the model forecasts with 98.84% accuracy. Moreover, the result is statistically robust at a 5% significance level. Thus, our findings support that the PPP relationship between inflation and the exchange rate does exist in Bangladesh. This finding is consistent with the results of M. Hossain and Ahmed (2009), A. Hossain (2002), and Ahmed (2012). All these researchers also conducted their study in the context of Bangladesh and found a similar relationship, which suggests that PPP theory does work in Bangladesh. Moreover, the positive relationship between the increase in inflation and the depreciation of the home currency, which we have found in the current floating regime of Bangladesh by our analysis, is also consistent with the conclusion of Ball and Reyes (2012). However, the coefficient of determination indicates that only 5.4% of variations in the 30-day forward exchange rate can be explained by the Inflation differential, meaning that although the PPP relationship does exist in Bangladesh, it is not that strong. This is exactly similar to what was found in Bangladesh by A. Hossain (2002).

It is also revealed that there is a specific time lag between the Inflation differential and its impact on the exchange rate. For example, the last 30 days' Inflation differential between Bangladesh and the USA will not strongly affect next month's BDT-USD exchange rate. Instead, it will affect the 90-day forward exchange rate from now. This hidden lag is detected by the approach shown by Sayal (2004, p. 8). Interestingly, it is revealed that movements in 30, 60, and 90-day forward rates are most strongly affected by the 90, 60, and 30-day backward-looking Inflation differential from the assessment date, respectively. A correlation matrix with p-values exhibits that these lagged effects are robust.

A complex approach is used to detect the most prominent independent variables. Among the six sets of backward-looking Inflation differentials with varying durations, the one that exhibits the highest correlation (and lowest p-value) with the changes in the 30-day forward rate is identified as the most appropriate independent variable for the regression of the 30-day forecast model. Possibly due to this ingenious methodology, our model can forecast a 30-day forward rate with only ±0.58% error and 98.84% accuracy, even though it relies on the simple PPP theory.

The same approach is repeated to detect the most appropriate independent variable for the 60-day and 90-day forecasting models, but unfortunately, the 60-day and 90-day versions of this model are not so accurate. They produce an error of ±1.02% and ±1.36%, respectively. This error is considered large enough to reject the model in the real world of short-term forecasting. This also reveals that the forecast model's accuracy drops as time distance increases. Therefore, a more complex model is required for accurately forecasting exchange rates beyond 30 days.

Madura (2006, p. 245) and Hasanuzzaman (2012) explain the main reason behind this inaccuracy. According to them, the determinants of the exchange rate are not only inflation but also other factors. Our PPP-based model only relies on inflation and ignores all other remaining determinates, so it fails to forecast the exchange rates beyond 30 days. Moreover, as Bangladesh maintains a managed float system (M. Hossain, 2009), there were many government interventions throughout our sample period, which could be captured by our model. A combination of all these factors yields high error. Nevertheless, the 30-day version of our model works quite well, and its performance is satisfactory.

CONCLUSION

The 30-day forward rate forecasting model we presented works well and has satisfactory results. The uniqueness of this model is that, by plugging in only five pieces of readily available data, it is possible to forecast a 30-day forward rate with an error of only ±0.58%. Another significant contribution of this research is to demonstrate that the basic theme of PPP theory works in Bangladesh and that it is possible to forecast up to a 30-day forward exchange rate in Bangladesh by solely relying on PPP theory. However, our objective is only partly fulfilled, as the 60-day and 90-day forecast models that we presented produce large errors. Now, the question is, what modifications in the methodology can be made to make the 60-day and 90-day versions of this model more accurate?

A possible modification in methodology is to imply a two-step process. In the first step, the basic 30-day model, which has already been proven as adequately accurate, will be used to forecast the 30-day forward exchange rate, and a separate time series analysis will be used to forecast the 30-day forward Inflation differential. In the next step, these forecasted exchange rates and forecasted Inflation differential will be plugged again into the basic 30-day model to forecast the next 30-day forward exchange rate. In this way, it may be possible to accurately forecast the 60-day forward exchange rate from the assessment date without departure from PPP theory. If we want to forecast a 90-day forward exchange rate, then one identical step will need to be repeated, making it a three-step process. We hope that these two-step and three-step methods will be tested in future studies, eventually proving whether or not it is possible to accurately forecast the 60-day and 90-day BDT-USD forward exchange rate by solely relying on PPP theory.

REFERENCES

Ahmed, S. (2012). Explaining inflation in Bangladesh: The Financial Express, Dhaka, Monday, July 9, 2012. http://www.thefinancialexpress-bd.com/old/more.php?page=detail_news&date=2012-07-09&news_id=135857

Allsopp, C., Kara, A., & Nelson, E. (2006). U.K. Inflation Targeting and the Exchange Rate: FRB of St. Louis Working Paper No. 2006-030A. http://ssrn.com/abstract=900132

Antweiler, W. (2011). Purchasing Power Parity: The Pacific Exchange Rate Service. http://fx.sauder.ubc.ca/PPP.html

Apte, P., Sercu, P., & Uppal, R. (2002). The Exchange Rate and Purchasing Power Parity: Extending the Theory and Tests: CEPR Discussion Paper No. 3343. http://ssrn.com/abstract=315019

Ball, C. P., & Reyes, J. A. (2012). Remittances, Inflation and Exchange Rate Regimes in Small Open Economies. http://ssrn.com/abstract=1119318

Bask, M. (2006). Exchange Rate Volatility without the Contrivance of Fundamentals and the Failure of PPP: Bank of Finland Research Discussion Paper No. 8/2006. http://ssrn.com/abstract=1018331

Clarida, R., & Waldman, D. (2007). Is Bad News About Inflation Good News for the Exchange Rate? : NBER Working Paper No. w13010. http://ssrn.com/abstract=913306

Fayad, C., Fortich, R., & Velez-Pareja, I. (2009). Forecasting Foreign Exchange Rate Assuming PPP Conditions: Empirical Evidence Using VAR: Estudios Gerenciales. Journal of Management and Economics of Iberoamerica, Vol. 25, No. 113, pp. 211-226, October-December 2009. http://ssrn.com/abstract=1401538

Hargreaves, D., & Brook, A.-M. (2001). PPP-Based Analysis of New Zealand's Equilibrium Exchange Rate: Reserve Bank of New Zealand Discussion Paper No. DP2001/01. http://ssrn.com/abstract=320296

Hasanuzzaman, M. (2012). Trend about exchange rate of Bangladesh Taka: The Financial Express, February 11, 2012. http://www.thefinancialexpress-bd.com/more.php?date=2012-02-11&news_id=97989

Hossain, A. (2002). Exchange Rate Responses to Inflation in Bangladesh. http://ssrn.com/abstract=880195

Hossain, M. (2009). Exchange rate management in Bangladesh: An assessment: The Financial Express, August 29, 2009. http://www.thefinancialexpress-bd.com/2009/08/29/77461.html

Hossain, M., & Ahmed, M. (2009). Exchange rate policy under floating regime in Bangladesh: An assessment and strategic policy options: BIDS-PRP Working Paper Series Working Paper No. 2 http://mpra.ub.uni-muenchen.de/20487/1/PRP_WP2_Ex_Rate_in_Bangladesh.pdf

Investopedia. (2013). Purchasing Power Parity - PPP: Investopedia US. http://www.investopedia.com/terms/p/ppp.asp

Kamin, S. B. (1997). A Multi-Country Comparison of the Linkages Between Inflation and Exchange Rate Competitiveness: BIS Working Paper No. 45. http://ssrn.com/abstract=860684

Madura, J. (2006). *International Financial Management* (8 ed.): Thomson South-Wrstrrn.

Nguyen, J. (2011). 4 Ways To Forecast Currency Changes: investopedia.com. http://www.investopedia.com/articles/forex/11/4-ways-to-forecast-exchange-rates.asp

Qayyum, A., Arshad, & Zaman, K. U.-. (2004). Exchange Rate Misalignment in Pakistan: Evidence from Purchasing Power Parity Theory: Pakistan Development Review, Vol. 43, No. 4, Winter 2004. http://ssrn.com/abstract=966106

Sayal, M. (2004). Detecting Time Correlations in Time-Series Data Streams: Hewlett-Packard. http://www.hpl.hp.com/techreports/2004/HPL-2004-103.pdf

Schnabl, G., & Grauwe, P. D. (2006). Exchange Rate Stability, Inflation and Growth in (South) Eastern and Central Europe: Review of Development Economics, (Forthcoming). http://ssrn.com/abstract=946968

Suthar, M. H. (2008). Determinants of Exchange Rate in India. http://ssrn.com/abstract=1165602

Taylor, A. M., & Taylor, M. P. (2004). The Purchasing Power Parity Debate: Journal of Economic Perspectives—Volume 18, Number 4—Fall 2004—Pages 135–158. http://www.ssc.wisc.edu/~mchinn/taylor&taylor_PPP_JEP.pdf

Taylor, M. P., & Sarno, L. (2001). Purchasing Power Parity and the Real Exchange Rate: CEPR Discussion Paper No. 2913. http://ssrn.com/abstract=280902

The World Bank. (2012). Global Economic Monitor: The World Bank Group. http://data.worldbank.org/data-catalog/global-economic-monitor

Tsurumi, H., & Chen, C. L. (1998). Testing the Purchasing Power Parity Theory: A Case of the Taiwanese Dollar Exchange Rate: Journal of Economic Integration, Vol. 13, No. 2, June 1998. http://ssrn.com/abstract=108368

Younus, S., & Chowdhury, M. I. (2006). An Analysis of Bangladesh's Transition to Flexible Exchange Rate Regime: Bangladesh Bank, Working Paper Series No: WP 0706. http://www.bangladesh-bank.org/pub/research/workingpaper/wp0706.pdf

Zanna, L.-F. (2009). PPP Exchange Rate Rules, Macroeconomic (In)Stability, and Learning: International Economic Review, Vol. 50, No. 4, pp. 1103–1128, November 2009. http://ssrn.com/abstract=1495269

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