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BANGLADESHI REAL EXCHANGE RATES AND COMPETTITIVE POSITIONS IN EXPORT MARKETS RELATIVE TO THE TWO ASIAN LARGEST COUNTRIES

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Abstract: *An exchange rate system is important for a country to maintain economic stability. The objective of this study is to calculate the real exchange rate between Bangladeshi taka-Chinese renminbi and taka-Indian rupee to analyze the Bangladeshi competitive positions in the bilateral export markets with her two largest trading partners in Asia. Empirical results suggest that the Bangladeshi inflation rate is relatively higher than that in the People's Republic of China but relatively lower than inflation rate in India, particularly since 2009. However, taka-renminbi and taka-rupee real exchange rates were consistent with the predictions by the Purchasing Power Parity theory, whereby reserving Bangladesh's relative competitive positions in export markets with the two largest Asian economies over a period during which many extraordinary events—political, economic, and otherwise—occurred both in Asia and throughout the world.*

Keywords: *Exchange rate, Bangladesh taka, Chinese yuan, Indian rupee, Export markets*

JEL Classifications: *F00, F31, G15.*

Introduction :

Bangladesh is the 61st largest export economy in the world and the 100th most complex economy according to the Economic Complexity Index developed by the MIT Media Lab, which is an interdisciplinary research laboratory at the Massachusetts Institute of Technology created in 1985. Bangladesh exports of $33.4B was less than its imports of $36.9B in 2014, resulting in a negative trade balance of $3.49B. The two largest countries in the Asian region of the People's Republic of China and India happens to also be Bangladesh's two largest trading partners in Asia.

It is well stated in international finance literature that the real exchange rate between currencies in two economies determines the relative competitive position in the export markets between these two countries. As a consequence, management of the real

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exchange rate is crucial for economic growth. Effective management of such exchange rate is quite challenging since international economics and finance theories do not provide definitive guidance on the causal relationship between exchange rate changes and output growth. Empirical analyses is usually relied upon in this process which is further complicated by the often ambiguous results of such empirical analyses.

Rodrik (2008) conducted a comprehensive study of 184 countries observed during the period 1954-2004 period with regresses per capita GDP growth on an index of undervaluation and GDP per capita and accounts for fixed effects and year-specific dummies. This study found that under valuation is systematically associated with periods of high growth, an effect that is large and significant for poor countries. These findings are supported by the reasoning that undervaluation leads production factors to move in the direction of the tradable (export and import-competing) sectors, which tend to have higher productivity growth rates (Cottani et. al, 1990), and to exhibit larger economies of scale, learning by doing, and knowledge spillovers (Rodrik, 2008). The presence of these factors makes an economy more competitive, increasing its domestic profitability and investment, and ultimately spurring growth (Bhalla 2012).

Dhasmana (2015) offered the position known contractionary devaluation by stating that it is entirely possible that exchange rate devaluations can cause a reduction in output as occurred in Mexico some years ago. In addition, Purchasing Power Parity (PPP) theory holds the position that currency devaluation would be followed by high inflation rates, a decline in national income (which could cause discontent and lead to social unrest), and a rise in cyclical instability, personal bankruptcies, and speculation in the real estate and equity markets. Moreover, the culture, and degree of economic and political freedom of the country influences the full extent of negative impacts. Therefore, it is of special interest to empirically investigate the behavior of the exchange rate of Bangladesh and its competitive position in the bilateral export market with its two largest trading partners: the People's Republic of China and India. Accordingly, the objective of this study is to calculate the real taka-Indian rupee and the taka-Chinese renminbi real exchange rates to analyze the Bangladeshi competitive positions in the bilateral export markets with her two largest trading partners in Asia.

More specifically, if the findings reveal that the taka-renminbi and taka-rupee real exchange rates were consistent with the predictions by the PPP theory, then it can be concluded that Bangladesh reserved its relative competitive positions in export markets with the two largest Asian economies over a period during which many extraordinary events—political, economic, and otherwise—occurred both in Asia and throughout the world. Otherwise, it may be articulated that the Bangladeshi authority may need to improve their exchange rate policy to maintain their competitive positions in the bilateral export markets.

The remainder of this study is organized as follows. Section 2 reviews the literature on the impacts of exchange rate changes on the economy; section 3 summarizes the Bangladeshi, Chinese, and Indian exchange rate policies; section 4 introduces the framework for this empirical investigation; section 5 describes the data set and graphical presentations of the empirical results; section 6 explains the methodology; section 7 reports the estimation results; section 8 discusses the results and, section 9 provides some concluding remarks.

Brief Literature Review :

The choice of exchange rate regime has been a subject of ongoing debate in international Economics (Bailliu, Lafrance and Perrault, 2002). This debate has spawned a number of empirical studies on the existence of the relationship between economic growth and the choice of exchange rate regime. The results of these empirical studies have produced varying results. Some of the empirical results showed that there does not exist any relationship between exchange rate regime and economic growth (Ghosh et al., 1997; The IMF study, 1997) although there have been some evidence linking the two factors (Bailliu, Lafrance, and Perrault, 2001; Calvo and Reinhart, 2000; Levy Yeyati and Sturzenegger, 1999; Levy Yeyati and Sturzenegger, 2001). However, none of these studies seem to be able to suggest a specific criteria as to what regime is the best for achieving fast sustainable economic growth. To this end, Dehejia (2003) argued that the choice of the regime and its success depend on individual countries and their own economic considerations and environments.

Moreover, while the advantages of a freely floating regime are well known, it is still debated whether this regime is suitable for less developed countries. The problem of destabilizing speculation and consequent excessive exchange rate volatility appears to be exacerbated in developing countries, making a floating regime especially unviable and unsuitable, particularly in the absence of a resilient and developed financial system (Hossain, 2009; Grenville and Gruen, 1999). In light of the Asian and Latin American economic crises in the 1990s, there has been a growing tendency among countries to adopt a corner regime—either a fixed or a floating regime. However, many studies document that the way developing countries float is not consistent with the characteristics of clean floats (Hausmann et al., 2001; Hernandez and Montiel, 2003).

Chinese, Bangladeshi, and Indian Foreign Exchange Policies :

Chinese Foreign Exchange Policy

China's exchange rate policy has become a focal point of international attention in recent years (Williamson, 2000, 2005; Eichengreen, 2004; McKinnon, 2006; Frankel and Wei, 2007; Goldstein and Lardy, 2008; Laurenceson, 2008; Evenett, 2010). A few contentious matters concerning China's exchange rate regime have been particularly salient for their likely global repercussions. Primarily among these are the renminbi's exchange rate and the leeway for change. While it remains unclear as to whether the level of renminbi is undervalued, there is nearly unanimous agreement that the Chinese exchange rate regime should be changed to allow for greater flexibility (Chinn and Wei, 2008; Eichengreen and Rose, 2010).

The Chinese currency has been hard-pegged to the United States dollar for most of the past two decades, the Chinese authority strictly regulated the level and variability of the renminbi's exchange rate which resulted in an outright denial of market forces in the country's exchange rate system and critically contributed to the renminbi's misalignment. In response to domestic and international pressure, the Chinese monetary authority announced on 21 July 2005 and reiterated on 19 June 2010, the adoption of a Chinese version of a managed floating rate system. Under this new system, the renminbi exchange rate is to be administered by the government but allowed to move within a fluctuation

band specified by the authority. In managing the rate movements, market conditions are to be considered and reference made to a basket of currencies (the People's Bank of China, 2005, 2008).

The most important feature of the new system is the use of a basket currency which is has been widely interpreted as China's adoption of a basket pegging system. Zhang et al. (2011) argues that this policy change actually comprises a complex package that reconfigures the Chinese exchange rate system. There are three pillars for the new regime: a central parity that is administered by the central bank; a basket currency used as a reference unit and anchoring mechanism; and a fluctuation band that specifies the allowed range for daily currency variation around the central parity. The core of the system is the central parity between the renminbi and the U.S. dollar.

The central parity is based on three factors: the weighted average of market makers' pre-session quotes, movements of selected international currencies included in the basket, and the central bank's assessment of macroeconomic conditions (State Administration of Foreign Exchange, 2009). While the Chinese foreign exchange market formally opens at 9:30am every working day, at 9:15am market markers for renminbi/dollar spot trading, 26 in all as at the end of 2010 (China Foreign Exchange Trading System, 2010), are convened by the monetary authority for a fixing meeting in which they submit their offers for the day. The highest and lowest quotes are eliminated and the rest are averaged by the authority. The government then exercises discretion in aligning the mean rate from the market makers with the rate implied by the basket currency and changes in macroeconomic variables (Zhu and Zhao, 2009). The monetary authority finally arrives at a central parity rate for the day which is published before the market opens. All subsequent transactions on the market are conducted on the basis of this central parity (State Administration of Foreign Exchange, 2009).

As illustrated above by the microstructure of the Chinese foreign exchange market, the renminbi is not directly pegged to a currency basket. Therefore, it is abundantly clear that China is not operating a conventional basket peg. Instead, the current Chinese system can be broadly defined as a flexible rate regime in which the exchange rate for the Chinese currency is adjusted according to a set of indicators. In this system, a basket currency, among other things, has been deployed by the Chinese central bank as a reference unit for judging the necessity for rate adjustment and as an anchoring device for managing exchange rate movements by setting the central parity.

Bangladeshi Foreign Exchange Market :

Hossain and Ahmed (2009) reported that Bangladesh adopted a freely floating regime on May 30, 2003 by abandoning the adjustable pegged system. Over the following ten month period after the adoption of the freely floating regime, the Bangladeshi exchange market remained stable, experiencing a depreciation of less than one percent from June 2003 to April 2004. However, the nominal Taka-US dollar exchange rate has retreated to a downward trend from between the peak at Tk.70/USD and the low at Tk. 58/USD, i.e., 20 percent appreciation over the 2004-2007 period. The Taka-US dollar exchange rate then stabilized until December 2010. The Bangladeshi nominal Taka-US dollar exchange rate then steadily depreciated from Tk.70.75/USD in 2010 to Tk.84.5/USD in January 2012 and then gradually appreciated to Tk.77.80/USD in April 2015.

Hossain and Ahmed (2009) further posited that exporters often demand depreciation to offset domestic price and wage inflation and regain competitiveness. Depreciation affects the country's output and inflation through three different channels. The authors argued that depreciation first directly affects the rate of inflation. However, the impact of depreciation on inflation will depend on the level of the pass-through. Second, depreciation affects output through a *balance sheet* effect: the depreciation increases the cost of repayment of foreign currency denominated debt, reducing profits in this period, and thus the capital stock and output in the second period. Third, a larger depreciation entails a smaller increase in interest rates. Thus, a larger depreciation increases output in the second period, since the reduction in interest rate eases the credit constraint (they call this *the credit channel* effect). The overall effect on income will depend on which of the two channels dominate. If the credit channel dominates over the balance sheet channel, depreciation is expansionary, otherwise, it is contractionary.

Many studies have attempted to analyze the behavior of exchange rates in Bangladesh. Hossain (2002) investigated the exchange rate responses to inflation in Bangladesh for the period 1973-1999. The results of this investigation found that the effect of devaluation on inflation during the fixed exchange rate regime was not significant, and claims the results to be robust for the whole sample period. By analyzing the movement of the real exchange rate and trade balance in Bangladesh for the period 1973-1996, Hossain (1997) found that the continued in-flows of foreign capital, foreign aid and overseas workers' remittances have caused an appreciation of the real exchange rate by increasing the relative demand for non-tradable goods.

Rahman and Basher (2001) estimated the equilibrium real exchange rate as well as exchange rate misalignment for the period 1977-1998. They found that trade liberalization and increase in debt service burden resulted in a real depreciation of the currency while increase in capital in-flow, improvement in terms of trade, and increase in government consumption of non-tradable goods resulted in a real appreciation of the currency. From the estimated long run equilibrium real exchange rate, they found that Bangladeshi currency was considerably overvalued until late 1980s. However, the real exchange rate broadly was in equilibrium during the 1990s.

Islam (2003) argued that prior to adopting a floating exchange rate regime the economic and institutional prerequisites of a floating exchange rate regime were not met in Bangladesh. Rahman and Barua (2006) performed a correlation analysis and found that there is a strong correlation (-0.40) between depreciation and export-import gap as a share of reserves. Also, they found that letter of credit openings for imports have a positive correlation (0.45) with volatility of the exchange rate which implies that the higher the letter of credit openings the more volatile is the exchange rate. They conclude that high seasonal demand for foreign currency because of increased import bills, systematic withdrawal of excess liquidity by Bangladesh Bank, relatively faster expansion of credit and higher interest rates on various national savings instruments are the reasons behind the interest rate hike in the money market and depreciation of the nominal exchange rate.

Younus and Chowdhury (2006) made an attempt to analyze Bangladesh's transition to a floating regime and its impact on macroeconomic variables. They found that output growth in Bangladesh performed well in the intermediate and floating exchange rate regimes. Inflation is lower in the intermediate regime despite higher money supply and exchange rate depreciation. They also found that currency depreciation boosted export growth in the floating regime. The logical implication of this finding is to improve the domestic economic conditions, the country should pursue the "Thou Shall Beg Thy Neighbor's Policy".

Indian Foreign Exchange Policy :

Regarding the Indian exchange rate system, Dhasmana (2015) theorizes that prior to the Balance of Payments crisis in 1991, the Indian rupee was pegged to a basket of currencies dominated by the US dollar. The external payment crisis of 1991 forced the Reserve Bank of India to reform the financial sector and shift the paradigm from fixed to market-based exchange rate regime in March 1993. The institution of Current Account convertibility in August 1994 and the gradual liberalization of the Capital Account along with other trade and financial liberalization led to a rise in total turnover in the foreign exchange market from USD 73.2 billion in 1996 to USD 130 billion in 2002-03 and further to USD 1,100 billion in 2011-12. A direct outcome of these changes has been a rise in the volatility of Indian rupee.

The Reserve Bank of India's exchange rate policy objective was to maintain orderly conditions in the foreign exchange market by eliminating lumpy demand and supply and preventing speculative attacks, without setting a specific exchange rate target. The Indian central bank has intervened in both the spot and the forward segments of the foreign exchange market and adjusted domestic liquidity through the use of Bank rate, Repo rate, etc. and monetary sterilization to achieve its objective. Dhasmana (2015) argues that the Indian central bank's intervention during this period has been asymmetrical during episodes of appreciation and depreciation.

Underlying this asymmetry has been the notion that an appreciated rupee would hurt exporters through a loss in cost competitiveness and consequently adversely affect India's growth performance. Empirical evidence on the impact of exchange rates on the performance of Indian firms is non-existent. Dhasmana (2015) suggests that the impact of exchange rates vary across different types of firms and industries. The author further posits that while the export competitiveness channel is dominant in industries with higher degrees of concentration, both export competitiveness and import cost channels operate in industries with lower degrees of concentration. This indicates that an unambiguous case for a beneficial effect of exchange rate depreciation or an adverse impact of exchange rate appreciation cannot be made for firms in industries with low degree of market concentration.

Framework for Empirical Investigation :

Based on international finance theory, changes in a country's exchange rate impact its gross domestic product and unemployment. In addition, fluctuations in a home country's inflation alter the inflation rate differential between the home country and its trading partners. As expected under relative purchasing power parity (PPP), the differential

inflation rates in the two economies must be exactly offset by changes in the respective nominal exchange rates so that the two countries' competitive positions will be unaffected (Eun and Resnick 2015). In this view, the real exchange rate illuminates the home country's competitive position relative to the trading partner. The real exchange rate is denoted by q, and is expressed as:

$$q \quad \frac{1+\pi_{hc}}{(1+\varepsilon_{hc,tp})(1+\pi_{tp})} \qquad (1)$$

where π_{hc} is the home country's inflation rate, hc = home country (Bangladesh in this study); π_{tp} is the inflation rate of its trading partner *tp*, and $(1+\varepsilon_{hc,tp})$ is the ratio of the price of the trading partner's (*tp)* currency in terms of the home country's currency in period t to the price of the trading partner's currency in terms of the home country's currency in period t-1.

Under PPP, the real exchange rate is unitary, q = 1. Other things equal, as the domestic currency price of its trading partner's currency rises, the real exchange rate decreases, improving the home country's competitive position vis-a-vis the trading partner. Likewise, other things equal, if the home country's inflation rate exceeds that of its trading partner, then q rises above unity with a consequent deterioration of the home country's competitive position and all the attendant negative effects on its economy. In this case to prevent a rise in the real exchange rate, the home country's currency price of the trading partner's currency must rise to reflect the inflation differential.

Data and Variables :

This study uses the following monthly time series data on Bangladeshi taka vs Chinese renminbi and Bangladeshi taka vs Indian rupee nominal exchange rates and consumer price indices in China, Bangladesh and India to calculate the real exchange rate q, expressed by equation (1) to study the Bangladeshi competitive positions in her export markets with China and India. The sample period is from January 1997 to December 2015 where the data is available. The data for all Chinese, Bangladeshi, and Indian time series are from the International Monetary Fund.

Methodology :

As usually is the case, monthly data contains a lot of noise. Moreover, there are some degree of rigidity in business operations, i.e., their business plans cannot be changed monthly; therefore, there is time lag in export markets' reactions to changes in monthly real exchange rate. Also, the above calculated q, using monthly data, should be expected to be different from unity. This creates questions as to whether the calculated real exchange rate, q, is statistically different from unity at any conventional levels of significance. To address the excessive noise in the monthly data and the rigidity in business operations, this study will calculate and analyze the 12-month, 24-month, and 36-month moving averages of q, in addition to its monthly values.

To scientifically substantiate the conclusion whether or not the calculated real exchange rate, q, is statistically different from unity at conventional levels of significance, this study calculates the ±2 standard errors of the 12-month, 24-month, and 36-month moving averages of the q to determine if the band of the ±2 standard errors of any of these moving averages contains the unity, i.e., the line q =1. If σ_q and μ_q are respectively the standard deviation and the mean of a calculated time series of moving averages of a given q; then, under the normality assumption, which could be tested using the Doornik and Hansen's (1994) test statistic, probability theory states:

$$\Pr(\mu_q - 2\sigma_q \leq \mu_q \leq \mu_q + 2\sigma_q) \quad 95.4\%$$

As described by equation (1), under PPP, the real exchange rate is expected to be unitary, q = 1. Therefore, if the band of the ±2 standard errors of any of these moving averages series q contains the unity, the probability for that series to be statistically equal to 1 is 95.4 percent and to be different than one is 4.6 percent.

Statistically, the aforementioned equation can be restated as if the band of the ±2 standard errors of any of these moving averages series q contains the unity. The null hypothesis that the series q is different from one should be rejected at 5 percent level of significance.

Empirical Results :

The Bangladeshi inflation rate relative to the inflation rate in China and India over the sample period is graphically illustrated in Figures 1 and 2, respectively. A close look at the Figures suggests that the Bangladeshi inflation rate is relatively higher than that in the People's Republic of China and also relatively higher than that in India until 2009. However, the Bangladeshi inflation became relatively lower than that in India from 2009 until the end of the sample period.

Figure 1

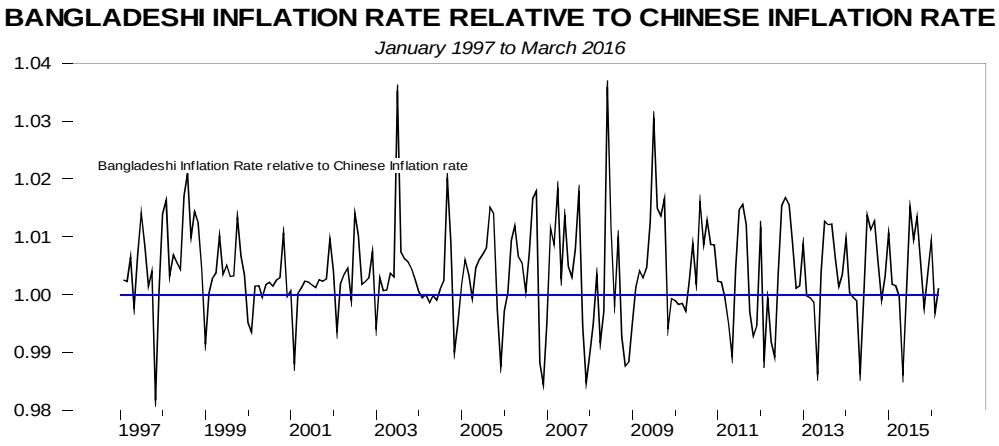
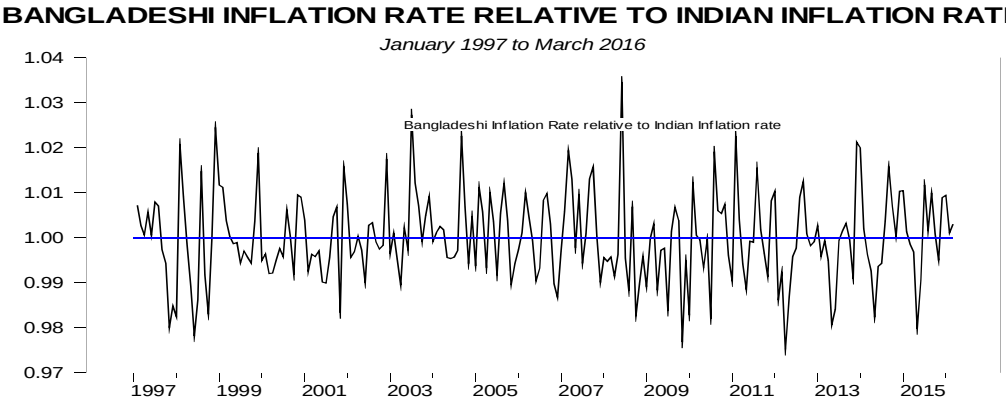


Figure 2



The real exchange rates for Bangladesh-China and Bangladesh-India are calculated and are graphically illustrated by the following Figures 3 and 4, respectively.

Figure 3

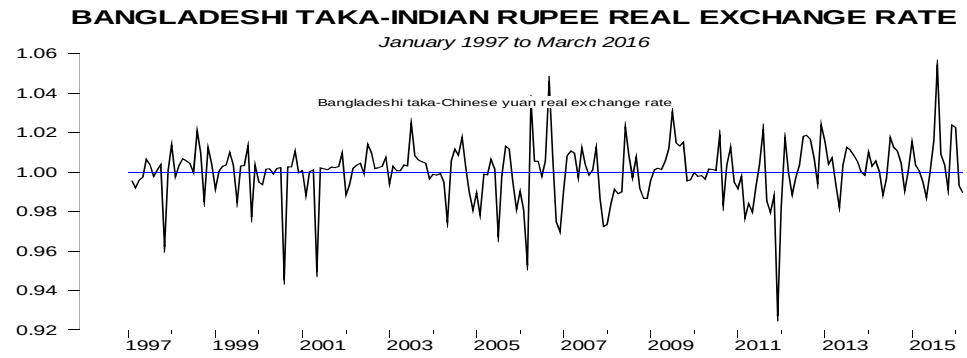
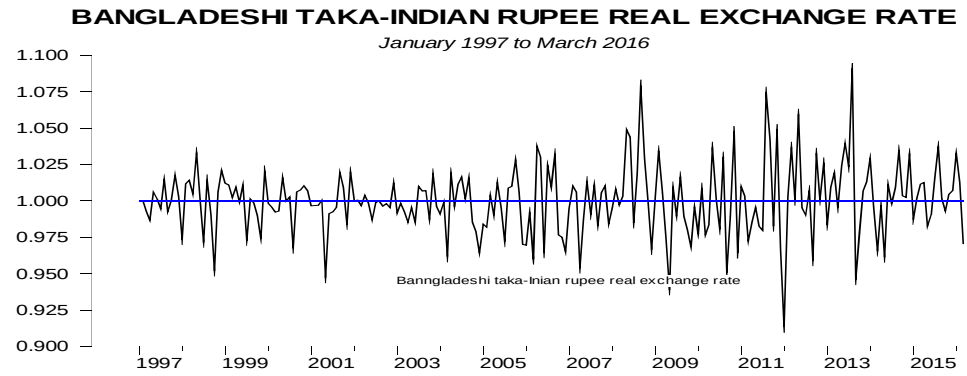


Figure 4



Before testing for normality, this investigation utilizes the Kwiatkowski-Phillips-Schmidt-Shin test to determine the stationarity of the Bangladeshi real exchange rates against its two largest trading partners in Asia. The testing result reveals that with 230 observations and as compared to the one percent (1%) level of significance of 0.7390, the calculated Kwiatkowski-Phillips-Schmidt-Shin test statistics being 0.291056 and 0.176042 for the taka-yuan real and taka-rupee exchange rates, respectively, suggest that the calculated Bangladeshi real exchange rates are stationary.

It is well known that all tests for normality are sensitive to outliers in the series being tested and the usual method to remove the impact of outliers is to dummy them out. This study calculates and analyzes the Bangladeshi real exchange rates for almost two decades during which many extraordinary events—political, economic, and otherwise—occurred both in Bangladesh, in Asia and in the world. These events no doubt affected the performance of the Bangladeshi real exchange rate, resulting in many outliers in the series. In fact, the Doornik and Hansen's (1994) test statistic rejects the null hypothesis of normality for the entire calculated taka-yuan and taka-rupee real exchange rate series.

To correct the impact of the outliers causing rejection of normality assumption, this study uses the recursive Chow test to identify outliers in the Bangladeshi real exchange rate series and dummies them out of the series. The Doornik and Hansen's (1994) test statistic is then used to test for the normality of the resulting series. The recursive Chow test identifies the outliers in the taka-rupee series in September 2008, May 2009, August 2011, January 2012, and August 2013 and September 2013. As to the taka-yuan series, the recursive Chow test identifies the outliers in the taka-rupee series in November 1997, August 2000, May 2001, July 2005, March 2006 and April 2006, December 2011, and August 2015.

The calculated Doornik and Hansen's (1994) test statistics testing the null hypothesis that the Bangladeshi real exchange rate series (after the above outliers are dummied out) is normally distributed with the significant levels in parentheses are 0.69269 (0.7073) and 4.3603 (0.1130) for the taka-rupee and taka-yuan series, respectively. These empirical results suggest that the null hypotheses of these series are normally distributed should not be rejected at any conventional levels of significance. Failure to reject the null hypothesis of normality indicates that these two real exchange rate series are in fact normally distributed.

Given that these real exchange rates are normally distributed and there is some degree of rigidity in business operations, it is informative to determine if the band of the ±2 standard errors of any of these moving averages series of the Bangladeshi real exchange rate q contains the unity. If the band of the ±2 standard errors of a moving average of a given series contains the unity, the hypothesis that the series in question is different from should be rejected at 5 percent level of significance.

Empirical Results :

Figures, 5, 6, and 7 below illustrate the monthly values of q for Bangladeshi taka and Chinese renminbi as well as its 12-month, 24-month and 36-month moving averages and their ±2 standard errors.

An analysis of the results reveals that the bands of the ±2 standard errors all other moving averages of the taka-renminbi real exchange rate contain the unity. This empirical finding suggests that the taka-renminbi real exchange is consistent with the predictions by the PPP theory.

Figure 5

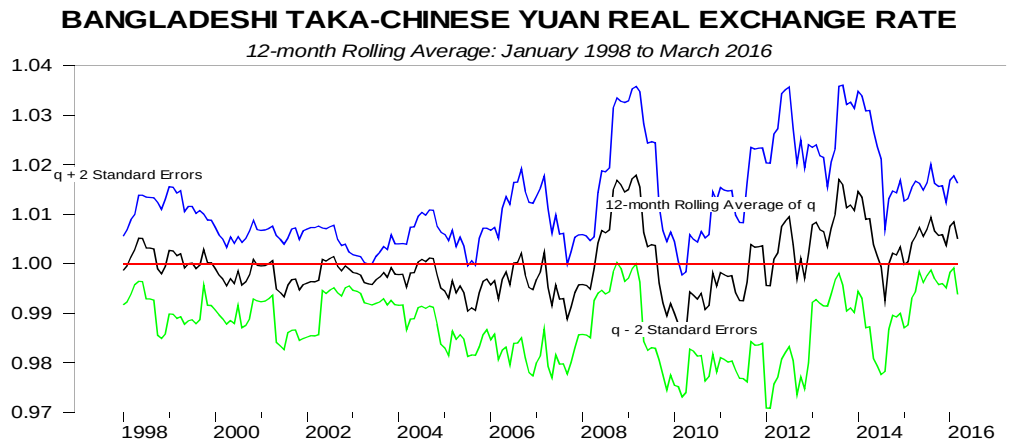


Figure 6

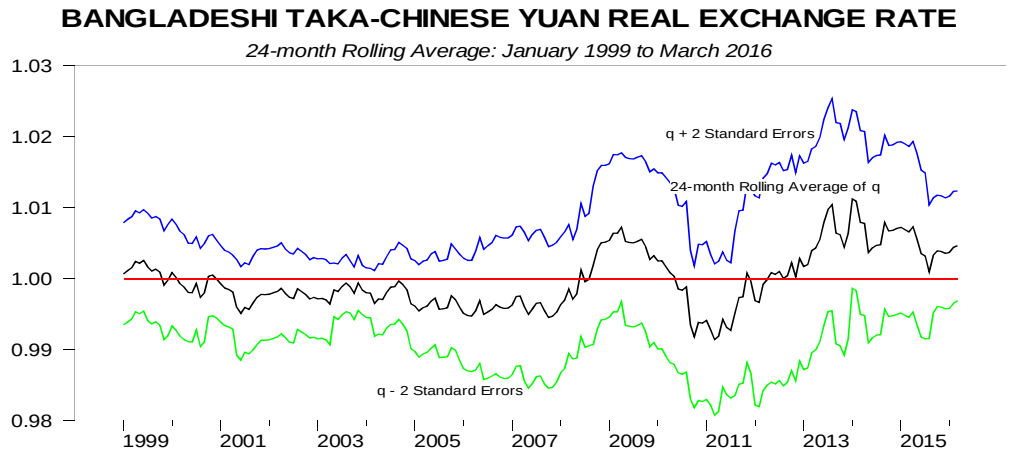
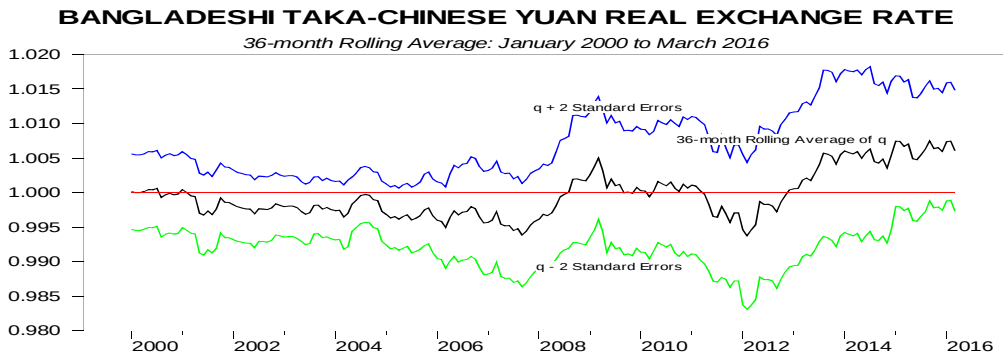


Figure 7



Finally, the following Figures, 8, 9, and 10, illustrate the monthly values of q for Bangladeshi taka and Indian rupee as well as its 12-month, 24-month and 36-month moving averages and their ±2 standard errors

Figure 8

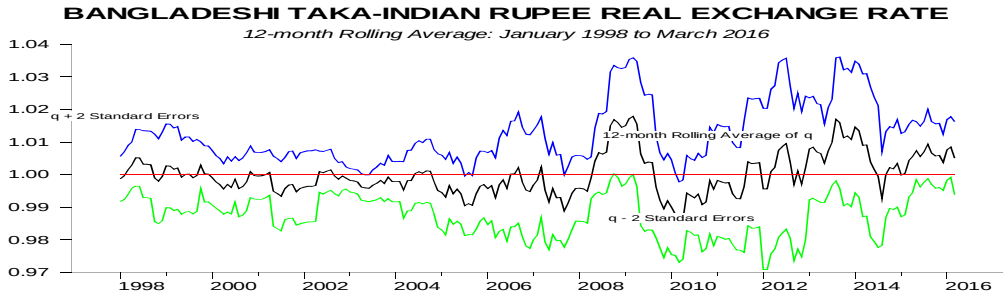


Figure 9

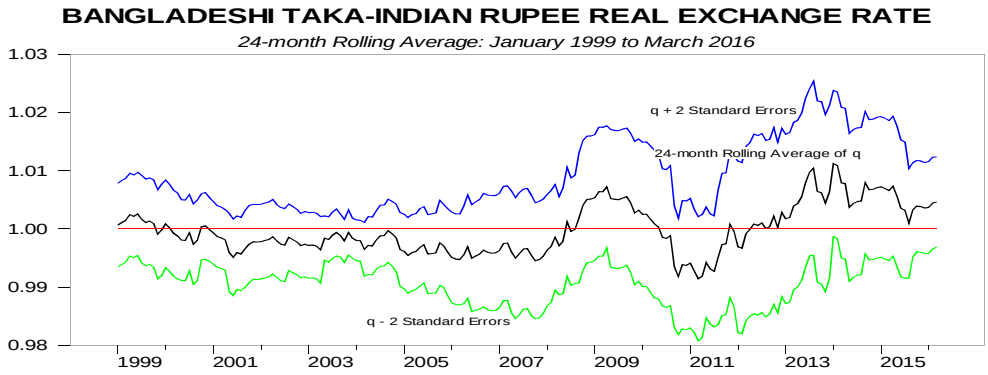
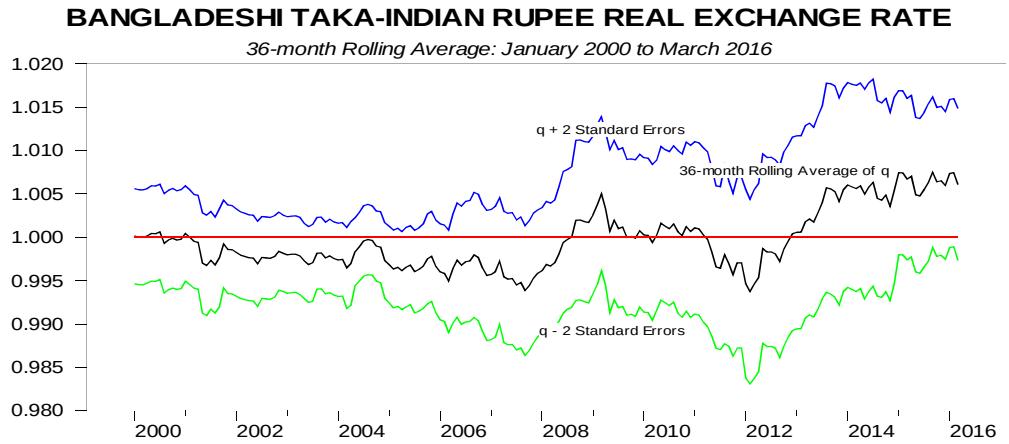


Figure 10



As in the case of taka-renminbi, an analysis of the results reveals that the bands of the ±2 standard errors all other moving averages of the taka-rupee real exchange rate contain the unity. This empirical finding suggests that the taka-rupee real exchange is consistent with the predictions by the PPP theory.

Concluding Remarks :

As stated in the body of this paper above, International finance literature theory holds that changes in a country's exchange rate impacts its gross domestic product and unemployment. Unfortunately, international economic and finance theory does not provide definitive guidance on the causal relationship between exchange rate changes and output growth; the debates are usually informed by empirical analyses that often yield ambiguous results. Moreover, fluctuations in a home country's inflation alter the inflation rate differential between the home country and its trading partners. Under relative purchasing power parity, the differential inflation rates in the two economies must be exactly offset by changes in the respective nominal exchange rates so that the two countries' competitive positions will be unaffected.

This study uses monthly data over the January 1997 – May 2016 period to calculate and graphically illustrate the relative inflation rates between Bangladesh-China and Bangladesh-India as well as the relative taka-renminbi yuan and taka-rupee real exchange rates to assess Bangladeshi's relative competitive positions in its bilateral export markets with these two larger countries. The results reveal that the Bangladeshi inflation rate is relatively higher than that in the People's Republic of China and also relatively higher than the inflation rate in India until 2009. However, the Bangladeshi inflation became relatively lower than that in India from 2009 until the end of the sample period.

Finally, the testing results indicate that only the real taka-renminbi and taka-rupee exchange rate is not statistically different from unity over the entire sample period. These findings suggest that the taka-renminbi and taka-rupee real exchange rates were consistent with the predictions by the PPP theory, whereby reserving Bangladesh's relative competitive positions in export markets with the two largest Asian economies

over a period during which many extraordinary events—political, economic, and otherwise—occurred both in Asia and in the world.

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