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Causes of Indian Rupee Depreciation and its Impact on Bangladesh Economy

By

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Abstract

The intention of this paper is to examine the impact of Indian Rupee depreciation on Bangladesh Economy. The empirical results obtained from OLS for the sample period from 2007:10 to 2013:10 show that Bangladesh's export to India is sensitive to India's Rupee depreciation. It is elastic implying that a 1% increase in India's Rupee will cause Bangladesh's export to India to decline by 2.7 percent. The relative output and the relative price variables are also very sensitive to Indian Rupee depreciation. Bangladesh import from India is insensitive to India and Bangladesh relative exchange rate changes. It is insensitive implying that 1% increase in India's Rupee will not cause any changes on Bangladesh's imports from India. However, Bangladesh's imports are very sensitive to the relative price level changes as evident from the estimated equation. The empirical results obtained from OLS show that Bangladesh consumer price index is insensitive to relative exchange rate changes though appear with the expected positive sign. However, India's consumer price index is highly significant with the expected positive sign implying that a 1% increase in the India's price will cause Bangladesh price level to increase by 0.76 percent.

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Causes of Indian Rupee Depreciation and its Impact on Bangladesh Economy

1. Introduction

Increased globalization plays an important role in transmitting economic shocks between countries. As international interdependence grows, changes in foreign economic policies exert greater influence on domestic economies. Therefore, the intention of this paper is to examine the impact of recent Indian Rupee Depreciation on Bangladesh economy. Because, India's economy is large relative to that of Bangladesh, and Bangladesh shares most of its border with India. India is also one of Bangladesh's major trading partners, the level of integration between the two countries through trade is very strong. Because Bangladesh's capital markets are not fully open, trade plays an important role in the transmission of shocks. Therefore, contagious effect through border and trade can have significant impact on domestic macroeconomic variables, particularly inflation and output.

Recently, the exchange rate between the Indian Rupee and US dollar fell from 55.52 Rs/USD on May 22, 2013 to 66.57 Rs/USD on August 30, 2013 depreciating more than 8 percent during the period which is about 16.5 percent relative to the same period of the preceding year. The value of Indian Rupee's unprecedented fall against US dollars since end May 2013 prompted Reserve Bank of India (RBI) and Indian Government to take series of actions.

Indian authorities have reacted to the sharp depreciation by implementing a host of measures including higher interest rate through a liquidity squeeze on the banking system. RBI intervened in the market to protect the rupee by selling 2.72 billion of US dollar in June, 13 as against the purchase of only USD 469 million.

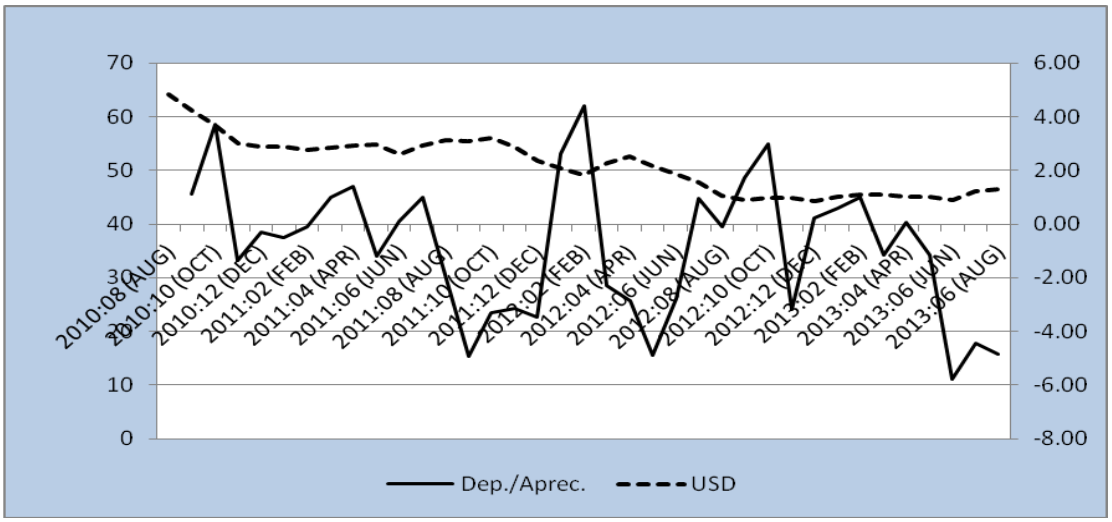
In this backdrop, an attempt has been made to assess the impact of Indian Rupee depreciation if any on Bangladesh economy. The plan of this study is as follows: after introduction in Section 1, causes of Indian Rupee deprecation is analyzed in section II. Section III deals with the related literature followed by an overview of Indian and Bangladesh trade relations in Section IV. Model specification, data and model variables are

discussed in Section V followed by the empirical results in Section VI and finally conclusions and recommendations in Section VII.

II. A Brief Analysis of Causes of Indian Rupee Depreciation

In India, in the backdrop of slackening growth, higher fiscal and current account deficits, higher CPI inflation coupled with the announcement effects of US Federal Reserve Bank to reverse its quantitate easing (QE) bond purchases and its consequent increase in expected real interest rates in the US have translated into a rapid appreciation of the US dollar and depreciation of Rupee. It was also largely due to safe heaven flight of capital resulting from sell-offs in the financial markets. The sell-off had been made worse by new capital control introduced on August 14th in response to incipient signs of capital flight which reversed again in September 2013. Indian government reduced the amount from 400% to 100% that Indian residents and firms can take out of the country.

Chart-1: Trends of India's Rupee dollar Exchange Rate and its Appreciation and Depreciation



Many foreign investors feared that India might freeze their funds too, as Malaysia did during its crisis in 1998 (The economist, 24th August, 2013). Despite the assurance of Indian authorities, the markets (stock and currency) keep sliding like other emerging and developing economies where most currencies have fallen 5-15% against the dollar in the past three months.

The RBI started easing monetary policy in the beginning of 2013, but last month (July, 2013) saw a sudden change as the rupee was seen to be volatile (Table-1). Surprising the market expectations, the recent policy statement of RBI supported the stimulus program of the government which may likely to create downward pressure on Rupee. Unexpected increased in money supply causes exchange rate to depreciate along with capital outflow on fears that foreign capital could flow back to the United States as the US economy improved. According to RBI new Governor Raghuram Rajan, the Indian Rupee has been oversold supports the Rudiger Dornbusch (1976) theory on exchange rate over shooting. The RBI increased money supply to arrest slowdown in the Indian economy during the last two years. Theoretically, we may expect that increased money supply overshoots exchange rate as asset market equilibrium come first than goods market. However, overtime exchange rate appreciates and the economy reached to its new equilibrium with higher output.

In sum, a sharp depreciation in the currency although poses no immediate threat to the Indian government's solvency as the government has almost no foreign currency debts. The pain may be felt in other ways. Private firms that owe most of India's foreign debts will be under deep stress; particularly if the rupee drops further some may go burst. Inflation will rise as the weak Rupee is fueling inflation and making imports more expensive as the country heavily relies on imports of crude oil, chemical and some foodstuffs, which are priced in US dollars. In the short term nothing can do so the market may overshoot intensely and appreciate thereafter. In the meantime India's Rupee to a dollar may likely to find a new equilibrium with higher output and GDP growth.

Table-1: Major Monetary Policy Rates and Reserves Requirements

Effective Date	Bank Rate	Repo	Reverse	Cash Reserve Ratio	Marginal Standing Facility	Statutory Liquidity Ratio
20-09-2013	9.50	7.50	6.50	-	9.50	-
15-07-2013	10.25	-	-	-	10.25	-
3-05-2013	8.25	7.25	6.25	-	8.25	-
19-03-2013	8.50	7.50	6.50	-	8.50	-
9-02-2013	-	-	-	4.00	-	-
29-01-2013	8.75	7.75	6.75	-	8.75	-

Source: RBI

Table-2: Sale/Purchase of U.S. Dollar by the Reserve Bank of India

Month		Net Purchase/ Sale of Foreign Currency ($ mil.)	Purchase (+) ($ mil.)	Sale (-) ($ mil.)
June	2013	-2,252.00	469.00	2,721.00
May	2013	-107.00	3,003.00	3,110.00
April	2013	518.00	3,298.00	2,780.00
March	2013	820.00	3,165.00	2,345.00
February	2013	-280.00	3,021.00	3,301.00
January	2013	-18.00	2,039.00	2,057.00

Source: RBI

Some found it convincing for Indian economy that the economy may actually getting into a situation where the economy will likely to find a new better equilibrium with higher output and employment aided by increased exports and decreased imports providing protections to domestic companies helping to reduce its large current account deficits. On other hand, other policy makers are strongly skeptic about such a positive idea. They favored not to allow Rupee to lose its value too much as it might have serious adverse policy implications

on India's commercial borrowings from the external sources as it results in increased debt repayments.

Many market players feared that lake of faith in the market is taking the economy into a new phase of a crisis as the falling Rupee will increase inflation by raising the cost of imports, through stricter restrictions on money that companies and individuals can send out of the country. The weakened rupee pushed international investors pulling money out of Indian shares and debts markets. The weak Rupee is fueling inflation and making imports more expensive as the country heavily relies on imports of crude oil, chemical and some foodstuffs, which are priced in US dollars.

Recent Trends in Bangladesh Taka:

Bangladesh economy stood well with 6.13 percent real GDP growth in FY13 amid global economic weaknesses. Although in FY12, the country faced the challenges of rising inflation and balance of payments pressures stemming largely from a sudden surge in oil imports however, FY13 end with lower points-to-points CPI inflation and large surpluses in the balance of payments with all time high foreign exchange reserves.

After a sudden drop in the par value of Taka against USD in early 2012, the Bangladeshi currency gradually gained its strength against US dollars since then (Chart-1). Relatively stronger growth in FY13 compared to other neighboring countries, surplus in the current account, higher exports and remittances, lower imports due to slower import demands, comparatively higher interest rates and comfortable foreign exchange reserves helped Taka to gain value against US dollar. Bangladesh Bank's intervention in the foreign exchange market also helped to stabilize the value of Taka. Bangladesh Bank has continued its interventions in FY13 with a net purchase of USD 4.54 billion during FY13 including USD 964 million in Q4FY13. The REER based exchange rate reflecting the external competiveness of Taka increased to Taka 79.07 per USD at end June 2013 from Taka 78.37 per USD at end March 2013 while the weighted average nominal exchange stood at 77.76 per USD at end June 2013 from Taka 78.58 per USD at end March 2013. Appreciation of REER based exchange rate indicates some erosion of export competitiveness of Bangladesh currency in the international market during the period.

Although the current trend in export remains healthy, it may suffer some moderation in future. Due to decay of export competitiveness compared to India and other competitors, Bangladesh's export growth may be negatively affected in future while at the same time importers may be benefited as they have to spend lower amounts of money due to relatively higher par value of Taka. The net results would, however, depend on whether exporter's loss is higher than the importers gain from imports. The imports from India may pick up as a result of Indian Rupee depreciation as well. Both the situations work as a catalyst for higher imports to Bangladesh in the long run. Therefore, the central bank of Bangladesh should be more careful while pursuing balance model to contain inflation in the medium and long term that may actually reduce economic growth in the long run.

III. A Brief Review of the Literature

Many studies examine the impact of foreign monetary shocks on macroeconomic variables in developed and developing countries. Examples include Younus and Wheeler (2009), Amuedo-Dorantes and Wheeler (2001), Cushman and Zha (1997), Mixon, Pratt, and Wallace (1979), Selvor and Round (1996), and Sheehan (1992).

Younus and Wheeler (2009) examine the impact of domestic and foreign monetary shocks on Bangladesh's major economic aggregates. In the context of a semi-global economy, the conduct of monetary policy becomes increasingly more difficult as globalization proceeds. It becomes important to examine the impact of changes in relevant 'foreign' variables (e.g., interest rate, money supply, exchange rate) while formulating domestic monetary policy. The empirical results of the present analysis show that innovations to foreign money supply have significant impacts on Bangladesh's real exchange rate, interest rate, and output.

Amuedo-Dorantes and Wheeler (2001) examined the impact of the European Union (EU) on Spanish economic activity during the period from 1987 to 1997. They employ monthly data to estimate the impulse response functions and variance decompositions derived from a near vector autoregressive (NVAR) model. All techniques support the hypothesis that the European Union's income and prices had a strong influence on Spanish income and price variables.

Hoffmaister, Roldos and Wickman (1997) examine empirically the sources of macroeconomic fluctuations, especially output and prices, in Sub-Saharan African countries. They divide the countries into CFA franc countries (where exchange rates are pegged vis-à-vis with the French franc) and non-CFA franc countries (where exchange rate can adjust frequently).

They examine whether differences in macroeconomic fluctuations between CFA franc and non-franc countries are due to domestic shocks such as supply shocks, fiscal and nominal shocks or external shocks such as world interest rate or terms of trade shocks. They also examine whether structural differences among countries and differences in the exchange rate regimes contribute to the differences in macroeconomic fluctuations to the CFA franc and non-CFA franc countries.

A five variable (output, real exchange rate, and the price level, the world interest rate, and the terms of trade) structural vector autoregressive (SVAR) model is used to derive variance decompositions and impulse response functions. Variance decompositions and impulse response functions show that the sources of output fluctuations in Sub-Saharan African countries are mainly due to the domestic supply shocks. External sectors also have some impact on the domestic output, prices and the real exchange rate more in CFA franc countries than non-CFA franc countries.

In the CFA-franc countries, sixty percent of price fluctuations are due to demand shocks, while twenty percent of price fluctuations are due to domestic supply and external shocks. In the non-CFA-franc countries, eighty-five percent of fluctuations of prices are due to demand shocks. Due to favorable terms of trade shock, the price level declines temporarily and then quickly revert to its original level (Hoffmaister, Roldos and Wickman, 1997, p.20). An examination of differences in economic structure across the countries does not appear to have significant impact on the differences in macroeconomic fluctuations. However, differences in exchange rate regimes turn out to have significant impact on the macroeconomic fluctuations.

Cushman and Zha (1997) examine monetary policy shocks in Canada by using a structural vector autoregression (SVAR) model with monthly data form 1974 to 1993. The

variables they used are: the U.S. dollar price of Canadian currency, a Canadian monetary aggregate (M1), the Canadian three-month treasury bill rate, the Canadian consumer price index, Canadian industrial production, Canadian total exports to the U.S., and Canadian total imports from the U.S., U.S. industrial production, the U.S. consumer price index, the U.S. Federal Funds rate, and the world total exports commodity price index in U.S. dollars. All variables are in logarithmic form except for the interest rates.

The results from contemporaneous coefficients show that all the variables in the money demand and money supply equations are significant with the expected sign except for the foreign interest rates. The estimated results of the information market variables are significant except for domestic (Canada) and U.S. industrial production, the foreign interest rate and world commodity price index of exports.

Selvor and Round (1996) examine to what extent Japanese business cycles are transmitted to Australia over the period from 1961.1 to 1994.4. Japan is the major trading partner of Australia. Japan contributes twenty five percent (25%) of Australian exports to Japan and receives twenty percent (20%) of imports from Japan. Impulse response functions estimated from the VAR show that an innovation to Japan's GNP has a significant positive impact on Australian GDP. U.S. GDP also has a significant positive impact on the Australian GDP, which is twice as large as the impact of Japanese GNP. However, Australian GDP does not have any significant impact on the Japanese GNP.

Sheehan (1992) conducted a study to examine the impact of monetary policy of the G-7 countries, Switzerland, and the U.S. on the monetary policy of the G-7 countries and Switzerland. He found that the G-7 countries are unsuccessful in influencing money growth of other G-7 economies. U.S. money growth, domestic inflation and domestic real output have significant impacts on France, Germany, Italy, Japan, United Kingdom and Switzerland's money growth.

Mixon, Pratt and Wallace (1979) separate the exchange rate regimes as fixed, transition, and flexible exchange rate, The fixed rate period is 1962.I to 1970.IV, the transition regime is from 1971.I to 1974.III, and flexible exchange rate regime is from 1974.IV to 1977.III. They regressed the U.K. nominal GDP on U.S. money supply, a trend

variable, and a set of dummy variables for different exchange rate regimes and seasonal dummy variables. An F-test fails to reject the hypothesis that U.S. money supply has no effect on U.K. income during a fixed exchange rate period. The U.S. money supply has a positive effect on U.K. income in both the transition and flexible exchange rate periods. The differences in the results as noted by Mixon (1992) are due to differences in the exchange rate regimes.

IV. An Overview of India and Bangladesh Trade relationship

India is Bangladesh's second largest source of imports (comprising around 14 percent of total imports, much of it being cotton and fabrics used in manufacture of apparels for exports), although a minor export destination (less than 4 percent of total exports). The impact of Indian Rupee depreciation on Bangladesh's external trade competitiveness is therefore a significant policy concern.

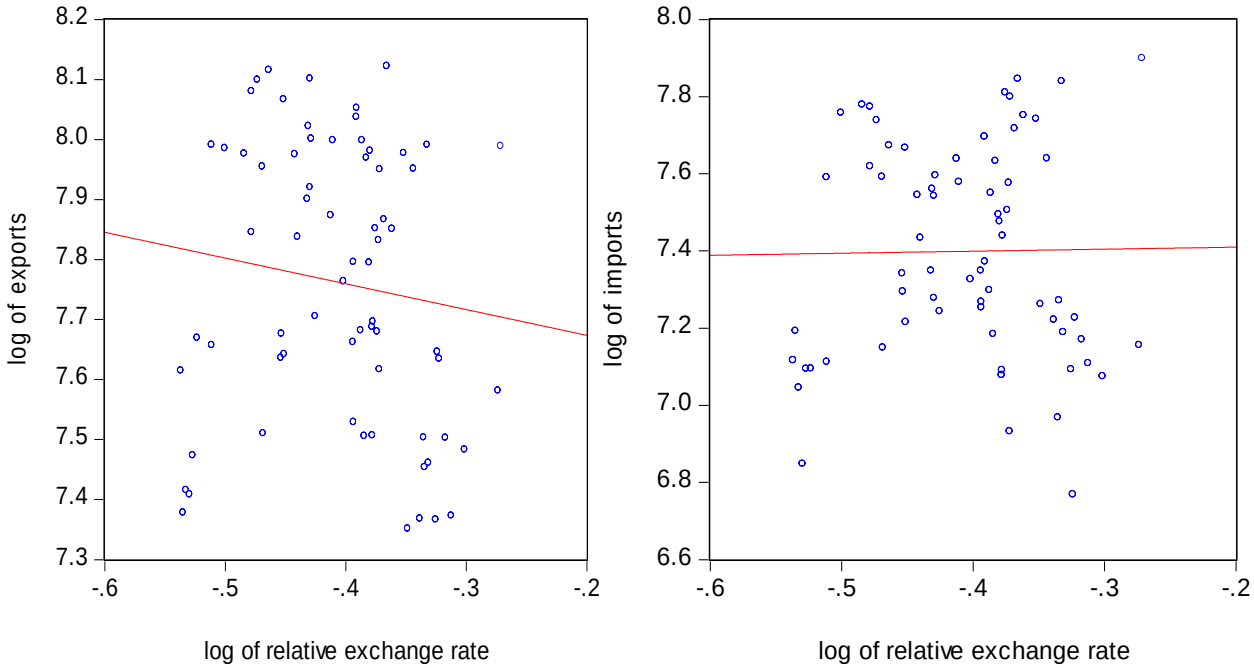
It is too early however to expect to see the above surmised impacts of the rather brief spell of Indian Rupee depreciation clearly showing up in Bangladesh's recent global and bilateral external trade trends (charts-2, 3, 4) given the 'J-curve' effect of trade volumes adjusting slowly rather than simultaneously to exchange rate changes; impacts of modest magnitude may not even show up, remaining overshadowed by other influences. BB Research Department will track trade data over the coming quarters to identify and analyze the impact of Rupee depreciation in further detail.

Top 5 counties of Export Shipments, 2012-13			**Top 5 counties of Import Payments, 2012-13**		
Name of the country	*Value in million USD*	%	Name of the country	*Value in million USD*	%
USA	5419.6	20.05%	China	6324.0	18.55%
Germany	3962.6	14.66%	India	4776.8	14.01%
UK	2764.9	10.23%	Malaysia	1903.1	5.58%
France	1513.9	5.60%	Singapore	1422.0	4.17%
Spain	1301.4	4.82%	South Korea	1295.9	3.80%
Others	12065.0		Others	18361.8	
Total	27027.36		Total	34083.6	

Impact on Trade Balance

India is the second largest trading partner of Bangladesh. In FY'13, Bangladesh exported goods amounting of about USD 564 million to India while imported of about USD 4,777 million. Due to Rupee depreciation Bangladesh trade balance with India may deteriorate as increased export competitiveness of India relative to Bangladesh is likely to have an adverse impact on Bangladesh's exports to India.

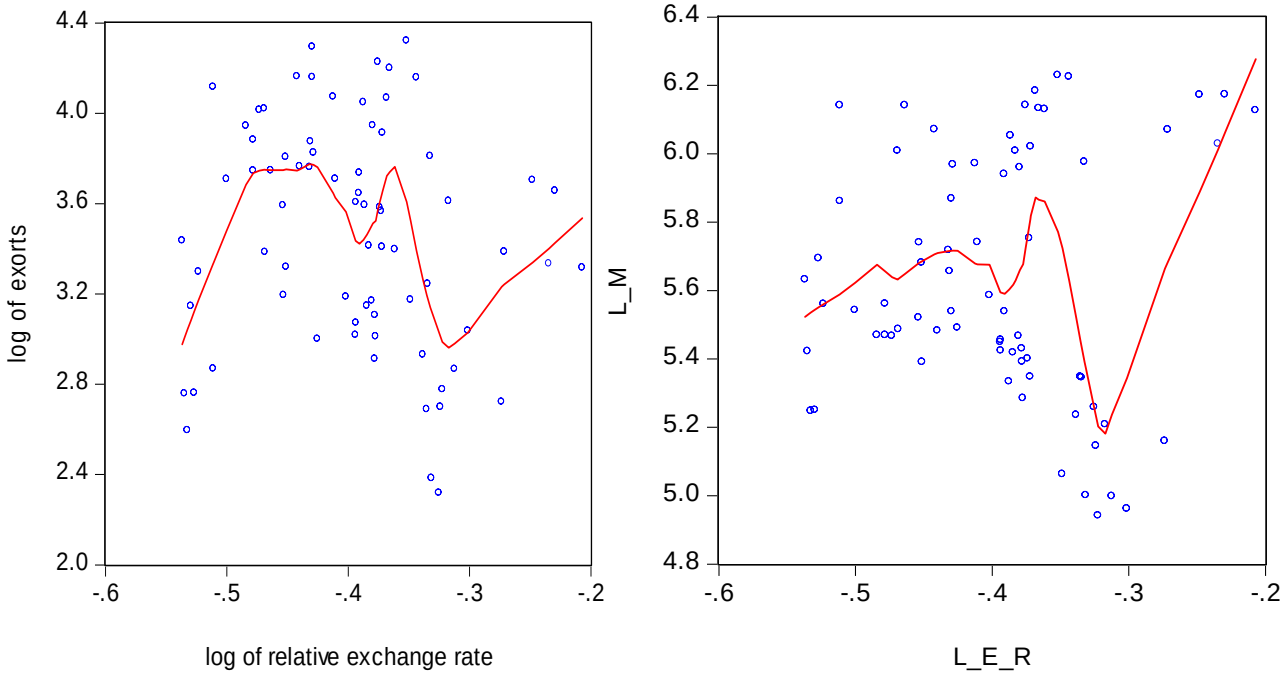
Chart 2: log of relative exchange rate vs. Bangladesh export (left) to and import (right) from India



On the other hand, lower import cost would increase imports from India. A commodity wise analysis shows that, top five exportable items of Bangladesh to India are fruits, precious metals, iron and steel, jute goods and raw jute and vegetable oils. However, it is worth noting that none of these commodities are the major commodities for Bangladesh to export. On the other hand, with respect to Bangladesh import payments, India placed second after China for the commodity imports e.g., cotton, cereals, vehicles, and nuclear reactors. Bangladesh imports raw cotton from India which is used as inputs for the RMG sector.

Chart 3: log of relative exchange rate vs. Bangladesh export (left) to and import (right) from India

With nearest neighbor fit



A linear regression line of the above scatter diagrams show that Bangladesh exports to India (left) have negative relationship with the relative exchange rate changes while the relationship is positive with imports. This is may be because a fall in Rupee would make imports costlier for India thereby Bangladesh exports of the major commodities to India are expected to decrease to some extent. In fact during July-September, 2013, raw jute exports are reduced by 55.87% in volume and 52.96% in value which is one of the major export goods to India. Jute goods also faced hit from Rupee depreciation. An empirical analysis on Bangladesh's export to India from the sample period October 2007 to October 2013 revealed that Bangladesh exports to India is very sensitive to relative exchange rate changes which show that if the relative exchange rate increase by 1% that will cause Bangladesh's export to India to decline by 2.87 percent.

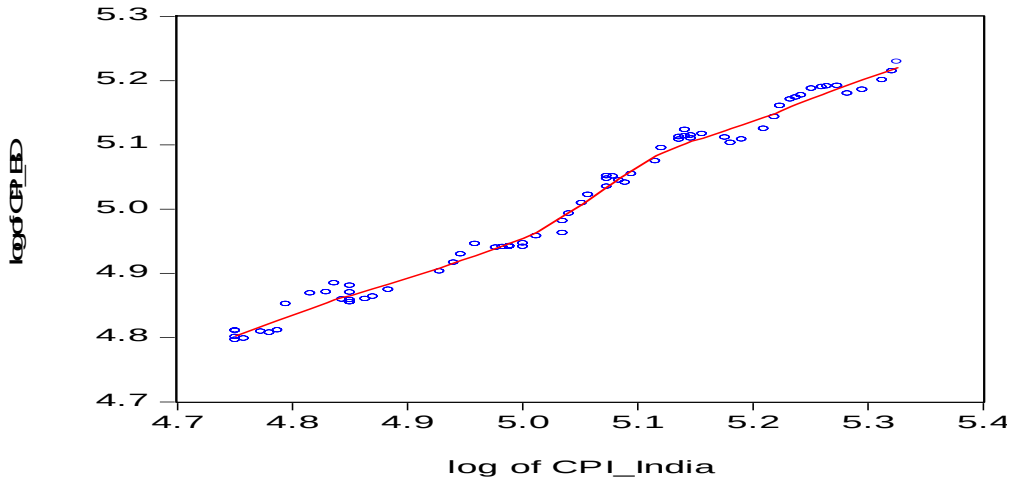
The actual data during July-September, 2013 show that Bangladesh export shipments to India fall by 29.42 (y-o-y) percent (Table-1) while during the same quarter Bangladesh total export shipment to world increased by 21.24 percent implying that it is may be due to country specific

factors such as India's Rupee depreciation that have negative impact on Bangladesh exports to India.

Impact on inflation

The point to point WPI Inflation of India increased from 4.70% in May, 13 to 7.00% in October, 13. Bangladesh is a net importer in the trade relationship between India and Bangladesh. Therefore, inflation may decline in the short run due to lower import cost of consumer goods as a result of appreciation of Taka and depreciation of Rupee. However, in the medium term inflation may increase in Bangladesh due to higher inflation in India which will transmit to the Bangladesh economy through increased imports unless there is a policy action from RBI to curb inflationary pressure in India.

Chart-4: log of India's CPI inflation and Bangladesh Inflation



From the above linear regression line of scatter diagram estimated for the same sample period shows that Bangladesh consumer price index would increase due to changes of Bangladesh and India's relative exchange rate. An estimated coefficient between India's consumer price levels with Bangladesh consumer price level shows that a 1% increase in the India's price level will cause Bangladesh price level to increase by 0.76 percent through import channel as the coefficient of import is on the other hand appeared significant and positive in the price equation as well.

Table-3: Average monthly export of Bangladesh and India, January-September, 2013

HS Code		Bangladesh		India		As % of Total Export Bangladesh	India
62	**Woven Garments**	**Average Monthly Export (USD MM)**	**As % of Category Export**	**Average Monthly Export (USD MM)**	**As % of Category Export**	**39.9%**	**2.6 %**
	USA	309.04	32.5%	154.11	23.4%		
	Germany	134.90	14.2%	41.63	6.3%		
	UK	91.42	9.6%	66.97	10.2%		
	Spain	45.73	4.8%	28.65	4.4%		
	Canada	42.52	4.5%	10.36	1.6%		
61	**Knitwear**					**41.1%**	**2.1 %**
	Germany	215.53	22.0%	46.60	8.9%		
	UK	109.77	11.2%	64.85	12.3%		
	USA	105.62	10.8%	119.63	22.8%		
	France	77.25	7.9%	28.41	5.4%		
	Spain	69.04	7.0%	15.20	2.9%		
63	**Other Made Textile Articles**					**3.0%**	**1.4 %**
	USA	11.28	16.0%	169.85	48.0%		
	Germany	6.27	8.9%	21.97	6.2%		
	India	6.01	8.5%	-	-		
	UK	5.83	8.3%	21.78	6.2%		
	Canada	4.31	6.1%	8.82	2.5%		
53	**Raw Jute & Jute Goods**					**2.3%**	**0.1 %**
	Turkey	14.92	26.9%	0.29	1.2%		
	China	7.74	14.0%	5.10	21.5%		
	Iran	6.40	11.5%	0.15	0.6%		
	India	4.54	8.2%	-	-		
	Pakistan	3.52	6.3%	0.02	0.1%		
03	**Frozen Foods**					**2.7%**	**1.4 %**
	Belgium	10.28	16.0%	9.86	2.8%		
	Netherlands	9.99	15.5%	3.55	1.0%		
	Germany	8.18	12.7%	2.08	0.6%		
	USA	7.30	11.4%	104.28	29.5%		
	UK	7.29	11.3%	9.95	2.8%		

Source: BRAC EPL, Stock brokerage Ltd.

Export competitiveness of India and Bangladesh

Although export competitiveness of India following Rupee depreciation will increase as compared to Bangladesh it may not have substantial impact on Bangladesh total exports if economic and political stability prevails in the country. According to World Trade Organization (WTO) database, Bangladesh ranked 3rd on textile and apparel exports after China and Italy. Bangladesh total amounts of exports receipts from the world on clothing was USD 19.95 bn in 2012. On the other hand, India ranked 7th on textile and apparel exports. Total export amount was USD 13.83 bn in 2012. Table-1 shows major export commodities of Bangladesh and % share of Bangladesh and India's exports in these commodities.

Table-4: Exports of Clothing in the World Market (USD at current prices)

Rank	Country	USD in MM	% share of world export
1	China	159,613.7	37.76
2	Italy	22,147.5	5.24
3	Bangladesh	19,948.3	4.72
4	Germany	17,574.7	4.16
5	Turkey	14,289.6	3.38
6	Viet Nam	14,068.3	3.33
7	India	13,832.7	3.27
8	Others	161,210.6	38.14
	World	422,685.6	100.00

Source: World Trade Organization (WTO)

1.4 Impact on Import

With respect to import payments of Bangladesh, India placed second after China for the commodities e.g., cotton, cereals, vehicles, nuclear reactors etc. Bangladesh imports raw cotton from India which is used as intermediate goods for the garments industries.

Top 5 commodities of Export Shipments, 2012-13 **Top 5 commodities of Import Payments, 2012-13**

Items	*Value in million USD*	%	Items	*Value in million USD*	%
Woven garments	11039.9	40.85%	Capital Goods	5758.8	16.90%
Knitwear	10475.9	38.76%	POL (refined)	3642.0	10.69%
Jute goods	800.7	2.96%	Textile and articles thereof	3273.0	9.60%
Home textile	791.5	2.93%	Iron, steel and other base metals	2334.7	6.85%
Shrimps	454.9	1.68%	Raw cotton	2005.1	5.88%
Others	3464.5		Others	17070.0	
Total	27027.36		Total	34083.6	

Impact on other BOP flows

As far as other flows from India are concerned such as remittances, private capital outflows, bilateral grant, loans, stock of debt it is revealed that in FY13 the amount is not very significant to have impact on BOP. Remittances from India are on average $3^{1/2}$ percent of total remittances and bilateral loans and grants in FY13 was USD172 million while stock of debt was USD83 million. Vulnerability from private capital outflows will not be significant as Bangladesh has relatively closed capital account.

IV. Model Specification, Data and Model Variables

In order to examine empirically three models for exports, imports and price level have been specified for the sample period from 2007:10 to 2013:10. Ordinary Least Suare (OLS) method are used to estimate the model.Model variables specified for three equations are as follows:

Model-1: Dependent Variable: log of BD export to India

Log_y=log of industrial production index.
Log_e=log of relative exchange rate.
Log_p=log of relative price level.

Model-2: Dependent Variable: log of BD import from India

Log_y=log of industrial production index
Log_e=log of relative exchange rate
Log_p=log of relative price level.

Model-3: Dependent variable: log of price level_BD

Log_y=log of industrial production index of India and Bangladesh
Log_e=log of relative exchange rate between India and Bangladesh
Log_p=log of relative price level between India and Bangladesh(CPI)
Log_m=log of imports of Bangladesh from India
Log_p_India=log of India's price level

Empirical Results

Impact on Exports

The empirical results obtained from OLS show that Bangladesh's export to India is sensitive to India's Rupee depreciation. It is elastic implying that a 1% increase in India's Rupee will cause Bangladesh's export to India to decline by 2.7 percent. The relative output and the relative price variables are also very sensitive to Indian Rupee depreciation. The statistically significant and positive coefficient of the price level of India compared to Bangladesh implies that a 1% increase in the relative price level would cause Bangladesh export to India to increase by 5.69 percent. On the other hand, industrial production index as proxies by output show that a 1% increase in the India's output compared to Bangladesh would cause Bangladesh export to India decrease by 1.91%.

Model-1: Dependent Variable: log of BD export to India			
Variable		Co- efficient	T-value
Log_e		-2.77	0.02**
Log_y		-1.91	0.00***
Log_p		5.69	0.00***
c		2.0	0.01***
AdjR2	0.51		
DW	2.05		

Note:*** implies significant at the 1% level. ** implies significant at the 5% level

2.2.2 Impact on Imports

The empirical results obtained from OLS show that Bangladesh import from India is insensitive to India's Rupee depreciation.

Model-2: Dependent Variable: log of BD import from India		
Variable	Co efficient	P-Value.
Log_e	0.14	0.81
Log_y	-0.24	0.28
Log_p	-4.03	0.03***
c	6.15	0.00***
AdjR2	0.80	
DW	2.38	

Note:*** implies significant at the 1% level

2.2.3: Impact on the Price level

Model-3: Dependent variable: log of price level_BD		
Variable	Co efficient	T-value
Log_p_India	0.73	0.00***
Log_e	0.03	0.37
Log_M	0.01	0.00***
Log_y	-0.01	0.75
c	1.16	0.00***
AdjR2	0.99	
DW	1.65	

Note:*** implies significant at the 1% level
Log_y=log of industrial production index of India and Bangladesh

Empirical results obtained from OLS show that Bangladesh consumer price index is insensitive to relative exchange rate changes though appear with the expected positive sign. However, India's consumer price index is highly significant with the expected positive sign implying that a 1% increase in the India's price will cause Bangladesh price level to increase by 0.76 percent.

3. Conclusion:

Empirical analysis (quantitative estimation using actual data) shows the existence of elastic demand of BD's export to India with respect to changes of relative exchange rate (depreciation) with a positive coefficient of 2.7. On the other hand, estimate of BD's import demand (from India) with respect to changes of relative exchange rate (depreciation) shows a statistically insignificant coefficient (0.13) though with the positive sign. However, actual data shows that during the period of sharp depreciation of Indian rupee relative to BDT (May-September 2013) imports payments of BD from India posted a very marginal increase of only 11 million USD (on quarter to quarter basis). Thus, econometric estimation seems to support the trend of actual data. There are sensible arguments to think that this quantitative result may be valid for very short term or near term.

In the medium term however sudden upsurge of huge global demand of different Indian products including cotton, RMG, textiles, edible oil, and fish feed (due to depreciation of Indian Rupee) may contribute to higher local prices of these products in India due to sudden demand pressure; and also Indian's limitation in enhancing its export supply in immediate term to respond this higher global demand will contribute to higher local prices. In this situation like other countries BD's import from India would expect to fall in the medium term followed by a gradual increase in import from India in the long term. In fact, supply rigidity due to the nature of export items which is largely depend on agricultural raw materials such as cotton, oil seeds, fruits and other imported raw materials Indian producers may adjust quantity of export supply slowly with somewhat higher local prices. In this way higher price level in India may transmit to the domestic price level of Bangladesh through import channel. However, the net results would depend on the relative exchange rate changes and the price level changes.

In conclusion, as BD's export to India is likely to be slowdown and import would increase somewhat in the immediate term the impact on BD's trade balance with India may deteriorate. As exchange rate of Indian Rupee has stabilized since end of September, 13 of around 61-62 against US dollar and therefore negative spillover risk for Bangladesh from Indian Rupee exchange rate volatility have subsided.

Reference:

1. Amuedo-Dorantes, Catalina; Wheeler, Mark, "An Empirical Analysis of the European Union's Impact on Spanish Economic Performance**,"** ***Applied Economics***, (June 2001), pp. 1001-1008.
2. Enders, W., **Applied Econometric Time Series**, John Wiley & Sons, New York, NY, (1995).
3. Mixon, J. Wilson; Pratt J. Leila; Wallace, S. Myles, "Cross-National Money to Income Causality: U.S. Money to U.K. Income," ***Journal of Money, Credit and Banking,*** **(**November 1979), pp. 419-426.
4. Mundell, R., "Capital Mobility and Stabilization Policy under Fixed and Flexible Exchange Rates", ***The Canadian Journal of Economics and Political Science****,"* (November 1963), pp. 475-485.
5. Sheehan, Richard G. "U.S. Influence on Foreign Monetary Policy," ***Journal of Money, Credit and Banking***, (November 1992), pp. 447-464.
6. Sims, C.A., "Interpreting the Macroeconomic Time Series Facts: The Effects of Monetary Policy," ***European Economic Review*****,** (June 1992), pp. 975-1000.
7. Sims, C.A., Stock, J.M,, Watson, M., "Inference in Linear Time Series Models," ***Econometrica,*** (January 1990), pp. 113-144.
8. Walsh, Carl. E, **"*Monetary Theory and Policy*,"** *MIT Press*, Cambridge, Massachusetts, (1998).
9. Younus, Sayera and Wheeler, Mark (2009), "The Impact of Monetary Policy Changes in a Global Economy: Evidence from Bangladesh," **The Global Journal of Finance and Economics*,*** Vol. 6, No. 2, (2009):113-126.