Print ISSN: 2288-4637 / Online ISSN 2288-4645
doi: 10.13106/jafeb.2016.vol3.no2.33.

Modeling Effect of Exchange Rate Volatility on Growth of Trade Volume in Pakistan

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[Received: December 8, 2015. Revised: March 17, 2016. Accepted: April 10, 2016.]

Abstract

This study empirically evaluates the impact of exchange rate volatility, foreign direct investment, terms of trade, inflation, and industrial production and foreign exchange reserves on Pakistani trade volume over the period of 1975-2010 using quarterly data set. The study employs financial econometrics methods such as Augmented Dickey Fuller (ADF) test GARCH (1, 1) technique and Almon Polynomial Distributed Lag (APDL) models to estimate the relationship of variables. Findings of the study are in accordance with theoretical relationships presented by Clark, Tamirisa, Wei, Sadikov, & Zeng (2004), McKenzie (1999), Dellas & Zilberfarb (1993) and Côté (1994). These findings are also in accordance with the empirical studies which support positive relationship of exchange rate volatility and exports presented by Hsu & Chiang (2011), Chit (2008), Feenstra & Kendall (1991), Esquivel & Larraín (2002) and Onafowora & Owoye (2008). Findings of the study in terms of imports are supported by the studies such as Lee (1999), Alam & Ahmad (2011) and Arize (1998). The study also recommends some very important policy prescriptions.

Keywords: Exchange Rate, Uncertainty, Foreign Trade, APDL, Pakistan.

JEL Classification Codes: C11, C32, F31, F40, F41.

1. Introduction

Exchange rate is one of the very important macroeconomic variables. Volatility of exchange rate plays a pivotal role in changing the volume of trade and subsequently affecting the trade balance in very diverse nature. Unstable exchange rate makes the process of trade balance slow down and undermines the movements of capital. It shakes investor's confidence as to invest in a country where the nature of exchange rate is highly volatile which intuitively slows down the process of growth. Instability of exchange rate do affect long term decisions by upsetting the volume of trade, allocation of investment and policy framework of the government regarding sales and procurement. It equally affects balance of payments and other economic activities in the medium term. Domestic consumers and traders are also affected in the short run. Changing exchange rate provides a chance to investors to get higher returns by investing in foreign currency and streng then foreign currency instead of home currency and further exacerbate trade balance.

According to Farooq (2009) exchange rate is a conversion factor that determines rate of change of currencies. The effects of exchange rate instability on the international trade volume have been extensively studied since the late 1970's when most of the countries adopted the fixed exchange rate regime. Theoretically high rate of exchange rate instability will reduce trade by creating uncertainty about future profit from trade. In the short run by using the forward markets, firm can reduce the uncertainties by managing the timings of payments and receipts. Exchange rate instability also affects trade by influencing long term investment decisions of firms.

Exchange rate volatility does have an influence on the decisions of policy makers regarding the volume of exports and imports, manufacturing of goods, reserve money, and balance of payments. In order to get higher profits and returns, exchange rate volatility offer chances to investors to invest in foreign currency. System where the difference between actual and expected value of exchange rate is minimized always support traders and investors. Sengupta & Sfeir (1998) find out two reasons for exchange rate volatility to have an impact on the international trade. The impact of declining exchange rate is likely to raise volume of exports and improves balance of payments and provide a large incentive for domestic economic growth. Moreover, the investors are likely to increase global diversity in the asset market.

Since 1982, Pakistan followed the floating exchange rate system and exchange rate fluctuations were very nominal at the

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initial stage. However, exports changed generally in line with total world imports. In 1980 the share of Pakistan in the world imports was 0.12 percent whereas in 1992, the share was 0.18percent which further changed to 0.17 percent in 2002-2003 and increased to 0.22 percent during 2008-09. The share of Pakistan's export in total world exports was 0.21 percent in 1999 which declined in the subsequent period to 0.11 percent and 0.13 respectively. This volatility of exports may be attributed to the volatile exchange rate, in addition to the other factors.

The generalized floating system was launched in the early 1973. High degree of instability and volatility of exchange rate have motivated researchers and policy makers to study the degree and nature of impact of volatility and uncertainty of exchange rate on the volume of trade. Mixed results have been yielded by the studies which deal with the effects of volatility of exchange rate on flows of trade. Volatility of exchange rate will affect the risk-averse participants by imposing costs and favor foreign markets in spite of domestic markets, as argued by a number of studies. The mixed results have motivated to conduct the present study. Some studies find negative effect of instability on trade volume while some other studies show positive effect of volatility of exchange rate on growth of trade volume. Purpose of the present study is to analyze exchange rate instability by using different estimation techniques in order to explore consequences of instability on the growth of Pakistani trade volume and examine its relationship with monetary, trade and fiscal policies. Findings of the study would be helpful in economic planning, decisions of exchange rate management and maintaining good trade relations with the other countries.

The present study examines whether or not the exchange rate volatility affects the imports and exports of Pakistan. The study also explores and empirically tests the impact of FDI, CPI, manufacturing production index, terms of trade and real interest rate on imports and exports of Pakistan. Another objective of the study is to suggest policy recommendations in connection with the relationship of trade related variables.

Remaining part of the study is organized as follows. Sections 2 and 3 present literature review and methodology. Results and discussions are presented in the section 4. Section 5 concludes the present study with certain policy recommendations.

2. Literature Review

Pakistani exports to its trading partners have been affected by volatility of exchange rate from 1974 to 1985 (Kumar & Dhawan, 1991). Instability of exchange rate has been observed adversely affecting demand for exports. The effect of volatility of exchange rate on the demand for Pakistani exports has been investigated by Alam (2010). Findings of these studies conclude that real exports are co-integrated with real effective exchange rate instability. Alam & Ahmad (2011) investigate the effect of exchange rate volatility and some important explanatory variables on Pakistan's bilateral trade with its major trading partners such as USA, UK, Japan, Saudi Arabia, UAE, Germany and Kuwait by using quarterly data from 1982Q1 to 2008Q2. Results reveal negative and statistically significant effect of exchange rate volatility on Pakistan's trade balance with all the trading partners in general but substantially with UK. These adverse effects persist in the long run.

The relationship of volatility of exchange rate and international trade is also an empirical issue (Arize, Osang, & Slottje, 2000). Findings of the study reveal an adverse effect of volatility of exchange rate on the demand for exports form Less Developed Countries (LDCs'). Similar findings are reported by Chowdhury (1993). However, the effect remains equivocal in case of bilateral trade volume. US bilaterally imports from the UK, Germany, France, Japan, and Canada and imports are adversely affected by volatility of exchange rate as investigated by Koray & Lastrapes (1989). The flow of exports and imports is affected by instability of exchange rate of Japan with its seven trading partners (Daly, 1998). Exchange rate instability can affect volume of trade positively and negatively as per findings of the study. The effect is found to be insignificant by Klaassen (2004) who employed data of bilateral aggregate exports of US with the other G-7 countries.

The impact of exchange rate uncertainty on the disaggregated imports of UK by focusing on 15 main manufacturing categories has been investigated by Pattichis*, Cheong, Mehari, & Williams (2004). Findings of the study reveal the effect of Euro on exchange rate risk which if recognized, would have a positive impact on the UK's trade and its macroeconomic policy. Bredin, Fountas, & Murphy (2003) have analyzed short-run and long-run association between merchandise volume of exports and their determinants such as relative prices, foreign income and exchange rate instability by applying the econometric methods of cointegration and error correction. The results of the study reveal insignificant effect of exchange rate instability on the trade volume in the short rum but in the long run significant positive effect is observed. Lee (1999) has examined the effect of exchange rate volatility on US imports of manufacturing sector in terms of durable and nondurable goods. The study finds neither price nor volume is significantly affected by the volatility of the exchange rate.

Ahmed (2009) investigated the impact of exchange rate instability on growth of trade volume of Bangladesh. Findings of the study reveal depressing effects on the trade volume of the country with Western European and North American countries in the short run and the long run. Wang and Barrett (2007) examines the effect of exchange rate instability on the flows of international trade by focusing on the exports of Taiwan to the United States for the period of 1989 to 1999. Findings of the study are particularly specific to the relationship of instability of monthly exchange rate and the flows of agricultural products. Doğanlar (2002) has examined the impact of exchange rate instability on the exports of Asian economies. The study finds a long-run equilibrium association between real exports, foreign activity, relative prices and exchange rate instability. Arize et al. (2000) have empirically investigated the impact of real exchange rate instability on the flows of exports for 13 less developed countries (LDC's) over the quarterly period from 1973 to 1996.

According to the study, instability of the real effective exchange rate negatively affects the demand for exports both the short-run and the long-run in each of the 13 LDC's. Rashid & Husain (2010) have investigated the effects of inflows of capital on domestic price level, monetary growth and exchange rate instability. The study finds an inflationary impact of capital inflows for the period of the study. Aurangzeb, Stengos, & Mohammad (2005) have analyzed the impact of exchange rate instability on Pakistan's exports to its major trading partners under the floating exchange rate regime for the period1985 to 2001.The study reveals an increase in exchange rate volatility approximated by the conditional variance of exchange rate, exerts a significant negative effect upon the volume of exports in the short-run.

The literature speaks of mix findings in terms of effectiveness of volatility of exchange rate on the macroeconomic activities of an open economy. Most of these studies relied upon linear relationship of variables. Volatility of exchange rate may not be linearly related with other macroeconomic variables because the behavioral variables are not related at a constant rate. There is need for a study employing the nonlinear relationship of exchange rate volatility and the volume of trade. There are studies which propose non-linear effects of volatility in exchange rate on the volume of trade. In order to understand then on linearity in the relationship of bilateral exports and the exchange rate uncertainty, Baum, Caglayan, & Ozkan (2004) have employed the data set of 13 developed countries for the period of 1980-1998. The study also includes volatility of foreign income in addition to the volatility of exchange rate in the regression model. Volatility of foreign income can intensify or diminish the impact of exchange rate instability on exports as indicated by results of the study. By employing the econometric methods of time-series data on the volume of bilateral exports of US with the six other G-7 nations has been examined with reference to the threshold effect of exchange rate instability by Zhang, Chang, & Gauger (2006). The study reveals nonlinear relationship of exchange rate instability with volume of exports. Volume of exports has a tendency to increase when exchange rate instability exceeds a certain threshold.

3. Methodology

The data employed in the present study is time series in nature. Quarterly data from 1975Q1 to 2010Q4 is arranged from the authentic data sources such as International Financial Statistics (IFS-CD-ROM, 2011) and State Bank of Pakistan (SBP-Annual report, 2011).

Real Exchange Rate (RER), Consumer Price Index (CPI), Industrial Production Index (IPI) have been employed as the main variables in the study. The IPI is used as a proxy for Economic Activity (EA) or aggregate income of importing countries. Real Imports (RIM), Real Exports (REX), Real Foreign Direct Investment (RFDI), Real Foreign Exchange Reserves (RFER) and Terms of Trade (ToTs) have also been incorporated. All the variables are normalized by assuming their appropriate transformation. Mostly log transformation is used in the studies. The nominal exchange rate (NER) is converted to real exchange rate (RER) by using the formula:

$$RER_{PAK} NER_{PAK}\left(\frac{CPI\_USA}{CPI\_PAK}\right)$$

In this calculation, CPI_USA is the price level in USA and CPI_Pak is price level in Pakistan. This formula of real exchange rate is also used by Lee (1999). The Industrial production index for industrial countries is used as a proxy for foreign economic activity or aggregate income of importing countries (Alam, 2010). It is calculated by using the quarterly average production index of all advanced countries. Terms of trade is calculated by dividing the unit value of exports by the unit value of imports (Mankiw, 2014). Real Exports are calculated by diving unit value of exports by price per unit of exports based on 2005 index (Arize, Malindretos, & Kasibhatla, 2003). Real imports are obtained by dividing unit value of imports by price per unit of imports[1]. Volatility of exchange rate is calculated from GARCH (1,1) variance series of the real exchange rate. The GARCH variance series is based on time period and the squared roots of the series indicates volatility of exchange rate. Data of FDI and Foreign Exchange Reserves are in millions of US dollar. The variables in their real forms are calculated by dividing the nominal values by the CPI. CPI is also used as measure of inflation and independent variable of the model in order to view the impact of price changes on the growth of imports and exports.

Coefficients of the lag in the Koyck distributed-lag model are assumed to decline geometrically, as the lag length increases. That is why such models may not be applicable when there is functional relationship between the coefficients and time lags[2]. The finite distributed-lag model can be presented as follows:

$$Y_t = \alpha + \beta_0 X_t + \beta_1 X_{t-1} + \beta_2 X_{t-2} + \ldots + \beta_k X_{t-k} + u_t \quad (1)$$

Equation (1) can be written more precisely as equation (2).

$$Y_t = \alpha + \sum_{i=0}^{k} \beta_i X_{t-i} + u_t \quad (2)$$

In this expression β_1 is approximated by length of the lag. Hence, β_1 is polynomial function of lag length (i) with degree of polynomial (k) less than length of the lag.

$$\beta_i = a_0 + a_1 i + a_2 i^2 + a_3 i^3 \ldots\ldots + a_m i^m \quad (3)$$

On substitution of value of β_1 equation (4) can be derived given below:

$$Y_t = \alpha + \sum_{i=0}^{k} (a_0 + a_1 i + a_2 i^2 + a_3 i^3 \ldots\ldots + a_m i^m) X_{t-i} + u_t \quad (4)$$

The equation can be further reduced to the estimable form as follows.

1) Both the unit value of imports/exports and their prices are in US $.
2) (Gujarati et al., 2012), pp. 656-712.

$$Y_t = \alpha + \sum_{i=0}^{k} a_i Z_{it} + u_t \quad (5)$$

Thus Almon scheme regresses Y on the new constructed variables Z instead of the original X variables. That is why OLS assumptions hold and parameters meet all the desirable statistical properties. For instance, second degree polynomial, gives the values of βi's from the estimated values of the parameters of equation (5) as follows:

$$\begin{aligned}
&\hat{\beta_0} = \hat{a_0} \quad (6)\\
&\hat{\beta_1} = \hat{a_0} + \hat{a_1} + \hat{a_2}\\
&\hat{\beta_2} = \hat{a_0} + 2\hat{a_1} + 4\hat{a_2}\\
&\hat{\beta_3} = \hat{a_0} + 3\hat{a_1} + 9\hat{a_2}\\
&\ldots\ldots\ldots\ldots\ldots\\
&\hat{\beta_k} = \hat{a_0} + k\hat{a_1} + k^2\hat{a_2}
\end{aligned}$$

End point restrictions are imposed on βi depending upon whether or not the value of independent variable with certain degree of lag affects the dependant variable[3]. With the application of end point restrictions on the values of βi the model becomes *Restricted-Least Squares Model*. The question of lag length is settled by starting with a very large value of the lag length and then using the criteria of Akaike or Schwarz information the appropriate lag length and degree of polynomial are selected (Gujarati et al., 2012).

Two separate equations are estimated in the study one for real exports and the other for real imports. The independent variables included in the study are real exchange rate, industrial production index, real foreign exchange reserves, real foreign direct investment, terms of trade, volatility of exchange rate and consumer price index. The econometric methods employed in the study are described along with their findings and results in the subsequent section.

4. Results and Discussions

In this section of the study results of the estimated models are presented. Discussion on the methodology in terms of mathematical equations and their logic has been cut short for space saving.

Results of the unit root test suggest that all the variables are statistically insignificant at level by using both constant and trend (C & T). All the values are significant and the hypothesis of stationarity at 1st difference is accepted. However, CPI is stationary at 2nd difference. The variables become stationary by using first difference as they reject the null hypothesis at five, one and 10 percent level of significance. The test concludes that there was a problem of non-stationarity in the time series data which is removed by applying the ADF-first and second difference method. The subsequent analysis employs the stationary series by taking the first difference of each variable and the second difference of CPI.

3) For example, when $\beta_k <= 0$, <= then k[th] lagged form of independent variable is not affecting dependent variable.

<Table 1> Results of ADF Unit Root Test

Var. in Log Form	Level		1st Difference		2nd Difference		Order of Integration
	C	C & T	C	C& T	C	C & T	
RER	-1.63	-0.18	-7.43	-7.66	-	-	1(1)
IPI	-1.06	-2.18	-3.48	-3.54	-	-	1(1)
REX	-1.59	-2.51	-3.33	-3.46	-	-	1(1)
RIM	-1.09	-2.88	-4.75	-4.76	-	-	1(1)
RFER	-1.83	-2.28	-11.12	-11.15	-	-	1(1)
RFDI	-2.55	-4.04	-13.47	-13.49	-	-	1(1)
ToT	-1.16	-3.39	-13.54	-13.64	-	-	1(1)
Vol. ER	-2.31	-2.55	-6.03	-6.04	-	-	1(1)
CPI	-0.94	-2.93	-2.23	-2.68	-8.14	-8.16	1(2)

Note: 5 %, 1 % and 10 % level of significance are used.

4.2. Results of the Almon Polynomial Distributed Lag Model

The results of Almon polynomial model are used for the estimation of impact of explanatory variables on the real exports (REX). The regression equation for REX is as follows:

$$\begin{aligned}
Y_{REX} = {} & \alpha_0 + \alpha X_{RER} + \alpha_2 X_{TOT} + \alpha_3 X_{CPI} + \alpha_4 X_{FER} + \alpha_5 X_{IPI}\\
& \alpha_6 Z_{0FDI} + \alpha_7 Z_{1FDI} + \alpha_8 Z_{2FDI} + \alpha_9 Z_{3FDI} + \alpha_{10} Z_{4FDI}\\
& \alpha_{11} W_{Vol_ER} + \alpha_{12} W_{Vol-ER} + \mu_t
\end{aligned}$$

Where

Y_{REX} = Real Exports
X_{RER} = Real Exchange Rate
X_{ToT} = Terms of Trade
X_{CPI} = Consumer Price Index
X_{FER} = Foreign Exchnage Reserves
X_{IPI} = Industrial Production Index
Z_{FDI} = Foreign Direct Investment
W_{Vol_ER} = Voltality of Exchange Rate
m_t = Error Term

Variable REX is regressed on the variables ToT, CPI, IPI, FER, Vol_ER, FDI and their appropriate lagged values incorporated in the equation[4]. The FDI has got four degree of polynomial and Vol_ER was assigned one degree polynomial. The results are presented in the Table 2.

The results from the estimated model reveal significant impact of real exchange rate (RER) on real exports (REX). For every one percent increase inRER there is 68 percent rise in REX. TOTs significantly affect REX. For every one percent rise in TOTs the REX fall by 14 percent. It adds much to our surprise to find insignificant contribution of CPI (the inflationary effect) to the changes of REX. Though statistically foreign exchange reserves (FER) show significant impact on REX but its contribution is very small. For every one percent increase in the foreign currency reserves, the REX increases by five percent on the average. Similarly industrial production index seems to have contributed much significantly to the change in the real exports of the country.

4) Selection of Lag has been made by estimation of models in E-views.

FDI also has significant impact on exports. The coefficients of lagged values of the variable FDI have shown significant impact from the first lag through fourth period of lag. The results also reveal increasing impact of FDI on exports with increasing the periods of the lag but with different direction of relationship. The volatility of exchange rate (Vol_ER) indicates significant but negative effect on the REX as shown by the W0Vol_ER variable. The effect subsides with the increase in time lag.

<Table 2> Results of Almon Model For Real Exports

Dependent Variable: REX				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.936	1.581	-5.649	0.000
RER	0.683	0.196	3.473	0.000
TOT	-0.458	0.141	-3.230	0.001
CPI	-0.023	0.135	-0.175	0.861
FER	0.057	0.028	1.988	0.049
IPI	1.513	0.241	6.265	0.000
Z_0FDI	-0.015	0.017	-0.882	0.379
Z_1FDI	-0.058	0.018	-3.216	0.001
Z_2FDI	0.021	0.011	1.908	0.058
Z_3FDI	0.012	0.004	3.097	0.002
Z_4FDI	-0.003	0.001	-2.275	0.024
W_0Vol_ER	-0.042	0.017	-2.413	0.017
W_1Vol_ER	-0.021	0.011	-1.980	0.050
AR(1)	0.497	0.084	5.865	0.000
R-squared	0.967	Akaike info criterion		-1.187
Adjusted R-squared	0.964	Schwarz criterion		-0.878
Log likelihood	91.186	F-statistic		268.931
Durbin-Watson stat	2.042	Prob (F-statistic)		0.000

Lag Distribution of LFDI_PAK(-1)		β_i	Coefficient	Std. Error	T-Statistic
. * |		0	0.022	0.019	1.164
. * |		1	0.047	0.020	2.364
. * |		2	-0.015	0.017	-0.882
. * |		3	-0.043	0.018	-2.395
. * |		4	-0.006	0.020	-0.298
. *|		5	0.033	0.018	1.845
	Sum of Lags		0.037	0.058	0.639

Lag Distribution of VOL		γ_i	Coefficient	Std. Error	T-Statistic
* . |		0	-0.087	0.053	-1.635
* . |		1	-0.067	0.033	-2.022
* . |		2	-0.048	0.018	-2.605
* . |		3	-0.029	0.022	-1.330
* . |		4	-0.010	0.039	-0.270
.*|		5	0.008	0.059	0.138
	Sum of Lags		-0.236	0.105	-2.230

The value of R^2 in this model comes out to be 0.94 which shows 94 percent variation in dependent variable (RIM) is explained by the explanatory variables included in the model. The problem of autocorrelation controlled by AR(1) roots which reduce the autocorrelation to almost nil. That is why the new value of Durban Watson is 1.94 which is approximately 2. The value of F-statistic is 184.20 with its p-value 0.000 which shows overall significance of the estimated model of real imports. The values of Akaike and Schwarz are -1.80 and -1.56 respectively which are at the minimum level from amongst the models tested alternatively.

The variables RER, TOT, and CPI do not have had significant impact on real imports. Foreign exchange reserves (FER) indicate positive and significant impact on the real imports (RIM). Every one percent increase in the foreign exchange reserves creates provision of 4 percent increase in the real imports(RIM). Industrial production index (IPI) also raises the real imports. Every one percent increase in IPI raises RIM by 78 percent on the average. According to the results, FDI plays its significant role to the extent of one period lag values. As the number of lags is increased, the sign of the coefficient is reversed (from positive sign to the negative sign). That clearly indicates short term effect of the FDI on the real imports only. Volatility of exchange rate has also significant but negative impact on the real imports to the extent of immediate lagged values. For the longer lags the relationship of RIM and volatility of exchange rate does not last.

Overall the results of Almon model suggest that the model provides a good fit both for real exports (REX) and real imports (RIM). The CPI does not have any significant impact on both exports and imports. It is concluded that the effect of RER on REX is significant and RER do not have significant impact on RIM. Therefore, Pakistani imports have had inelastic demand among the consumers in the country. Pakistan is a developing country and Pakistani currency has been depreciating very rapidly against US dollar for the period of the study. This may be because of increase in inflation, decrease in domestic investment, increase in government expenditures and low tax base ratio. All these factors are creating shocks to the Economy of Pakistan.

5. Findings and Recommendations

Objective of the study is to examine the impact of exchange rate volatility, FDI, FER, RER, TOT and CPI on real exports and real imports of Pakistan. Using the log transformation of the data the present study calculates very important elasticities. In order to suggest some useful policy recommendations the present study has employed state of the art econometric methods such as ADF-Unit Root and Almon Polynomial Distributed Lag models. Results of unit root reveal stationarity of all the variables by taking first difference except CPI which is significant at second difference.

Results of the Almon model reveal significant effects of real

exchange rate on exports and insignificant impact on imports which have developed deep-rooted part and parcel of the consumption bundle of Pakistani consumers. Results of this study are supported by Alam (2010). Results of the Almon model also reveal negative and significant effects of volatility of exchange rate on both exports and imports. The results of study for real imports are supported by Alam and Ahmad (2011). Based on these findings the present study strongly recommends policy makers to ensure political and economic stability in the country in order to be out of the uncertainty prevailing in the country. The lagged effects of uncertainty last for around three to four quarters of the financial year of the economy of Pakistan. Instability is dangerous as it adversely affects the trade volume of the country and thereby distorts economic growth and internationalization of the economic activities of Pakistan.

Regarding uncertainty, findings of the present study are quite contrary to the those revealed by Hosseini and Moghaddasi (2010), Arize et al. (2000) and Arize et al. (2003) who have shown advantages of exchange rate volatility in terms of exports and imports of their focused economies. TOT has shown negative and significant impact on exports but insignificant impact on imports. That clearly reiterates the fact that demand for Pakistani imports are highly insensitive to change in relative prices of imports. These results are also supported by Mendoza (1995) but these findings are different from Chowdhury (1993). The policy makers are recommended to adopt import substitution policy by adopting business friendly policies in Pakistan. Productive capacity of the country should be expanded.

Almon model has also shown significant positive impact of IPI, FER and RER on real exports as indicated by earlier by Alam (2010). Industrial production index and the real exports are the cohesively reinforcing factors to one another. Foreign exchange reserves seem to have supportive effect for the expansion of export oriented industries of Pakistan by providing a capital base for the macro economy of Pakistan. Generally foreign exchange reserves raise affordability of the export oriented industries to expand their capacity when they are earning more in terms of foreign currency reserves. Real exchange rate and real exports theoretically move in the same direction. That positive relationship applies to the economy of Pakistan as well. Only the variable FER and IPI have shown significant positive impact on real imports. Foreign exchange reserves raise capacity of the country to import more. This is what seems to have happened for the Economy of Pakistan for the period of the study. Theoretically national income of the country positively affects real imports. Since IPI is employed as proxy for the national income, therefore the positive sign of its coefficient is quite convincing for the Pakistan economy. Rising foreign reserves enable Pakistan to import capital goods from abroad. That also improves value of the local currency.

It is concluded from the study that volatility of exchange rate creates significant level of uncertainty in respect of both exports and imports with different direction and different lag periods. The findings of the study are in accordance with theoretical relationships presented by Clark et al. (2004), McKenzie (1999), Dellas & Zilberfarb (1993) and Côté (1994). These findings are also in accordance with the empirical studies which support positive relationship of exchange rate volatility and exports presented by Hsu & Chiang (2011), Chit (2008), Feenstra & Kendall (1991), Esquivel & Larraín (2002), Onafowora & Owoye (2008). Findings of the study in terms of imports are supported by the studies such as Lee (1999), Alam & Ahmad (2011) and Arize (1998).

Pakistan is confronting the problems of twin deficits such as trade and budget deficits in addition to ever rising inflation. The study recommends some policy implications. For the improvement of demand for its aggregate exports, Pakistan needs to develop its external competitiveness. The unfavorable effects of exchange rate instability on exports can be moderated by developing the forward exchange markets in currencies which facilitate exporters to prevaricate against the risks in international transactions.

Policy makers should consider both the existence and the degree of exchange rate instability as a challenge to the trade deficit experienced by Pakistan's economy. Policy makers should also take notice of effects of the exchange rate instability on every trading transaction while implementing trade policies in order to enhance productive capacity of the exportable industries which ultimately improve the trade balance. Transparent exchange rate system should be established by policy makers under whom the exchange rate stability can be achieved and maintained. As part of the overall trade and economic growth strategy, policy makers should include the policy of controlling malpractices of speculators and manipulators of the real exchange rate.

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