Exchange Rate Volatility and its Effect on Pakistan's Export Volume

Dr. Najia Saqib[1] and Irfan Sana[2]

Abstract

This paper analyzes the effect of exchange rate volatility on the trade volume (Export) and the impact of REER on determinant of trade in Pakistan using time-series data for the period 1981-2010. The result shows that REER is inversely impact on Export Volume of Pakistan. On otherside the Import is directly correlated with the volume of export, and positively impact our Export, in the case of developing nation, the impact of import is also directly correlated with the volume of export, and if we want to decrease our Balance of trade deficit, we have to work on increase of our Export rather than decrease of our Import account as it also effect our Export. Thus, our findings support the core idea.

1 Introduction

Market dynamics is always vital issue for the economists. The impact of trade and its relevant factor are studied by almost all the economist and the question of developing an effective mechanism that enable the analyst to study the movement of economic statistics is still remain unanswered. Are we ever able

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[1] Prince Sultan University, Business Administration Department, Riyadh-Kingdom of
  Saudi Arabia, e-mail: dr.najiasaqib@gmail.com
[2] Bahria University, Karachi-Pakistan, e-mail: irfan.sana@gmail.com

to made our-self competent enough to analyses the trend of dynamics on market is still unclear to the policy and thinker.

The man-made economics system, which is currently prevailing in the different region of world, possesses different characteristics, and resulted in the different behavior of the same variable. Studying the trade niche of   market dynamics and its international implementation is also a key point in the evaluation of the current and future stability and the progress of the country.

Effect of different economic factor on the variable of export is explored in different light of thought. The two main school of economics that i.e. Neoclassical and the Classical believe that the trade is the fundamental accelerator of country and the progress of the country can only be obtained by the complete and free involvement of all the country and the mechanism of free international Market is the only solution of the financial and economic global crises.

The efficient used of all the available resources of the country, can only be obtained when he specialize in the production of product in which he has complete specialization and have a competitive edge. A labor abundant country should, divert all its resource to labor intensive product and import the capital intensive product and vice versa. The condition able the world to become the Global village in real sense, which able the efficient production of all the products at very cheap price which is in access of all the consumer of the world. This free trade mechanism, over the period of time will be result in the proper redistribution of income and the overall increase in the factorial efficiency of the world.

This implies a more equitable distribution of the benefits of international progress and, therefore, a more even spread of economic development across the world. International trade is also advocated as a powerful engine of economic growth for countries.

The international trade classical theories and its interaction in economic development are based on the belief of comparative advantage. The comparative advantage model states that a country is in winning situation, when concentrating on the productions of only those goods or render of those services in which they are more effective or possesses a comparative advantage over others and then trading these goods with other countries. In that condition, country can produce its products more inexpensively than others so that through trade all countries would benefit by obtaining goods more inexpensively than they would have if they produce all goods themselves.

Classical and neoclassical economics believe that trade meant for surplus; the trade can facilitate the country to go beyond the limits, and eliminate the production problem of scare resources, and can gain complete specialization and the division of labor. In this tradition, classical and neoclassical economics enthusiastically support free and unrestricted trade among nations by asserting that trade creates new opportunities for people in all countries to improve their economics welfare. Through such free trade and exchange, over time international income redistributions take place as free product and factor mobility equalize prices and incomes across the globe.

This implies a more reasonable distribution of the benefits of international progress and, therefore, a more even spread of economic development across the world. International trade is also advocated as a powerful engine of economic growth for countries. International trade expands market demand across country borders and thus removes constraints that may limit a country's ability to increase its production to optimum level. There are two aspects to a country's international trade: exports and imports, and this paper is more intended towards the analysis of import and exchange rate effect on export, using the monthly data of Pakistan.

Level of foreign reserves in a country has important implications for the macroeconomic stability of a country and its ability to cope with external crisis. This is particularly true for developing countries that are often faced with large external shocks and have limited or no access to international capital markets. Reserves act as an important means of self-insurance in these countries in the face of external shocks. Policy makers in these countries are therefore often required to make assessments regarding the adequacy of their reserve holdings

The real exchange rate, which is essentially the real worth of foreign exchange in terms of a given domestic currency (Bautista (1987)), is important for a number of reasons. It is an important determinant of the performance of a sector or an economy for which tradable goods constitute a significant proportion of output.

After discontinuation of "Bretton Woods"forex system of fixed rate in the year 1973, gradually all countries implement floating forex system in order to reduce protectionist trend and promote free trade and moving toward more free market trends . The countries implement moving forex systems are more change of exposure to the forex volatility.

Exchange rates are a perennial source of discussion and analysis, and one of the oldest subjects in international macroeconomics. But the vanes to taste do veer, and do so cyclically in terms of which aspects of exchange rates elicit attention and scrutiny. In the 1930s, under conditions of idle resources and weak demand, the competitive consequences of exchange rates were prominent, especially as many advanced countries successively went off the gold standard. In the 1970s and 1980s, as high inflation became one of the central issues in macroeconomic policy making, exchange rates were increasingly used as anchors for inflation. Periodic financial crises, however, highlighted the role of fixed exchange rates in contributing to such crises particularly in the context of free capital mobility; with many countries starting to move towards flexible exchange rates. In the 2000s, the cycle seems complete with the competitive consequences of exchange rates back in the limelight.

2 Literature Review

Bautista (1987), among others, observed that a decline in the real exchange rate tends to stimulate a decline in the price of tradable goods relative to the price

of non-tradable goods. Akhtar and Hilton (1984) have created adverse influence of exchange rate uncertainty on imports and exports. Rogoff(1998) stated that exchange rate flexibility generates significant problems for both exporters and importers.

Arize (1996) also proposed that negative significant relationship between exchange rate instability and imports and exports exists in the long run and short run. De Grauwe (1988) suggested that if the fabrication of model is accurate, then relationship between exchange rate volatility and trade should be positive.

Ortega and Giovanni (2005) suggested empirically the impact of trade cost on real exchange rate volatility. Doganlar (2002) analyzed empirically the impact of exchange rate instability on the exports of five Asian countries including Pakistan conclude that a long run relationship exists between real exports and exchange rate volatility.

Aizenman (2007) regarding the impact of reserve holdings in minimizing the real exchange rate volatility in developing countries in the event of exogenous terms of trade shocks. Given that higher real exchange rate volatility is associated with lower growth, this implies higher reserves may promote growth indirectly by helping reduce exchange rate volatility. Apart from their impact on growth, higher level of reserves is also associated with smoother capital account adjustment indicating their role in buffering price shocks.

Zhang (2000) says that inflation occurs in the end due to devaluation of the currency. Virgil (2002)investigated that the long run relationship between Turkey's real exports and its exchange rate instability is negative but statistically significant for Germany, France and the United states.

Smith (1999) stated that the analysis shows that an increase in exchange rate volatility is set out along with a decline in international correlations between bound and stock market. Abeysinghe and Yeok (1998) suggested that exchange rate deprecation stimulates exports and restrain imports, while exchange rate appreciation would be reduced exports and encourage imports.

This finding is thus more tightly related to the literature on exchange rates and FDI, Rodrik (2008) is perhaps the most complete assessment of the role of under-valued exchange rates in promoting economic growth. The author argued that exports can be hampered by market (coordination) failures, currency under-valuation can provide an impetus to exports and overcome said obstacles, and hence they are associated with faster growth. However, the statistical work presented by Rodrik is far from conclusive regarding the expected link between exchange rate under-valuation and exports as the primary mechanism linking such policies to subsequent economic growth, relying primarily on the econometric evidence presented in Hausmann, Pritchett and Rodrik (2005).

Similarly, Freund and Pierola (2008) analyzed over ninety episodes of manufactured "export surges" and concluded that export surges in developing (but not in developed) economies were associated with large real exchange-rate devaluations that left exchange rate undervalued and with the advent of new export products and destinations. Campa (2004) found that export growth

associated with hysteresis driven by the extensive margin of trade was small in a sample of Spanish manufacturing firms, which is consistent with Freund and Pierola's finding that persistent devaluations are not associated with export surges in developed economies

The real exchange rate measures the external purchasing power of money, that is to say, its purchasing power over foreign goods. The studies of Edwards (1997), de Melo and Robinson (1990), Biggs, Shah and Srivasta (1995), Bigsten et al. (1997) and Lucas (1993) show empirically and theoretically, that exports of manufactured products have a beneficial impact on total factor productivity.

The exchange rate and productivity seem to decisive in explaining the differential market shares for exports. The importance of the real effective exchange rate for exports of manufactured goods in Africa has been demonstrated by Ndulu and Semboja (1995), who found that the real effective exchange rate has a significant influence on manufacturing exports. Among the factors thought to influence export competitiveness, is the real effective exchange rate. Balassa (1990) established a link between the real effective exchange rate and exports of manufactured goods.

3 Modeling Frameworks

The data is comprised of thirty year time period i.e. from 1981 to 2010 on yearly basis. All the data are secondary type of data. The main source use to collect data is World Bank official website. The Variable analyzed is EXPORT, IMPORT, REER, Total RESERVE, CPI, FDI, GDP, GDP Deflator and Term of Trade. The variable are tested and they show also impact on our basic variable i.e. Export trade volume but due to economic unstable trend, that is resulting the error probability and decrease confidence level of variable, that will be discussed later the final variables selected for model are: EXPORT,IMPORT, REER and Total RESERVE.

3.1 Variable Explanation

The detail explanation of variable used above is explain below.

3.1.1. Export : Exports of goods and services (BoP, current US$) : Exports of goods and services comprise all transactions between residents of a country and the rest of the world involving a change of ownership from residents to nonresidents of general merchandise, goods sent for processing and repairs, nonmonetary gold, and services. Data are in current U.S. dollars.

3.1.2. Import : Imports of goods and services (BoP, current US$) : Imports of goods and services comprise all transactions between residents of a country and

the rest of the world involving a change of ownership from nonresidents to residents of general merchandise, goods sent for processing and repairs, nonmonetary gold, and services. Data are in current U.S. dollars.

3.1.3. REER : Real effective exchange rate index (2005 = 100): Real effective exchange rate is the nominal effective exchange rate (a measure of the value of a currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs.

3.1.4. Reserve : Total reserves (includes gold, current US$) : Total reserves comprise holdings of monetary gold, special drawing rights, reserves of IMF members held by the IMF, and holdings of foreign exchange under the control of monetary authorities. The gold component of these reserves is valued at year-end (December 31) London prices. Data are in current U.S. dollars. The Data is collected from World Bank official site and the codes of the variables are as in Table 1:

Table 1: Variable and Data from World Bank

S. No.	Variable	World Bank Codes
1.	EXPORT	BX.GSR.GNFS.CD
2.	IMPORT	BM.GSR.GNFS.CD
3.	REER	PX.REX.REER
4.	RESERVE	FI.RES.TOTL.CD

4 Methodology

To find the long run relationship between the variables we have used multiple regression analysis. In this research we have focused on secondary type of data, all data is collected from official website of World Bank Database. In this study we have used the simple linear regression technique to analysis the model. Augmented Dickey Fuller Test (ADF) and Phillips Perron Test (PP) test are used to check the individual stationarity of each variable.

$$\text{Log } X = \log f\,(M, REER, R) \qquad\qquad (1)$$

where X is the Exports volume of goods and services (BoP, current US$), log f represents the log function of, M, REER and R represent Imports of goods and services (BoP, current US$), Real effective exchange rate index (2005 = 100) and Pakistan Total reserves (includes gold, current US$)After specifying the Export function in linear form with an addition of error term, we can write in following way:

The econometric linear form of the equation is:

$$\text{Log } X = \alpha + \beta_1 \log M + \beta_2 \log REER + \beta_3 \log R + \varepsilon \qquad (2)$$

This research is based on the following hypothesis that clearly defines the research criterion.

H_0 Real Effective Exchange Rate has no significant impact on Export Volume
H_1 Real Effective Exchange Rate has significant impact on Export Volume
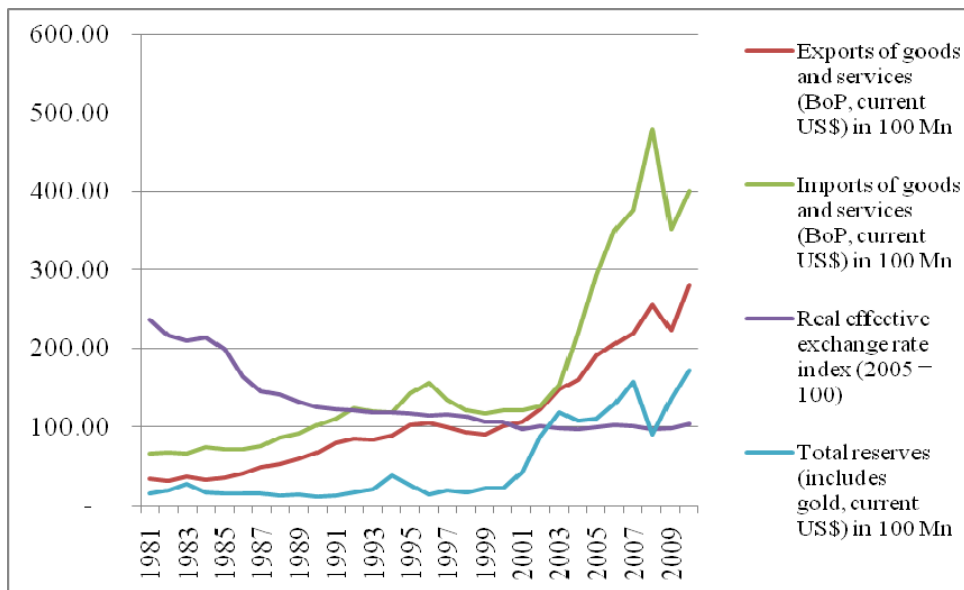
4.1 Variable Analysis

Figure 1: Graphical Analysis of Variables

The Figure 1 show the wild dispersion of the data from main stream which caused many problems related to the stationarity of data in other variables. The Energy crisis and other problem heavily affect the progress of economy and also many wrong decisions also affect the stability of Pakistan economy. The graph show rapid increase in the volume of import and export but it actual resulted in the rapid increase of trade deficit and the unstable of Exchange rate. The other political and economic facto and the main security concern issue also force the current foreign investor to leave the economy and the new investor also hesitate to enter into the Pakistan economy. The decrease in the FDI can be seen in the graph showing the data of last twenty years it also show the diversities of the economic

facto from main stream that also cause many problem in analyzing the trend and inter-correlation of economic factor in Pakistan.

4.2 Economic Analysis

The European debt crisis and its fall-out effects on global economy, the Euro-Dollar exchange parity and the international price of oil along with heavy debt repayment by Pakistan to the IMF are some of the important factors looming large on the external horizon. As a result of these developments, the most likely fatality would be Pakistan's exchange rate, which has already shed almost 10 percent of its value in the current fiscal year and is looking set to lose further ground in the coming fiscal year.

In a depressed domestic economic environment with supply constraints, the sharp depreciation of exchange rate is not likely to improve trade balance in general and exports in particular. On the contrary, this is sure to contribute to the astronomical growth in public debt with consequential increase in interest payments, fuel inflationary pressure and reduce the benefits of temporary decline in the international price of oil to domestic consumers.

Pakistan's exports crossed the $25 billion mark last year mainly on account of two-and-a-half-fold increase in the price of cotton and cotton-related products in the international market. Textiles being the single largest export item of Pakistan emerged as a major beneficiary of the extraneous developments. The government on the other hand took the credit for "raising" exports to $25 billion. The international price of cotton has scaled back to its normal level, and as such Pakistan's exports are down by four percent, to $21.5 billion. Exports are likely to remain below $24 billion at the end of the fiscal year. Is the government ready to take the blame for reduction in exports?

Imports, on the other hand, are up by 12 percent, to almost $41 billion, during July-May 2011-12 and likely to reach over $44.5 billion by the end of the fiscal year with trade deficit in the range of $20-21 billion. Imports of oil and fertilizer have contributed the most to the surge in imports. While increase in oil import bills is quite understandable, the import of over one billion dollars' worth of fertilizer was unjustified. Through prudent use of gas distribution, the imports of fertilizer could have been reduced substantially.

The surplus in the financial account is declining rapidly from $5.1 billion in 2009-10 to $1.2 billion in 2011-12 mainly on account of a massive decline in foreign investment. From as high as $8.4 billion in 2006-07, foreign investment has plunge to only $679 million in the first eleven months of the fiscal year. Political instability, deteriorating security environment, energy crisis, worsening macroeconomic fundamentals, particularly a free fall in exchange rate, and poor economic management have led to a sharp decline in foreign investment.

Although the current account deficit for the year (so far $3.4 billion) is low by Pakistani standard, the financing of this relatively low deficit has become

difficult for Pakistan. Declining capital inflows have forced the government to finance this deficit by drawing down its foreign exchange reserves. Total liquid foreign exchange reserves have declined from a peak of $18.2 billion in June 2011 to $15.4 billion by June 8, 2012 – a loss of $2.8 billion in almost a year.

Foreign exchange reserves consist of reserves held by the SBP and reserves held by the commercial banks that are basically the foreign currency deposits of the individuals with commercial banks. It is only the reserves held by the SBP, which matter for balance of payments. Reserves held by the commercial banks cannot be used to finance current account deficit.

Any decrease in reserves held by the SBP reflects deterioration in the overall balance of payments. Such deterioration puts pressure on the exchange rate. The private sector, in anticipation of further depreciation of exchange rate, converts their rupee in dollar and deposits them in commercial banks. Hence, the reserves held by the commercial banks increase with the decline in the reserves of the SBP. Rise in the reserves held by the commercial banks reflects 'dollarisation' of the economy, expectations of further depreciation of exchange rate, growing corruption and tax evasion.

The reserves held by the SBP in June 2011 stood at $14.8 billion but registered a sharp decline to $11.1 billion by June 8, 2012-a decline of $3.667 billion in almost one year. Reserves held by the commercials banks registered an increase of $840 million during the same period. The recent decline in the SBP reserves by $1.0 billion is one of the factors responsible for the free fall in exchange rate, which plummeted to as low as Rs95 per US dollar. Other factors include expected heavy debt repayments in 2012-13, political instability and inappropriate statement of the governor of SBP on the emerging balance of payments development. Pakistan's balance of payments is likely to come under more pressure owing to heavy debt repayment, financing of large deficit in trade and services accounts.

4.3 Export Analysis

The individual analysis of export, i.e. Goods and services, in the Pakistan context is clearly given the important of the two individual types and the Pakistan is still lagging very short in the export of services the data of the export of goods and services is plotted in the Figure 2 show that Pakistan should also focus on the services side of export ,as current more than 80% of the export is produce from goods side and the services side is very weak in contributing its due part to the export volume.
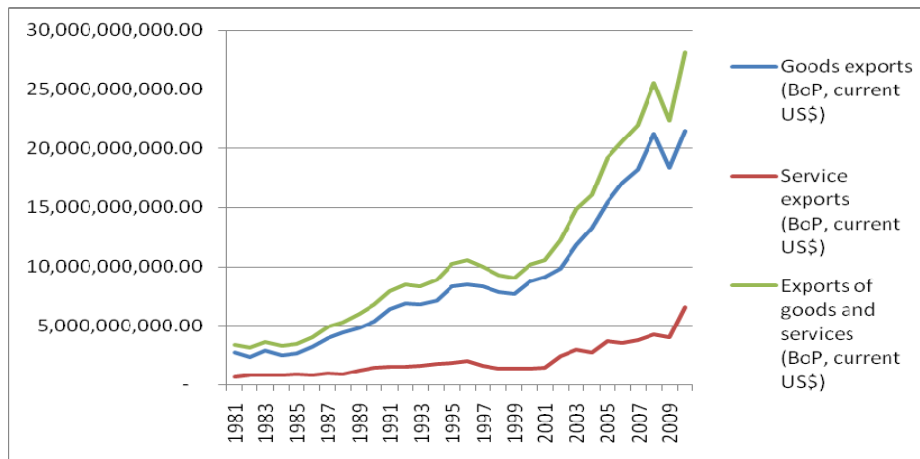
Figure 2: Factor-Wise Analysis of Export

5 Empirical Result

The standard Augmented Dickey-Fuller (ADF) unit root test and Phillips Perron Test is performed to check the order of integration of the individual variables selected for study. The results obtained are shown in Table 2.

Table 2: ADF and PP Test

	Augmented Dickey Fuller Test (ADF)				Phillips Perron Test (PP)			
	I (0)		I (1)		I (0)		I (1)	
	C	C&T	C	C&T	C	C&T	C	C&T
Export	0.17199	-1.94743	-5.44969	-5.34612	0.20817	-2.21021	-5.44805	-5.34711
Import	0.22665	-1.49761	-4.25824	-4.27305	0.02554	-1.7601	-4.24537	-4.27305
REER	-3.46306	-1.0982	-3.52497	-4.39515	-4.45085	-0.79711	-3.52497	-4.61609
Reserve	-0.28682	-1.82767	-4.82368	-4.92479	-0.30741	-1.81598	-4.80326	-4.98624

Authors' Estimation

Note: McKinnon critical values for intercept(C): 1% level = -3.831511, 5% level =-3.029970and Intercept & trend (C & T): 1% level = -4.532598, 5% level = -3.673616

While the ADF test corrects for higher order serial correlation by adding lagged differenced terms on the right-hand side, the PP test makes a correction to

the t-statistic of the coefficient from the regression to account for the serial correlation in it. The data show its significant level at around 5% in all the cases. The both the test show non signification at zero level i.e. I (0) but become significant at I (1). The level of signification at Level I (1) is said to be stable and the regression model can be run on it.

The regression result are more accurate if the signification level is high but the calculated and tested level is also appropriate to calculated the further relationship of these variable using regression methods.

6 Main Result and Findings

The Model equation (2) is execute using E-Views to get the result stated in the Table 3, then further analysis is made on the bases of the result obtain from this regression analysis.

Table 3: Regression Model Analysis

	Coefficient	T-Stats	Probability
REER	-0.222	-14.613	0.000
IMPORT	0.607	12.807	0.000
T Reserve	0.070	3.159	0.004
Constant	0.898	9.862	0.000
Adjusted R2	0.989	-	-
Durbin Watson Stat	1.525	-	-
F Statistics	918.105	-	0.000

The table two shows that the import and Exchange rate has a significant effect on the export variable and they are having coefficient value of - 0.222351, which is significant. The Durbin Watson stat is also in suitable and acceptable range. The variable are in very high correlation as the R and adjusted R^2 is very high and the value of adjusted R^2 is 0.98957 which show very high degree of relativity among the variables selected.

The Table 4 shows that the residual have also a stationary in it and the Augmented Dickey Fuller Test value for residual stationary is 0.07 % with intercept and 0.55 % with Trend and Intercept.

The results indicate that there is a significant inverse relationship of Real Effective Exchange Rate on the volume of International Export of Pakistan and the concern problem of trade deficit can be handled by using this determinant of export, if it can be used in effective manner.

Table 4: Residuals Stationarity Test

	With Intercept	With Intercept and Trend
ADF Test Statistics	-4.717	-4.565
Probability	0.000	0.005

Authors' Estimation

Note: McKinnon critical values for intercept(C):1% level = -3.679322, 5% level = -2.967767, 10% level = -2.622989 and Intercept & trend (C & T): 1% level = -4.309824, 5% level = -3.574244, 10% level = -3.221728.

The results are in accordance with other studies, made in other part of the world but if we analyze the policies of Pakistan financial polices maker, we might be able to get the main cause trade problem in Pakistan. In the finding the result suggest positive relationship between the Pakistan Import and Export volume and negative relationship between the exchange rate and export volume .But the policies normally adopt by Pakistan regulatory authorities is increasing the exchange rate and impose tariff and Cash Margins to restrain the volume of import. As a matter of concern the concern authorizes of Pakistan should made a detail research on the bases of problem and the trade deficit problem should be handle in accordance with the existing research, this research and the future researches.

6.1 Trade Benefit Analysis

The analytical results based on co-integration analysis show that exports are co-integrated with exchange rate, Import and Reserve. Our results concerning the effects of exchange rate volatility on trade suggest that the long-run relationship between Pakistan trade volume and its exchange rate volatility is negative and graphically significant, these results, on the whole, provide uniform evidence on the effect of the exchange rate volatility on trade volume. This finding supports those who point out that exchange rate volatility have a negative impact on trade volume in Pakistan. In the light of results, it is suggested that Pakistan should not rely on the depreciation of exchange rate to improve its trade balance. The depreciation will further deteriorate the trade balance due to constant increase in the imports of the country. Therefore, Pakistan should concentrate on the other strategies to improve the trade balance.

7 Conclusion and Recommendations

The studies and analyses implied that there are significant impacts of foreign exchange volatility on the volume of trade in Pakistan. We use regression model to estimate the linkage and study found negative relationship between these two factors. The research also supports the view that the impacts of foreign exchange volatility on the volume of trade are more viable in long run as the case of Pakistan.

The result argues that the slow growth of international exports is linked to exchange rate developments. Theory would suggest that exports and the real exchange rate are inversely related, and the available data indicates that the recent period of stagnant or increasing real international exports coincides with the period of REER depreciation. Correlation coefficients also indicate an inverse relationship, and although the strength of the relationship depends on the REER measure chosen. The other strong factor witness in regression model is import which is also showing strong impact.

Regression analysis also provides interlink support for a relationship between the REER and international exports. However, the preliminary nature of trade data for the most recent years (2006 – 2010) makes it difficult to draw firm conclusions, which is unfortunate as this is the period of relatively strong REER fluctuation.

It should also be noted that most small economies like Pakistan are not well integrated into international capital markets, and have currencies that are not widely traded internationally; as a result they are less vulnerable to the type of large-scale speculative attack that has afflicted larger developing and developed economies and in some cases made exchange rate pegs difficult to sustain. As mentioned by Reinhart and Rogoff (2004) Pakistan has maintained a de facto peg for much of the time since the early 1990s. As Pakistan is not fully enjoy the benefit of floating rate. And the results are in accordance with literature but the other variable non-stationarity problem told some other story.

One of the important misalignments that can arise with a pegged exchange rate is between the real equilibrium exchange rate and the actual real exchange rate. The equilibrium REER depends on economic fundamentals and can change for a variety of reasons but typically the value of the equilibrium REER is not known with any certainty, especially when it is changing. These changes can cause the actual and equilibrium REERs to diverge. In maintaining a pegged exchange rate, it can be difficult to know if, when and by how much the peg needs to be adjusted in order to bring the actual and equilibrium REERs into alignment. Alternatively, the equilibrium REER may be unchanged, but the actual REER may change, and cause divergence between the actual and equilibrium REERs. Again, the peg may need to be changed to restore alignment. This may be difficult to achieve, especially if it is attempted by changing the peg without addressing the underlying causes of the misalignment, which may include inconsistent macroeconomic policies. If misalignment between the actual and equilibrium

REERs persists, and is not eliminated through adjustment of the nominal exchange rate, then adjustment will occur through other mechanisms.

Furthermore, the lack of transparency regarding the details of the basket and adjustments to the peg has most likely made it less effective as a nominal anchor for prices and inflation expectations. Difficulties have also arisen in ascertaining when the equilibrium and actual REERs have diverged, and when changes in the equilibrium REER necessitate changes to the peg. These points, as well as others in the above discussion, suggest that as the economy grows, it may be appropriate to introduce more flexibility into the exchange rate peg. This would permit nominal exchange rate flexibility to assist real exchange rate adjustment, as well as broader macroeconomic adjustment. It would also permit a more active monetary policy to control the inflationary pressures that undermine the economy's international competitiveness.

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