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Exchange Rate Instability and Trade: The Case of Pakistan

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C O N T E N T S

	<i>Page</i>
I. Introduction	1
II. Review of Literature	2
III. Data and Methodology	3
1. Data	3
2. Construction of Variables	3
3. Model	4
IV. Data Descriptive Analysis	7
V. Empirical Findings and Results	10
VI. Summary and Conclusions	12
References	14
Abstract	16

List of Tables

Table 1. Compound Growth Rates	8
Table 2. Empirical Findings and Results	11

List of Graphs

Graph 1. Exchange Rate Instability and Imports	8
Graph 2. Exchange Rate Instability and Exports	9
Graph 3. Exchange Rate Instability and Trade Balance	9

I. INTRODUCTION

Exchange rate is a vital macroeconomic variable and backbone of trade. The variations in exchange rate play an important role in the determination of trade balance. Volatile exchange rate slows down the process of trade, destabilises the capital movements, and shatters the investor's confidence to invest in a country with high exchange rate volatility, which in turn slows down the process of growth.

Instability in exchange rate can influence longer-term decisions by affecting the volume of exports and imports, the allocation of investment and government sales and procurement policies. In medium term, it can affect the balance of payments and the level of economic activity, while in the short run local consumers and the local trader can be affected.

Exchange rate instability gives chances to investors to invest in foreign currency (dollars) to get higher returns and thus resulting in the strengthening the dollar against the home currency, which directly impacts the prices of exports and imports and their growth rates. Risk averter traders and investors always favour the system where the variance of the difference between actual and expected value of exchange rate is minimised,¹ while risk lover traders and investors prefer volatile exchange rate so that they can maximise their profits because of high risk premium. Therefore, exchange rate instability can have positive impact on exports and negative for imports for risk lover traders and *vice versa* for risk averter traders.

Main objective of the study is to see whether exchange rate instability affects trade or not and if so, then in what direction? If instability is caused by an appreciation of the exchange rate then it will affect exports negatively and imports positively, conversely, if instability is caused by depreciation in the exchange rate then it will affect exports positively and imports negatively and *vice versa*. In most of the earlier studies, GDP is used as proxy for market, however, we used manufacturing and agriculture instability (components of GDP and are exportable sectors) in the exports function because exports are mainly dependent on these sectors and not on other components of GDP. Therefore, we check the impact of other instabilities on the imports and exports of Pakistan.

Organisation of the paper is as follows: Section II briefly reviews the literature on trade and exchange rate instability. Data and methodological issues

¹They are in favour of stable exchange rate.

are discussed in Section III. Descriptive analysis is given in Section IV, empirical findings and their interpretation are presented in Section V and main conclusions are reported in Section VI.

II. REVIEW OF LITERATURE

Various studies carried out to estimate the relationship between trade and exchange rate uncertainty have reported mixed results. Akhtar and Hilton (1984), Kumar and Dhawan (1991), Cushman (1983), Pozo (1992), Peree and Steinherr (1989), Persson and Svensson (1989), Kenen and Rodrik (1986) found adverse impact on trade. Rogoff (1998) stated that exchange rate volatility creates significant problems for both exporters and importers. [Arize (1996, 1998)] reports negative significant long run and short run relationship between exchange rate instability on imports and exports. Hooper and Kohlhagen (1978) found negative association between exchange rate instability and volume of trade but found positive association with export prices when exporters bear the exchange risk and negative impact when importers bear the risk. Lanyi and Suss (1986) argues that exchange rate variability affects domestic currency and prices of exports and imports, which hinders the international transactions.

It is often taken for granted that an increase in the risk leads risk averter individuals to shift towards least risky endeavors. This popular view has led many to conclude that exchange rate instability in principle should have negative impact on trade by increasing the risk of international trade activities [De Grauwe (1988)]. The risk averters worry about the worst possible outcomes, and increase exports to avoid the possibility of drastic decline in their revenues. However, less risk averse or risk neutral persons are less concerned with extreme outcomes.

Excessive real exchange rate variability has negative welfare effect; it reduces the level of international trade, affect investment decisions and hampers economic growth [Edwards (1987)]. The appreciation of currency because of the fluctuation results in large capital inflows adversely affects the trade [Baldwin and Krugman (1989)]. De Grauwe (1988) argued that association between exchange rate instability and trade should not be negative if the model is correctly specified and theoretically it should be positive. He further adds that negative impact of exchange rate instability is due to a mechanism, which he calls, political economy of exchange rate instability. Siddiqui and Salam (2000) show that the reduction in misalignment reduces the adverse impact of exchange rate disequilibrium on economic growth.

According to Rangrajan (1986) volatility of exchange rate can impair the smooth functioning of trade and world economy. It may also lead to higher prices for internationally traded goods as traders and banks add a risk premium to compensate unanticipated exchange rate fluctuations.

Gognon (1993) and Bayoumi (1996) concluded that direct effects of exchange rate volatility on trade volumes are very small. Gotur (1985) found that the relationship between trade and exchange rate uncertainty is insignificant and the results are not robust but there could be an indirect impact on trade through trade prices if there is any. Bailey, Travles and Ulan (1986), Bacchetta and Wincoop (1998) and Devereus and Engel (2002) found insignificant association between nominal exchange rate volatility and trade flows. Korey and Lastrapes (1989) found that the volatility tends to depress imports, but the association between exchange rate volatility and trade is insignificant.

Exchange rate volatility increases the options to export in the world market. Higher volatility increases the potential gains from international trade, which makes production more profitable. A more volatile exchange rate implies higher risk exposures for international firms and this effect works in the opposite direction and tends to decrease production and volume of international trade. The net effect of exchange rate volatility on production and exports depends on the degree of risk aversion of the firm [Broll and Eckwert (1999)].

III. DATA AND METHODOLOGY

1. Data

Data on exchange rate, exports, imports, foreign exchange reserves, imports of intermediate consumer good, imports of intermediate capital goods, GDP, manufacturing value added, and agriculture value added has been taken from various issues of *Pakistan Economic Survey*, while data on domestic CPI and foreign (USA) CPI has been taken from *International Financial Statistics*. Data is collected annually from 1982 to 2004 in order to avoid the problem of 1981 devaluation.

2. Construction of Variables

Regressing variables in a level form can have problems of spurious regression and we may end up with inaccurate estimates. Therefore to avoid the problem of spurious regression we regressed variables in growth rate form, which gives the true coefficient estimates. The variables in growth rate forms are not readily available therefore we calculate it using the following formula.

$$\text{Growth Rate} = \frac{Y_t - Y_{t-1}}{Y_{t-1}}$$

where Y_t does not represent any specific variable. To calculate the devaluation/depreciation of real exchange rate, the calculation method is the same as calculating the growth rate of other variables but it is calculated indirectly, i.e., growth rate of Dollar per Rupee real exchange rate instead of Rupee per Dollar exchange rate to get the extent of depreciation in the currency.

Exports of Pakistan are mainly consists of agriculture and manufacturing products therefore we ignore the other components of GDP and used joint variable of agriculture and manufacturing in the exports equation. Price weighted real exchange rate is used for the analysis and CPI measure is used as a price variable for both foreign and home countries. GARCH variance is used to calculate exchange rate instability, manufacturing instability and agriculture instability, growth instability, imports instability, exports instability and instability in trade balance.²

3. Model

As discussed earlier that to avoid the problem of spurious regression it is better not to estimate equation in the level form. Therefore, log first difference (growth rates) of the variables is used in the model for estimation. Moreover, in estimating exports and imports equation we might face simultaneity problem in the real exchange rate variable and identification problem is also a major concern which was taken care very carefully. Therefore, 3SLS technique is used for the estimation to overcome these problems. The three equation model consists of exports equation, imports equation and exchange rate equation. Growth rate of exports is a function of growth rate of the imports of consumer goods, growth rate of the imports of capital goods, growth rate of agriculture and manufacturing, real devaluation, exchange rate instability, agriculture and manufacturing instability, and lagged dependent variable. Growth rate of imports is a function of growth rate of exports, growth of GDP, real devaluation, exchange rate instability, growth instability, growth of FOREX reserves. Devaluation of real exchange rate is a function of growth rate of trade balance, growth rate of FOREX reserves, lagged dependent variables, exchange rate

²Though there are several other measures of instability which were previously used by many researcher but those measures assume constant variances over time, however, changes in the exchange rates are known to process non-Gaussian distribution. GARCH measure of exchange rate uncertainty allows us to consistently parameterise the conditional variance of the exchange rate, it therefore provides a parametric estimates of exchange rate uncertainty. Unconditional variance (coefficient of variation) understates the change in exchange rate instability but GARCH variance does not neither it overstate [Dorodian and Carporale (1996)]. Moreover, the foreign exchange market depends on the conditional variance and unconditional variance calculated by mean variance approach is not normally distributed and gives large fluctuations in the data. While conditional variance is smaller in size and it is normally distributed [Frenkel (1992)]. Now a days researchers model exchange rate as a process in which exchange rate changes are normally distributed at each point in time and the variance of exchange rate depends on whether the most recent exchange rate changes have been large or small, a time series exhibiting this behaviour is frequently modelled by GARCH process [Butler (2000)]. Melvin and Yin (2000) are motivated from the fact the mixture of distribution model provides an economic rationale for GARCH modelling of asset prices when the rate of information arrival is mixing variable. Pozo (1992), Pesaran and Robinson (1993), Henry and Summers (1999) and Anderson, *et al.* (2000) used GARCH variance to derive instability in exchange rates.

instability, and instability in exports.³ The Model can be mathematically represented as the following equation

Exports Equation

$$\begin{aligned} \dot{X}_t = & \alpha_0 + \alpha_1 \dot{ICM}_t + \alpha_2 \dot{IKM}_{t-2} + \alpha_3 \dot{AM}_t + \alpha_4 \dot{AM}_{t-1} \\ & + \alpha_5 \dot{ER}_t + \alpha_6 \dot{ERI}_t + \alpha_7 \dot{AMI}_t + \alpha_8 \dot{X}_{t-1} + \alpha_9 \dot{X}_{t-2} + \varepsilon_{1t} \quad \dots \quad (1) \end{aligned}$$

Imports Equation

$$\begin{aligned} \dot{M}_t = & \beta_0 + \beta_1 \dot{G}_t + \beta_2 \dot{ER}_t + \beta_3 \dot{ERI}_t \\ & + \beta_4 \dot{G}_t + \beta_5 \dot{R}_t + \beta_6 \dot{R}_{t-1} + \varepsilon_{2t} \quad \dots \quad \dots \quad \dots \quad (2) \end{aligned}$$

Exchange Rate Equation

$$\begin{aligned} \dot{ER}_t = & \gamma_0 + \gamma_1 \dot{TB}_t + \gamma_2 \dot{R}_t + \gamma_3 \dot{R}_{t-1} + \gamma_4 \dot{ER}_{t-1} + \gamma_5 \dot{ERI}_t \\ & + \gamma_6 \dot{XI} + \varepsilon_{3t} \quad \dots \quad \dots \quad \dots \quad (3) \end{aligned}$$

where \dot{X} represents growth rate of exports, \dot{ICM} represents growth rate of intermediate consumer goods imports, \dot{IKM} represents growth rate of intermediate capital goods imports, \dot{AM} represents joint variable of growth rate of agriculture and manufacturing, \dot{ER} represents real devaluation, \dot{ERI} represents exchange rate instability, \dot{AMI} represents instability in agriculture—manufacturing instability, \dot{M} represents growth rate of imports, \dot{G} represents growth rate of GDP, \dot{R} represents growth rate of FOREX reserves, \dot{GI} represents growth instability. \dot{TB} represents growth rate of trade balance, \dot{XI} represents exports instability, ε_{1t} , ε_{2t} , ε_{3t} represent error term of Equations 1, 2 and 3 respectively, α_s , β_s and γ_s are parameters, and subscript t represents the time-period.

³We used imports instability with exports instability in Equation 3 but it was insignificant. Similarly we also used instability in trade balance instead of instability in exports and imports separately but it was also insignificant. Moreover, using exports instability alone gives more forecasting power therefore we only used exports instability in the equation.

Imports play vital role in enhancing exports, these imports could be in the form of raw materials or machineries; both are used in the manufacturing sector. It is expected that imports of consumer goods have direct contemporaneous association with exports, while imports of capital goods affect exports with two period lags because machinery imported by the producers first setup and then start production, therefore, it starts impacting exports after two years. Agriculture and manufacturing sectors are the key determinants of exports sector in Pakistan. Current productivity and existing stock in both sectors have significant impact on exports therefore, it is expected that current and lagged joint agriculture-manufacturing growth variable has positive association with exports. Real exchange rate plays vital role in determining the competitiveness of trade, real depreciation/devaluation makes home products cheaper in the world market, which results in higher level of exports of the country. So, devaluation helps in improving the trade balance and association would be negative. However, some researchers argue that exchange rate does not significantly affect exports or imports of the country unless the exchange rate is highly undervalued or overvalued and no other incentives are given to the traders. Variability in exchange rate, which is the main variable of our analysis, is expected to have insignificant impact on exports because Pakistan is not the country where exchange rate instability is one of the major problems and almost all the countries do not see the exchange rate of Pakistan unstable. Variability in agriculture and manufacturing is expected to have negative impact on exports. 1st and 2nd lag period dependent variables are also used in the exports equation and it is expected to have negative sign of both the variables because the trend of growth of exports was negative in the past periods.

Growth of exports in the imports equation shows the impact of import substitution policies on imports. Imports substitution policies were adopted to cut down the imports therefore it is expected to have negative sign of import substitution variable. However, in the era of globalisation, lowering the tariff rates and removal of other non-trade barriers may not show the negative association between the exports and imports. In that case positive association is expected between exports and imports. Growth is one of the most significant variables which explains imports of any country and it is expected to have positive association between growth and imports. Opposite to exports, exchange rate appreciation makes foreign country goods cheaper and thus imports more, therefore, it is expected to have positive association between imports and devaluation. Variability in exchange rate is expected to have significant negative impact on the imports of the Pakistan because in a small developing country the importers play safe and more cautiously than any other developed country and they avoid risk as much as they can because of not having lots of resources to cover the cost incurred by variability in exchange rate. Growth instability is expected to have significant impact on imports, however, growth instability is recorded here as a sudden increase or decrease in growth, therefore it could be in

any direction. Positive association between growth instability and imports means that growth instability is captured by an increase in growth rate of a country and *vice versa*. Even if the country's growth is high but if she does not have resources to finance imports then she has to borrow or cut down the imports. In this case, foreign exchange (FOREX) reserves are key to finance the imports. The country has more reserves can finance imports easily, however if the level of reserves are low then country has to borrow from other countries. Therefore it is expected to have positive association between FOREX reserves and imports.

Deterioration of trade balance leads to exchange rate devaluation therefore it is expected to have positive association between devaluation and trade balance. Increase in FOREX reserves leads to appreciation in exchange rate; therefore it is expected to have positive association between FOREX reserves and exchange rate devaluation. Most of the researchers explains exchange rate as a random walk process, they argued that exchange rate can only be explained by its lagged value [see Meese and Rogoff (1987) etc]. Therefore we include lagged dependent variable as well which captures the inertia in the variable. Moreover, we also include variability in exchange rate as an explanatory variable which captures the impact of unnecessary appreciation or depreciation of exchange rate and response by the exchange rate. If the instability in exchange rate is caused by excess appreciation/revaluation then the coefficient of real devaluation would be negative and positive if it is caused by excess depreciation/devaluation. Variability in exports is expected to affect significantly the movements in real exchange rate.

IV. DATA DESCRIPTIVE ANALYSIS

Compound growth rate of imports for the entire period (1982-03) was 3.77 percent (Table 1), while exports grew at the rate of 7.46 percent. However, the growth rate of intermediate consumer and capital goods imports was higher than the total imports, which are directly used in our industries. Manufacturing grew at higher rate compared to the agriculture sector, i.e., 5.56 percent and 3.67 percent respectively. The average real devaluation was 11.9 percent per year. Comparing pre and post 1990, exports grew at faster rate in pre 1990 than post 1990. On the other hand imports of intermediate consumer goods and intermediate capital goods were higher in post 1990 than pre 1990. This result is also coherent with the higher growth rate of agriculture and manufacturing sector in pre 1990 than post 1990. Due to this higher growth in imports and less growth in exports in pre 1990, real devaluation was higher in post 1990. In the year 1998-99, the year of nuclear detonation, growth rate of both exports and import was negative, while, both imports of consumer and capital goods were around their average growth rate level. This shows that due to sanctions imposed on Pakistan only the imports of final consumer and manufactured goods were cut down. However, in the following two years

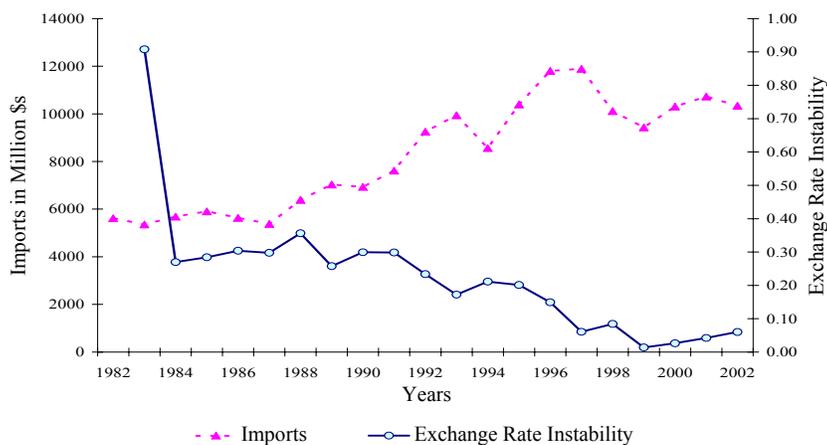
Table 1
Compound Growth Rates

Period	Exports	Imports				Agriculture	Manufacturing	Real Exchange Rate
		Total	Intermediate Capital Goods	Intermediate Consumer Goods				
1982-03	7.46	3.77	10.72	13.09	3.67	5.56	-11.79	
1982-90	9.12	2.66	10.03	10.02	3.96	7.21	-11.24	
1990-03	6.45	4.45	11.14	15.02	3.49	4.55	-12.13	
1998-03	5.28	3.85	12.04	14.21	1.83	5.27	-9.67	
2000-03	9.21	5.83	10.30	9.71	0.41	6.95	-8.92	
1998-99	-9.84	-6.78	9.86	12.85	1.95	4.07	-12.55	
1999-00	10.16	9.30	19.75	30.43	6.09	1.53	-8.98	
2000-01	7.39	4.07	11.91	20.14	-2.74	8.21	-10.18	
2001-02	-0.73	-3.63	13.58	0.32	-0.07	5.00	-11.56	
2002-03	22.17	18.18	5.58	9.56	4.15	7.67	-4.89	

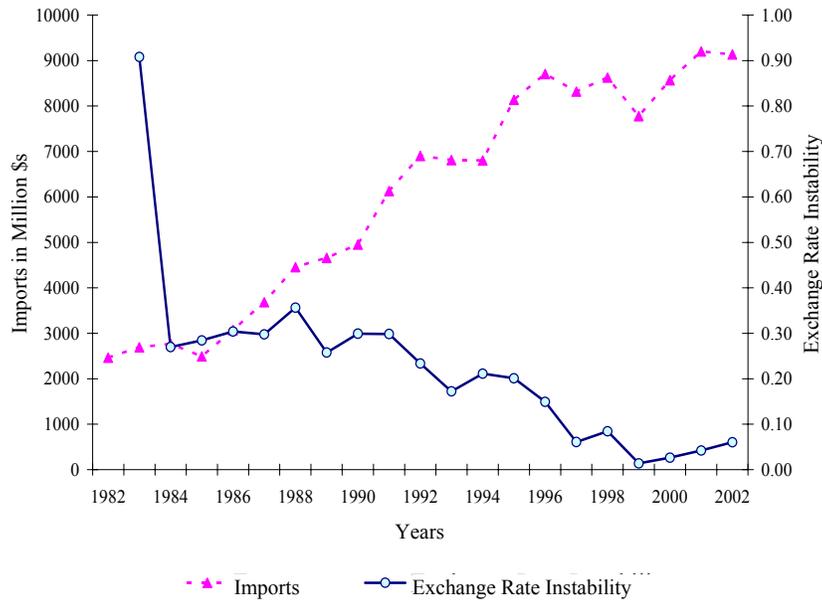
imports of intermediate capital goods rose sharply by 30.43 percent and 20.14 percent respectively and similarly the imports of intermediate consumer goods. The impact of these imports was started after two years in 2001 when the manufacturing grew at the rate of 5.21 percent and then in the following years at 5 percent and 7.67 percent respectively. Real devaluation was low in 1999-00 and 2002-03 when the exports grew at higher rate and high when exports grew at lower rate in 2000-01 and 2001-02.

Graph 1 shows the movements of exchange rate instability (derived from GARCH variance) and imports. It shows that imports have negative relationship with exchange rate instability in the long run as well as in the short run. Graph 2 shows the relationship between exports and exchange rate instability. It shows that exports have positive relationship with exchange rate instability in the short run but not very significant; however by looking at the overall trend of the two variables the relationship is negative. Graph 3 shows the relationship between

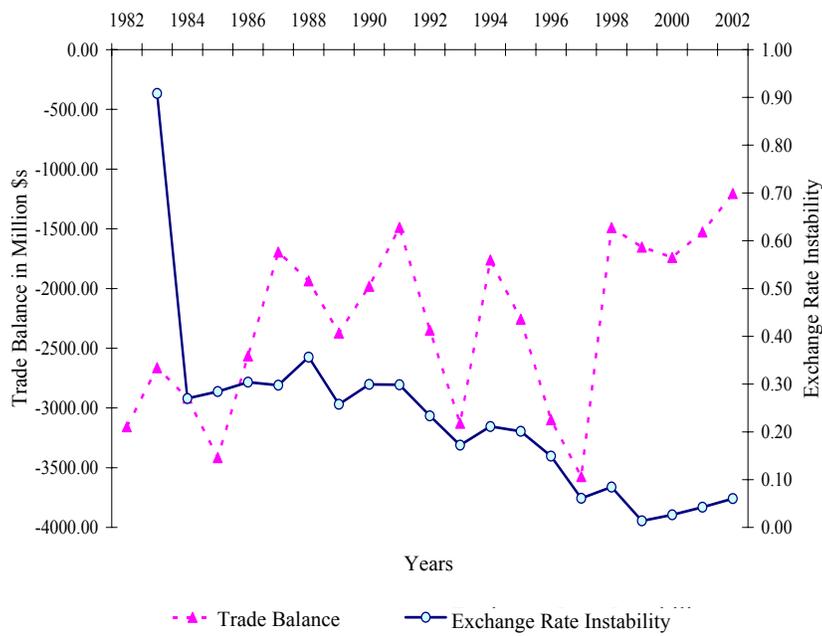
Graph 1. Exchange Rate Instability and Imports.



Graph 2. Exchange Rate Instability and Exports.



Graph 3. Exchange Rate Instability and Trade Balance.



trade balance and exchange rate instability. It shows positive relationship between the variables, however, till 1998 movement patterns of exchange rate instability and trade balance were ambiguous, but after 1998 the movements of exchange rate instability and trade balance are pro-cyclical.

V. EMPIRICAL FINDINGS AND RESULTS

Three Stage Least Square (3SLS) technique is used to estimate the simultaneous Equations (1), (2) and (3). We've estimated four equations and selected the best one among 4, which is represented by Final Equation in Table 2. The results are quite similar to our hypothesis formulated. Starting from Equation (1), exports has positive significant association with intermediate consumer goods imports and the value of the coefficient implies that one percent increase in imports of intermediate consumer goods leads to 0.58 percent increase in exports. Similarly, two-year lagged impact of intermediate capital goods imports is positive and significant as well. The value of the coefficient implies that one percent increase in intermediate capital goods imports leads to increase exports by 0.543 percent. Joint variable of agriculture—manufacturing growth shows insignificant contemporaneous effect while it has significant lagged impact on exports. Devaluation is measured indirectly and the estimated parameter of devaluation shows that the decline in the value of currency makes home goods cheaper in the world market, which helps in boosting exports of the country. Exchange rate instability does not have significant impact on exports. This result is as according to our hypothesis that Pakistan is not one of those countries where exchange rate instability is the major problem that affects the decision-making of exporters. Agriculture—manufacturing instability is also insignificant in explaining the exports behaviour of Pakistan. Two-year lagged dependent variable is significant in the exports equation, which shows that exports movements are random and can be explained by the lagged behaviour of the variable.

Coefficient estimates of imports equation show that exports have positive significant impact on imports. Though exports variable is used as a proxy to import substitution policies which were adopted to cut down imports but the coefficient shows the opposite results. The reason behind this result is the reduction in tariff rates and removal of other trade barriers, which invite more imports to come in the country. This shows that Pakistan is significantly implementing the WTO agreements, leaving the imports substitution policies and concentrating on outward oriented policies. As expected GDP growth has positive significant impact on exports. Coefficient of real devaluation is positive but *t*-value shows that devaluation does not have significant impact on imports. However, the value of the coefficient is positive which implies that opposite to its impact on exports, depreciation in currency makes foreign goods expensive which leads to decline in imports. Unlikely to the impact on exports,

Table 2

Empirical Findings and Results

Variables	Equation 1		Equation 2		Final Equation		Equation 3	
	Coefficient	t-values	Coefficient	t-values	Coefficient	t-values	Coefficient	t-values
EXPORTS Equation								
Constant	-0.344	-2.54**	-0.336	-2.51**	-0.361	-2.51**	-0.354	-2.45**
Growth of Intermediate Consumer Goods Imports	0.564	2.97*	0.551	2.93*	0.582	2.86*	0.580	2.85*
Lagged (-2) Growth of Intermediate Capital Goods Imports	0.494	2.39**	0.49	2.38**	0.543	2.58*	0.543	2.58*
Agri-Manf Growth	1.839	1.46	1.791	1.44	2.017	1.51	1.970	1.47
Lagged Agri-Manf Growth	3.522	2.93*	3.458	2.91*	3.648	2.84*	3.569	2.77*
Devaluation	-1.078	-1.49	-1.049	-1.46	-1.267	-1.74***	-1.261	-1.73***
Variability in ER	30.901	1.17	31.841	1.21	29.353	1.04	30.586	1.08
Variability in AMG	0.000001	0.7	0.000001	0.69	0.000001	0.45	0.000	0.42
1st Lagged Dependent	-0.133	-0.61	-0.134	-0.62	-	-	-	-
2nd Lagged Dependent	-0.807	-3.03*	-0.81	-3.05*	-0.818	-2.88*	-0.816	-2.87*
IMPORTS Equation								
Constant	-0.052	-0.74	-0.042	-0.62	-0.050	-0.72	-0.085	-1.08
Growth of Exports	0.364	2.27**	0.376	2.37**	0.356	2.22**	0.298	1.62
Growth	2.512	2.53**	2.396	2.48**	2.503	2.52**	2.800	2.44**
Devaluation	0.515	1.27	0.542	1.35	0.523	1.29	0.437	0.94
Variability in ER	-38.272	-2.12**	-38.305	-2.12**	-37.744	-2.09**	-33.132	-1.60
Growth Instability	0.133	2.9*	0.128	2.87*	0.131	2.87*	0.145	2.78*
Growth of Reserves	-0.085	-2.21**	-0.095	-2.78*	-0.085	-2.20**	0.176	3.65*
Lagged Growth of Reserves	0.163	3.81*	0.161	3.78*	0.163	3.83*	-0.137	-6.55*
EXCHANGE RATE Equation								
Constant	-0.139	-6.63*	-0.14	-6.75*	-0.138	-6.61*	0.101	2.75*
Growth Rate of Trade Balance	0.105	2.86*	0.112	3.3*	0.106	2.89*	-0.031	-1.34
Growth of Reserves	-0.014	-0.56	-	-	-0.014	-0.55	-	-
Lagged Growth of Reserves	-0.07	-2.72*	-0.07	-2.74*	-0.069	-2.69*	-0.070	-2.73*
Lagged Dependent Variable	-0.85	-3.98*	-0.808	-4.05*	-0.849	-3.97*	-0.875	-4.09*
Variability in ER	27.753	3.68*	27.394	3.66*	27.969	3.71*	27.277	3.61*
Variability in Exports	-8.017	-3.37*	-7.366	-3.61*	-8.157	-3.45*	-8.255	-3.45*

Note: *, **, *** Represent significance level at 1, 5 and 10 percent.

exchange rate instability affects imports significantly and inversely. This implies that importers of the country are risk averter and do not want to take risk even if the volatility is low. However, the positive aspect of the result is that the insignificant impact of exchange rate instability on exports and significant negative impact on imports helps in improving the trade balance. This shows that exchange rate instability is caused by excess depreciation rather than excess appreciation. Growth instability has significant positive impact on imports, which implies that the movements between the two are pro-cyclical which is also shown by the coefficient of growth in exports equation. FOREX reserves are the main determinant of imports in our country. The main example in this regard was the year 1998-99 when the economic sanctions were imposed, the country was short of reserves and our imports declined. Both current and lagged level of FOREX reserves has significant impact on imports. However, interestingly, current level of FOREX reserves has significant negative impact while lagged FOREX reserves have positive significant impact on imports. This implies that imports are financed on the level of last year's FOREX reserves but it may not respond to the current changes in the FOREX reserves.

The coefficient estimates of real exchange rate equation shows that growth rate of trade balance has significant positive impact on devaluation, which implies that improvement in trade balance leads to appreciation in currency. FOREX reserves have insignificant contemporaneous impact on devaluation while one-period lagged impact of FOREX reserves is significant. Though the adjustment should be contemporaneous but there are certain data issues therefore we could not get significant contemporaneous impact. Lagged dependent variable is significant in explaining the devaluation of home currency, which proves the random walk hypothesis of exchange rate determination. Exchange rate instability has positive significant impact on the real devaluation. This also implies that instability in exchange rate is mainly caused by excess depreciation. After that real exchange rate appreciates and adjusts to its equilibrium value. This is also known as Dornbusch overshooting hypothesis. Exports instability has significant impact in explaining the real devaluation. The coefficient of exports instability show negative impact on the devaluation, which implies that instability in exports mainly caused by decline in exports, which results in the decline in the value of currency to make the domestic things competitive in the world market.

VI. SUMMARY AND CONCLUSIONS

Our primary objective is to examine the nature of association of exchange rate instability with exports and imports. Analysis is based on simultaneous equations model using 3SLS technique. The study considers four risk variables, i.e., exchange rate instability, agriculture—manufacturing instability, growth instability, and exports instability. GARCH variance is used to calculate instability in the three variables.

It is concluded that exchange rate instability affects exports positively and imports negatively which implies that it helps in improving trade balance. However, the impact on exports is insignificant but significant with imports but we cannot say with certainty that whether it affects trade balance positively because we did not use direct trade balance variable in the model. It is also concluded that real devaluation helps in improving the trade balance by reducing imports and increasing exports. Imports and exports have positive significant association with each other, which shows that Pakistan is significantly following the policies which are coherent with WTO agreements. Consumer goods imports have direct contemporaneous association with exports while intermediate capital goods imports which mainly include machineries have two-period lagged impact on exports. Growth plays significant role in the imports of country, while previous stock as well as current production of both agriculture and manufacturing helps in boosting the exports. Exchange rate instability also affects the real exchange rate movements and it is concluded that initially in response to some shock exchange rate depreciates more than it should and then adjusts to its equilibrium level.

From the above conclusion we cannot say with certainty that exchange rate instability is always better for trade balance because in most of the years the instability in exchange rate is mainly caused by excess depreciation not by the excess appreciation. Flexible exchange rate regime is prevailing now a days in Pakistan. Since September 2001 it declines from Rs 64/\$ to Rs 58/\$ and now a days it is Rs 59.70/\$. The appreciation in exchange rate is due to high inflow of foreign exchange, which may adversely affect the exports and worsens the trade balance. The main problem stems from the uncertainty that exchange rate instability can create in the actual domestic currency earnings to exporters. So, we should have separate exchange rate for exporters when our exchange rate appreciates so much, otherwise our exporters might end in loss. In this scenario when the exchange rate appreciates too much in response to high inflow of foreign exchange, State Bank intervention would be good for the exporters to control the exchange rate, which helps in controlling the variability in it. However, controlling the exchange rate by intervention is against the policy of inflation targeting which we've adopted recently.

This study has many question marks for the future research such as why does the contemporaneous association between FOREX reserves and real devaluation is insignificant, what are the other instabilities in the market which can affect exports and imports and real exchange rate, what type of instability is captured by GARCH variance etc. In the future research one may use quarterly or monthly data if possible, which will definitely give better and more comprehensive results. Moreover it is also good if we can check the relationship between exchange rate instability and trade balance in the post 9/11 period in which the appreciation of exchange rate created problems for the exporters.

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ABSTRACT

The variations in exchange rate play a vital role in the determination of trade balance. Volatile exchange rate shatters the investor's and trader's confidence, and slows down the process of trade, which results in slower growth. In this paper, other market instabilities—such as GDP growth instability in imports equation and agriculture and manufacturing instability in exports equation—have been used with exchange rate instability, and GARCH variance is used to measure it. It is found that the impact of exchange rate instability on exports is positive but insignificant, while the impact on imports is negative and significant.

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