

Exchange Rate Regimes and Trade Deficit

A case of Pakistan

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Abstract

The study aims at the investigation of the relationship between the volatility of exchange rate and imports, exports and trade deficit of Pakistan while making a comparison between three consecutive decades (1980 through 2010). This comparison is intended to account for the political influence of democratic and non-democratic regimes on exchange rate, imports, exports, and trade deficit. The data of the variables is collected from official websites of Pakistan Bureau of Statistics and State Bank of Pakistan over a period of 30 years. The first part of the study is descriptive comparative analysis which showed that in the last regime (2000-10) exchange rate volatility performed most consistently; exports, imports and trade deficit growth were highest. The second part of the study is to investigate the link between the volatility of exchange rate, imports, exports and further trade deficit. The results showed the exchange rate volatility does have any significant impact on trade deficit. However, it has significant positive (contradictory to the previous studies) impact on imports and exports. Moreover, the duration for analysis can be extended.

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1 Introduction

Pakistan followed different exchange rate regimes; a fixed exchange rate before 1982, managed floating exchange rate since 1982 and flexible exchange rate system since July 2000. due to controlled exchange rate a very small fluctuation was noted during the last regime. However, (Kumar and Dhawan,1991) concluded that during the both regimes, fixed and managed floating rate regime, the share of Pakistani exports at remained fairly stable. In fact Pakistan's position as measured in the form its contribution to world exports remained flat over the previous 24 years. It ranged from 0.12 percent to .18 percent, the first figure is minimum and belongs to 1980 and second figure is a maximum and belongs to 1992. Later on, the share of Pakistani exports was .17 percent during 2002-2003. It was due to floating exchange rate which caused the exchange rate volatility. The sole research was conducted by (Kumar and Dhawan,1991) in the context of Pakistan who observed the relationship between the volatility of exchange rate and exports in the context of developed world which covered a period of 1974-1985. The findings of the study are as following; the exchange rate volatility significantly impacts the demand in exports, Japan and West Germany were suggested as an alternate market for the Pakistani exports instead of USA and UK. In Pakistan, there has been adverse volatility in exchange rates over the decades, this primarily derived attention towards this phenomenon equally for policy makers as well as researchers. Both, the nature as extent, dimensions of this volatility have lead them to investigate the impact further on the trade volume of Pakistan so that appropriate policy measure can be taken. The greater volatility in exchange rate has resulted in declining trend in trade in many countries which ultimately added to the further uncertainty about the prospect profitability from the exports of the country. This uncertainty may ask for hedging in the short run and may also effect the investments decisions of the firms in long run. However, the results of long run volatility have varied greatly. Although we see a large body of literature available on the topic, but the picture in the context of Pakistan looks dismal. We have tried to look at the phenomenon from a political perspective making it a regime-wise comparison.

2 Review of Literature

While we go through the literature on the topic, the studies yield mixed result. The research done by (Hooper and Kohlhagen,1978) is considered to be pioneer in this arena. However, they did not found any significant effect of the volatility of exchange rate on trade volume. The study covered both bilateral and multilateral

trade among developed countries over a period 1965–75.

(Cushman,1983) had focused on the relationship between volatility in real exchange rate and trade volume; and found the negative relationship between them. He also conducted another study by considering a third country into the framework. The results of the study showed that the volatility in exchange rate effects on bilateral trade flows which further explored dependence on two other factors i.e. , the exchange rate risk and exchange rate fluctuations.

(Akhtar and Hilton,1984) studied the volatility in exchange rate and used standard deviation in order to analyse the data. He found that the volatility in exchange rate had negative impact on the imports and exports of bilateral trade between West Germany and United States. This impact was found highly significant.

(Gotur,1985) examined the exchange rate risk for more than two countries by increasing the sample size in his study. Not like as (Akhtar and Hilton,1984), this study revealed that there is no significant relationship exchange rate risk and trade volume. The results of the study were same as found in the report published by IMF in 1984.

(Chowdhury ,1993) conducted a study to find out the impact of exchange rate volatility on the flows of trade. The study focused on the G-7 countries. The results showed a significant negative relationship between of the exchange rate volatility and trade volume over the sample.

(Baak,Mahmood, and Vixathep, 2002) also conducted the similar study in East Asian countries. The countries included Hong Kong, South Korea, Singapore and Thailand. The focus of the study was both over short run and long run. They also found a negative relationship between the volatility of exchange rate and exports. It is also worth mentioning here that several studies have been conducted to explore the relationship between the volatility of exchange rate and the growth of exports. But the results of such studies did not produce any conclusion. However, these studies produced links between exchange rate policies and the level of growth.

Some more studies conducted on the topic were; (Bahmani-Oskooee; 1984, 1986; Coes,1981; Rana,1983). (Bahmani-Oskooee,1984,1986). These studies included developing countries and also included the pegged exchange rate regimes. The results of these studies concluded that the exchange rate has a significant impact on trade flows. (Coes,1981;Rana 1983) studied the topic depending upon another study conducted by (Hooper-Kohlhagen,1978). Coes studied Brazilian exports and included 22 sectors over a period of 1966-1974. The study concluded that over the pegged exchange rate regime, the Brazilian economy observed a significant decrement in the exchange rate volatility. This decrement lead to price changes which resulted in openness in economy after 1968.

As observed, (Rana,1983) studied the developing countries and his study is considered to be the most comprehensive per se. he also derived similar results as the study of (Bahmani-Oskooee,1984). He also established the demand function for all the countries, and inferred insignificant and negative relationship between

the volatility of exchange rate and the volume of imports.

Another research conducted by (Alam-Qazi,2010) studied the depreciation of the local currency and the effective exchange rate volatility in a real sense. The study found them to be unrelated to import demand. The study was conducted in the context of Pakistan and the results can be generalized over the long run too. However, the short run perspective of the study explored the dynamic tends to of the variable like real economic growth, relative price of imports,real effective exchange rate and real effective exchange rate volatility Granger. The study concluded that the variable discussed effect the demand of imports over the short run.

Exchange rate policy has assumed an added importance in recent years due to changing global economic conditions. Another study examined the foreign exchange reserves, real and effective exchange rate response of imports demand in Pakistan using both classical and time series econometrics approaches. The real depreciation of the exchange rate has been found to have dampening impact on import demand. Adoption of a realistic exchange rate is highly desirable. Domestic inflation and an unrealistic exchange rate may discourage the investment flows needed to the new incentives. A stable and long-run relationship exists between imports and GDP, effective exchange rate and relative import prices. Co integration results do not support the long-run equilibrium situation between imports; and foreign exchange reserves and real exchange rate (Muhammad Afzal, 2007).

Finally, the study conducted by (S.Alam, Q.M. Ahmad, 2011)aimed at exploring the impact of exchange rate volatility on trade deficit of Pakistan. The study also discusses some important variables of bilateral imports of Pakistan with its major trading partners like USA, UK, Japan, Saudi Arabia, UAE, Germany and Kuwait. It covered a period of 1982Q1 to 2008Q2.The study concluded income elasticity to be significant with differing magnitude. It was also concluded that the volatility in exchange rate has negative and statistically significant for Pakistan's bilateral import from UK in the long run.

3 Objectives of the study

As the literature review suggests, previous study are provide mixed result on how exchange rate volatility impacts imports , exports and trade deficits. However, most of the studies showed that exchange rate volatility negatively affects imports, exports and trade volume. The purpose of the study is two-fold, descriptive and analytical. Firstly, we make a comparison between three decades, 1980-90, 1990-00, 2000-10. Out of the three decades being analyzed are two are non-democratic and a democratic. The variables intended for comparison are exchange rate volatility, imports, exports, and trade deficit. Our study is different from the previous ones in that we exclude trade volume and include trade deficit instead.

Secondly, the second objective is to explore the impact of the volatility of exchange rate on imports, exports and trade deficit. For the purpose, we develop three different models. We prospect a negative impact of the volatility of exchange rate on imports and exports as suggested by the literature.

4 Data and Methodology

As discussed earlier our purpose of the study has been For the purpose of performing the analysis, data related to exchange rate, imports, exports, and trade deficit has been collected from tow websites; State Bank of Pakistan(SBP) and Pakistan Bureau of Statistics(PBS). We have collected data for 30 years. Analysis was performed over a period of 30 years and the period was further subdivided into three decades; 1980-90, 1990-00, 2000-10. The analysis was conducted in phases i.e. descriptive and analytical. The analyses are performed by using SPSS 16.

In order to obtain the second objective of the study, we have applied three different ordinary least square models. The models which serve our purpose are given as below:

$$TD = \alpha_1 + \beta_1 EV_1 + \varepsilon_1$$

$$IMP = \alpha_2 + \beta_2 EV + \varepsilon_2$$

$$EXP = \alpha_3 + \beta_3 EV + \varepsilon_3$$

Where, in models, TD (trade deficit), Imp (imports), Exp (exports) are dependent variables and EV which represents exchange rate volatility as independent variable. The above models possess all the assumptions of classical linear regression models (CLRM).The parameters of the above models are estimated by using Ordinary Least Square technique.

4 Main Results

4.1 Descriptive Analysis

Table 1: Descriptive Statistics of the Sample

Decade	Descriptive	Volatility of Exchange Rate	Avg Annual Exchange Rate	Exports	Imports	Trade Deficit
1981-90	Min	0.14	10.65	2489.20	5363.60	-3381.30
	Max	1.00	22.53	4964.70	7069.40	-1603.30
	Mean	0.49	16.65	3430.62	5943.77	-2471.28
	S.D	0.32	3.60	901.12	605.11	534.83
	C.V	0.65	0.22	0.26	0.10	-0.22
1991-00	Min	0.13	24.87	6167.00	7631.20	-3522.10
	Max	3.00	59.08	8707.10	11894.20	-1415.70
	Mean	1.16	38.65	7685.15	9936.19	-2206.76
	S.D	0.95	10.89	879.93	1250.29	735.31
	C.V	0.82	0.28	0.11	0.13	-0.33
2001-10	Min	0.16	57.59	9134.60	10339.50	-20196.70
	Max	2.69	85.61	19290.00	39965.50	-1015.50
	Mean	0.98	66.84	14565.85	23809.68	-9036.57
	S.D	0.89	10.67	3695.06	10648.35	6939.42
	C.V	0.90	0.16	0.25	0.45	-0.77

4.1.1 First Decade (1980-90)

This era was first of two non-democratic ears included in our analysis. Prior to 1982 the exchange rate was used to be fixed. But Pakistan adapted to manage floating exchange rate since 1982 through 2000. During the first decade the average annual exchange rate has fluctuated between Rs10.65 per dollar to Rs

22.53 per dollar with a mean and standard deviation of Rs16.65 per dollar and Rs 3.60 per dollar respectively. This shows an increase of 111.54 percent during the decade. Furthermore, coefficient of variation is 0.22 which further helps us in making a decade wise comparison.

The volatility of exchange rate which is scaled standard deviation of exchange rate plummeted between Rs 0.14 per dollar and Rs 1 per dollar with a mean and standard deviation of Rs 0.49 per dollar and Rs 0.32 per dollar respectively. The coefficient of variation was Rs 0.65 per dollar during the decade.

The exports and imports fluctuated between \$2,489.20-\$4,964.70 and \$5,363.60-\$7069.40 respectively. Exports increased by almost 100 percent whereas imports increased by 31.8 percent. Exports and imports had means and standard deviations of (\$3,430.62, \$5,943.77) and (\$901.12, \$605.11) respectively. coefficient of variation for exports was 0.26 and that of imports was 0.10.

Trade deficit moved between \$-3,381.30-\$-1,603.30 during the decade with a mean of \$-2,471.28 and standard deviation of \$534.83. the coefficient of variation was -0.22.

4.1.2 Second Decade (1990-00)

This the only democratic ears included in our analysis. This era also followed managed floating exchange rate system. During the first decade the average annual exchange rate has fluctuated between Rs24.87 per dollar to Rs59.08 per dollar with a mean and standard deviation of Rs38.65 per dollar and Rs10.89 per dollar respectively. This shows an increase of 137.55 percent during the decade. Furthermore, coefficient of variation was 0.28which further helps us in making a decade wise comparison.

The exchange rate volatility as measured by standard deviation of exchange rate plummeted between Rs0.13 per dollar and Rs 3 per dollar with a mean and standard deviation of Rs 1.16 per dollar and Rs 0.95 per dollar respectively. The coefficient of variation was Rs 0.62 per dollar during the decade.

The exports and imports fluctuated between \$6,167.00-\$8,707.10 and \$7,631.20-\$11,894.20 respectively. Exports increased by almost 41.18 percent whereas imports increased by 55.86 percent. Exports and imports had means and standard deviations of (\$7,685.15, \$9,936.19) and (\$879.93, \$1,250.29) respectively. Coefficient of variation for exports was 0.11 and that of imports was 0.13.

Trade deficit moved between \$-3,522.10-\$-1,415.70 during the decade with a mean of \$-2,206.76and standard deviation of \$ 7,35.31. The coefficient of variation was -0.33.

4.1.3 Third Decade (2000-10)

This was the most interesting and second non-democratic era in our analysis. The exchange rate was pegged during this era. During the decade the average annual

exchange rate has fluctuated between Rs57.59 per dollar to Rs85.61 per dollar with a mean and standard deviation of Rs66.84 per dollar and Rs10.67 per dollar respectively. This shows an increase of 48.65 percent during the decade. Furthermore, coefficient of variation was 0.16 which further helps us in making a decade wise comparison.

The exchange rate volatility as measured by standard deviation of exchange rate plummeted between Rs0.16 per dollar and Rs2.69 per dollar with a mean and standard deviation of Rs0.98 per dollar and Rs0.89 per dollar respectively. The coefficient of variation was Rs0.90 per dollar during the decade.

The exports and imports fluctuated between \$9,134.60-\$19,290.00 and \$10,339.50-\$39,965.50 respectively. Exports increased by almost 111.17 percent whereas imports increased by 286.53 percent. Exports and imports had means and standard deviations of (\$14,565.85, \$23,809.68) and (\$3,695.06, \$10,648.35) respectively. Coefficient of variation for exports was 0.25 and that of imports was 0.45.

Trade deficit moved between \$-20,196.70-\$-1,415.70 during the decade with a mean of \$-9,036.57 and standard deviation of \$6,939.42. The coefficient of variation was -0.77.

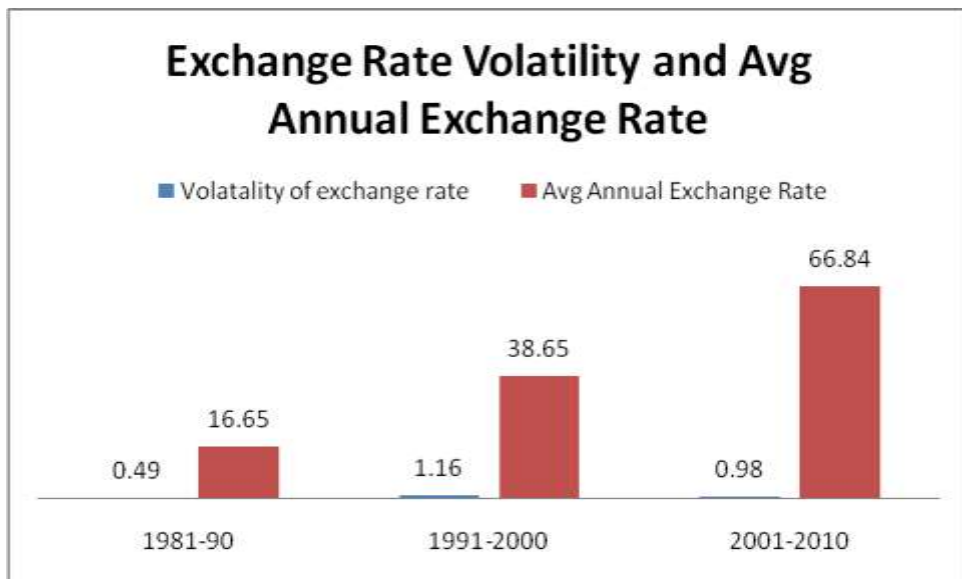


Figure 1: Average Exchange Rate Volatility & Exchange rate

The part of reason may be the underlying political factor. The lowest coefficient of variation also depicts the same thing. The same phenomenon has been explained by **Figure-1**. Although the average annual exchange rate seems to be very high but when coupled with the mean of volatility of exchange rate yields the same results as discussed earlier.

While we analyze the exports and imports through the decades, we see that increase in average exports and imports were the highest during the last decade (2000-10).

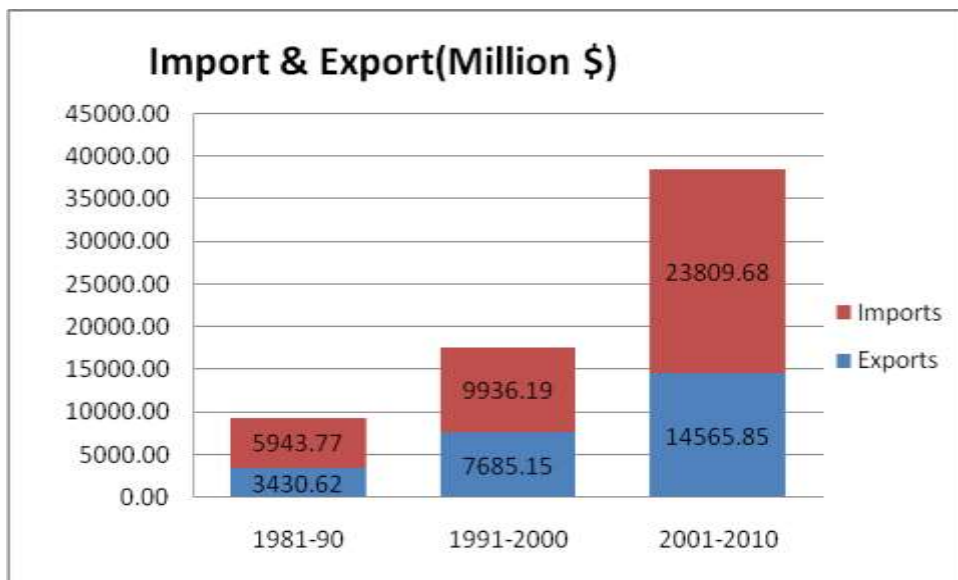


Figure 2: Imports and Exports

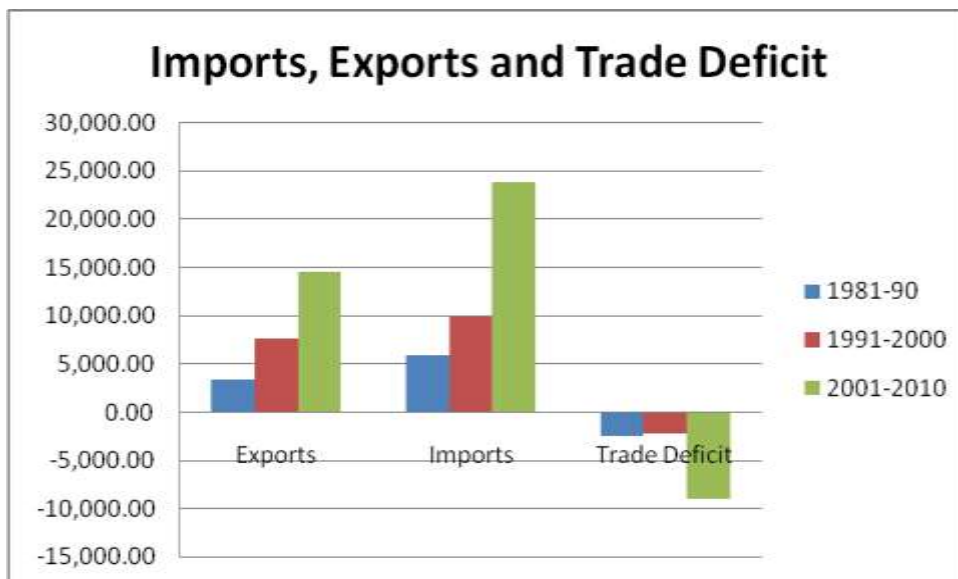


Figure 3: Imports, Exports & Trade deficit

The reason for this increase seems to be moderate investment and trade policies during the non-democratic Regime and pegging of the exchange also played its

role. Figure-2 enlightens the facts. Figure-3 explains the trade deficit which was highest during the last decade (2000-10) mainly due to rise in imports during the era.

4.2 Regression Analysis

Table 2: Regression Analysis of the Studied Models

Model	Intercepts	Slopes	t-stats	R-Squares
Model 1	-3,201.65 (1,371.93)	-1,558.69 (1,138)	-1.368 (0.18)	0.39
Model 2	6,855.23 (1,341.40)	1,940.35 (1,113.38)	11.74 (0.00)	0.81
Model 3	10,103.21 (2,598.66)	3,557.6 (2,156.93)	9.65 (0.03)	0.77

The estimated forms of the models (a), (b) and (c) are given below with their explanations:

$$TD = -3,201.65 + (-1,558.69)EV \dots \dots \dots (1)$$

Equation-1 shows that whenever the exchange rate volatility is zero then trade deficit will be \$ -3,201.65 and if we change exchange rate volatility with the rate of Rs1 per dollar then the trade deficit will decrease by 1,558.69 dollars. As the t-stat is -1.368 (p-value 0.18) which is insignificant and the value of R-square, which shows the explanatory power of the model, is 0.39 low hence the overall model is insignificant. Thus, it results in rejection of the hypothesis as exchange rate volatility plays no significant in determining trade deficit.

$$Imp = 6,855.23 + 1,940.35EV \dots \dots \dots (2)$$

Equation-2 shows that whenever the exchange rate volatility is zero then imports will be \$ 6,855.23 and if we change exchange rate volatility with the rate of Rs1 per dollar then the imports will increase by 1,940.35 dollars. As the t-stat is 11.74 (p-value 0.00) which is significant and the value of R-square, which shows the explanatory power of the model, is 0.81 high hence the overall model is significant. Thus, it results in the acceptance of the hypothesis as exchange rate volatility plays significant positive in determining exports.

$$\text{Exp} = 10,103.21 + 3,557.6\text{EV} \dots\dots\dots(3)$$

Equation-3 shows that whenever the exchange rate volatility is zero then exports will be \$ 10,103.21 and if we change exchange rate volatility with the rate of Rs1 per dollar then the exports will increase by 3,557.6 dollars.

As the t-stat is 9.65 (p-value 0.03) which is significant and the value of R-square, which shows the explanatory power of the model, is 0.77 high hence the overall model is significant. Thus, it results in the acceptance of the hypothesis as exchange rate volatility plays significant positive in determining imports.

5 Conclusion

The study was an addition to the previous studies conducted on the topic in terms of a comparison between democratic and non-democratic regimes over last 30 years. The first part of the study was the comparison between three decades (1982-90, 1990-00, 2000-10). Our descriptive analysis showed that the last decade (2000-10) was consistent with respect to exchange rate volatility and also produced highest increase in exports and imports where the trade deficit was the maximum during the decade. The second part of study was to find out the relationship between exchange rate volatility and trade deficit, imports, and exports. Out the three models developed, the one including exchange rate volatility and trade deficit was insignificant. Our study was different from the previous studies in that it included trade deficit rather than the trade volume and the study made a comparison between democratic and non-democratic regimes.

Although the study is very valuable in its own way, it's still has some limitations. Firstly, the duration of data variables can be extended. Secondly, imports, exports and trade deficit data was available on an annual basis, it would have been better if we had monthly data.

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