Factors Affecting Volatility of Exchange Rates in Pakistan - An Analysis of Volatility in Pre-Democratic Era and Post-Democratic Era

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Abstract

The purpose of the identify the factors that affect exchange rate volatility in Pakistan emphasizing on the political regime of the country, for this purpose the data of exchange rate was collected from the website of State Bank of Pakistan. In order to achieve the result test such as ADF, Cointegration test were employees which showed that GDP, trade openness and growth rates except FDI has a significant effect on the volatility. Further, we conducted a brief comparison of the Pre democratic and post democratic volatilities shows that post democratic regime is significantly more volatile than the pre democratic regimes because of political instability and most importantly due to the fixed exchange rates in pre democratic regime for a long time.

Keywords: Exchange Rate, Gross Domestic Product (GDP), Foreign Direct Investment (FDI), Volatility, Democratic regime.

1. Introduction

This paper is an attempt to identify the factors that affect exchange rate volatility in Pakistan emphasizing on the political regime of the country. The findings of this paper offer an empirical justification of the association among the exchange rate volatility and the democracy of Pakistan to reach the influence of the former on stable economic growth of the country. To ensure that the paper serve this purpose, we have designed a model, which can be controlled for the conventional factors that have significant influence on exchange rate volatility, notably the choice of political regime and macroeconomic performance in Pakistan. Determining the reasons for high volatility of exchange rate in Pakistan is crucial due to its strong relationship with the economic growth and its stability. Volatile exchange rate is common to result in suppressed international trade. Despite missed evidences in the empirical studies, literature in this context contains a consensus that high exchange rate volatility has adverse effect on international trade (Sauer and Bohara, 2001; Dell'Ariccia, 1999; Chowdhury, 1993). At least in the developing countries, authors affirm that high volatility in exchange rate provokes profitability and investment (Bleaney and Greenaway, 2001).

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The current study does not only focus on the factors that significantly affect volatility of exchange rate in Pakistan, but also compares their effect with each other. Hence, the results may provide technical assistance in dealing with the issues of exchange rate.

This paper consists of five sections. The first section is an introduction of the paper, which consists of a brief discussion of exchange rate behavior in Pakistan and identification of the aims objectives of this paper. The second section is the literature review. The third section presents the details of data used and methodology followed in the paper to achieve the aims and objectives. The fourth section presents the results of the methods introduced in the third section and discusses the findings. The fifth section concludes the paper.

1.1 Background

This section provides a brief review of exchange rate of Pakistan for the last fiscal year. Reason for choosing the last fiscal year is to identify the latest issues so that the study has significant objectives. This section is further divided into two parts. The first part discusses the behavior of exchange rate of Pakistan in the fiscal year 2011-12. The second part discusses the effect of exchange rate on another economical variable of Pakistan for the same period.

1.1.1 Exchange Rate in FY12

In fiscal year 2010-11, depreciation in Pakistani currency against US dollar was 0.6 percent while that in the fiscal year 2011-12 is reported to be 9.1 percent. Depreciation in Pakistani Rupee was relatively gradual through most of the years despite the servicing of IMF loans and lumpy oil payments. Rather than these bilateral and multilateral payments, adverse market sentiments and geo-political situations have strong influence on exchange rate depreciation in Pakistan. In the fiscal year 2011-12, response of Pakistani Rupee to noneconomic factors was the sharpest in November 2011 and May 2012. Figure 1.1 illustrates a comparison of movement in Pakistani Rupee and performance of Pakistan's reserves.

Figure 1.1: Daily Movement in exchange rate and SBP reserves

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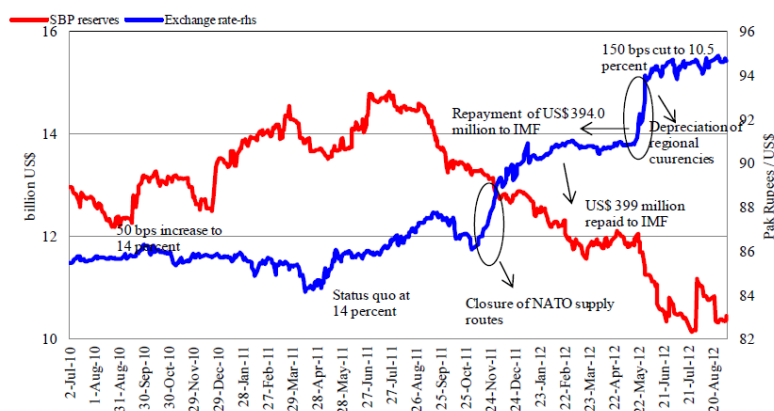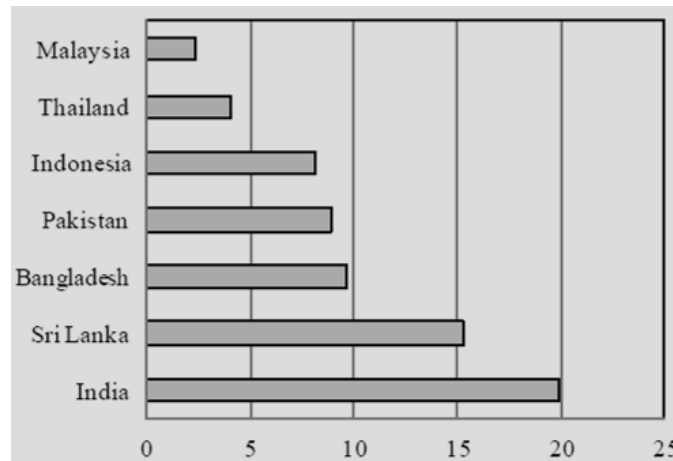
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Figure 1.2: Depreciation against US dollars in 2011-12

Global economic development also causes exchange rate depreciation and a part of that in Pakistan during 2011-12 was subject to this development. Figure 1.2 illustrates the same; however, depreciation of national currency in Pakistan is greater in comparison with that in the South Asian countries.

Depreciation in the nominal effective exchange rate of Pakistan in 2010-11 was 6.7 percent while that in 2011-12 was 3.9 percent. Reason for this reduction in depreciation of nominal effective exchange rate was a 4.6 appreciation of Pakistani Rupee against Euro, which was expected given the economic situation in the Euro zone. Other than this appreciation, Pakistani Rupee depreciated against major currencies such as British Pound, Japanese Yen, and US Dollar, which resulted in overall depreciation of the currency in the nominal terms.

The relative price index in Pakistan was increased by 9.3 percent in 2010-11 while that in 2011-12 was 8.8 percent. Main reason behind this decline in the increase of relative price index is the pressure of inflation in Pakistan, which was relatively higher than that in the trading partners of Pakistan. On the other hand, in 2011-12, real effective exchange rate appreciated by 3.8 percent while that in 2010-11, was slightly depreciated. Reason for this appreciation is the increase in relative price index that offset the nominal depreciation of Pakistani Rupee.

1.1.2 The Role of Exchange Rate in FY12

Core inflation in Pakistan is subject to the depreciation of the Rupee. Since the problem of balance of payment in 2008, correlation between the movement in non-food inflation and the depreciation in the exchange rate has strengthened, which is depicted in the figure 1.3.

Figure 1.3: The link between the exchange rate and the inflation
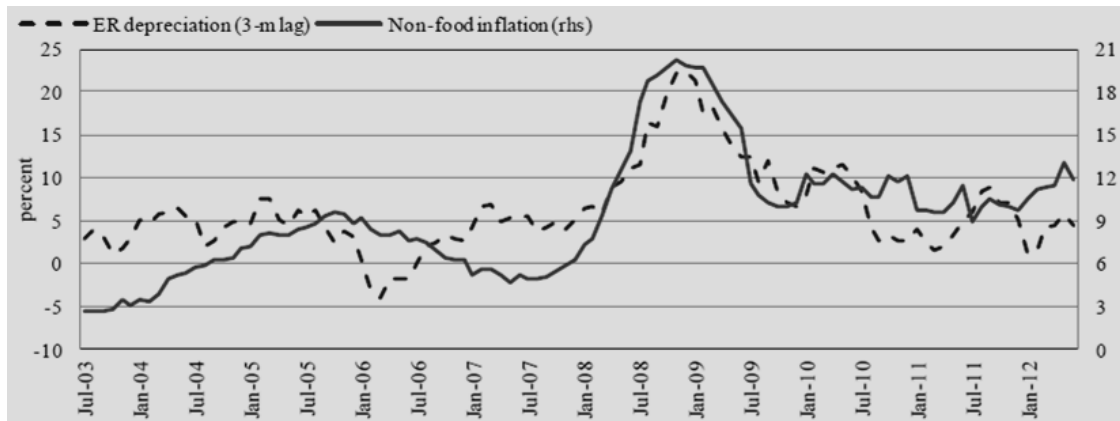
The precise link between inflation and exchange rate is likely to be more nuanced while the fact that imported inflation has led to domestic price pressure is tempting. In agriculture based industrial country like Pakistan, depreciation of currency is strongly linked with the domestic price of major crops and other inputs and also the price of oil and petroleum products. This further trigger inflation in the economy as the producers try to transfer the effect. Therefore, since 2008, there exists a strong correlation between lagged depreciation and non-food inflation, which is illustrated in Figure 1.4.

Figure 1.4: Association between non-food inflation and exchange rate depreciation
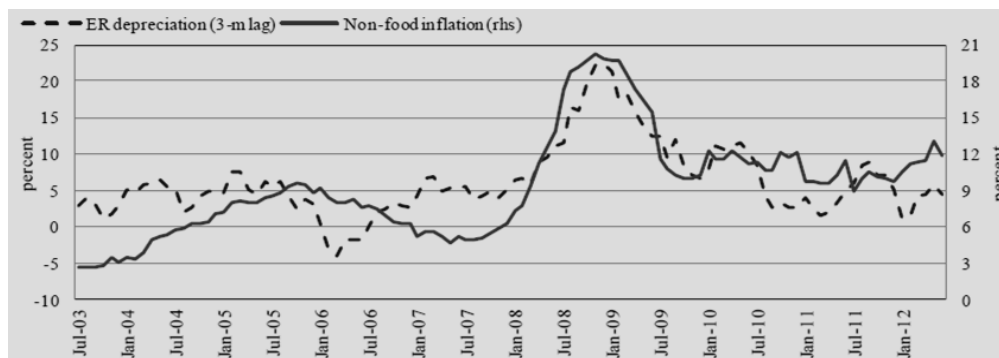
1.2 Statement of Problem

The Problem statement is to why Macroeconomic factors are responsible for high volatility exchange rates in Pakistan. The findings of this paper offer an empirical justification of the association among the exchange rate volatility and the democracy of Pakistan to reach the influence of the former on stable economic growth of the country.

1.3 Research Objectives

- To identify the reasons (Macroeconomic factors) that are responsible high volatility exchange rates in Pakistan
- To compare exchange rate volatility between democratic and non-democratic regime
- To determine cointegration between the exchange rates of Pakistan, India and China

1.2 Purpose of the Study

This paper is an attempt to identify the factors that affect exchange rate volatility in Pakistan emphasizing on the political regime of the country.

1.3 Scope of the Study

This paper offers an empirical justification of the association among the exchange rate volatility and the democracy of Pakistan to reach the influence of the former on stable economic growth of the country.

2. Literature Review

2.1 Factors Affecting and Affected by Exchange Rate Volatility

Many developing countries switched from fixed exchange rate system to floating exchange rate system in the Bretton Woods era (MacDonald, 2007; Ghosh et al., 2002,). Once switched to floating exchange rate system, volatility of exchange rates increased and they became hard to be anticipated. Given this nature of high volatility, research in this area became interesting as exchange rate volatility is closely related to the economic activities. On the other hand, some fundamental economic activities such as investment, international trade, and balance of payment play a mediating role in exchange rate volatility. Hence, any changes in the fundamental economic activities may lead to changes in volatility of exchange rate. Almost perfect integration of the exchange rate market causes changes in other exchange rate volatility given changes in some specific exchange rate volatility due to any news of fundamental economic activity. In the similar way, the contagious nature of exchange rates is explained within the macroeconomic view (Huang and Yang, 2002).

Market psychology also plays a significant role in exchange rate volatility. Speculations based on herd instinct, noises, or fads are well transmitted even though currencies have no apparent common fundamental. In addition, exchange rate is relatively volatile to the information comprised in exchange rate expectation.

For example, expected exchange rate might be measured by the forward exchange rate without a risk premium. Similarly, expected change in the exchange rate can also be measured by forward premium (MacDonald, 2007).

Another important factor to influence the exchange rate volatility and movement of exchange rate is the foreign exchange rate intervention. To stabilize exchange rate in the market, foreign exchange rate intervention is effective as it significantly reacts to the changes in exchange rate (Kim, 2002). Central bank intervenes in the foreign exchange market to prevent high exchange rate volatility. Exchange rates are also observed to overshoot, in such situations, the extent of overshooting can be minimized via interventions and thus, excessive volatilities are prevented. As the result, the need to do costly real economic adjustment and to avoid disruptive impacts of exchange rate overshooting is eliminated (Bank of Thailand, 2004). Disordered movement periods are most likely to experience policy interventions dominating the movements of exchange rates. To sum up, policy interventions are effective in smoothing out the volatility of exchange rate.

Significant effect of exchange rate volatility on key economic factors such as portfolio investment, foreign direct investment (FDI), capital account, foreign trade and international competitiveness are observed in numerous empirical studies (Karras et al., 2005; Berument and Pasaogullari, 2003). Through this effect, exchange rate volatility influences the ultimate goal of an economy that is economic growth and stability.

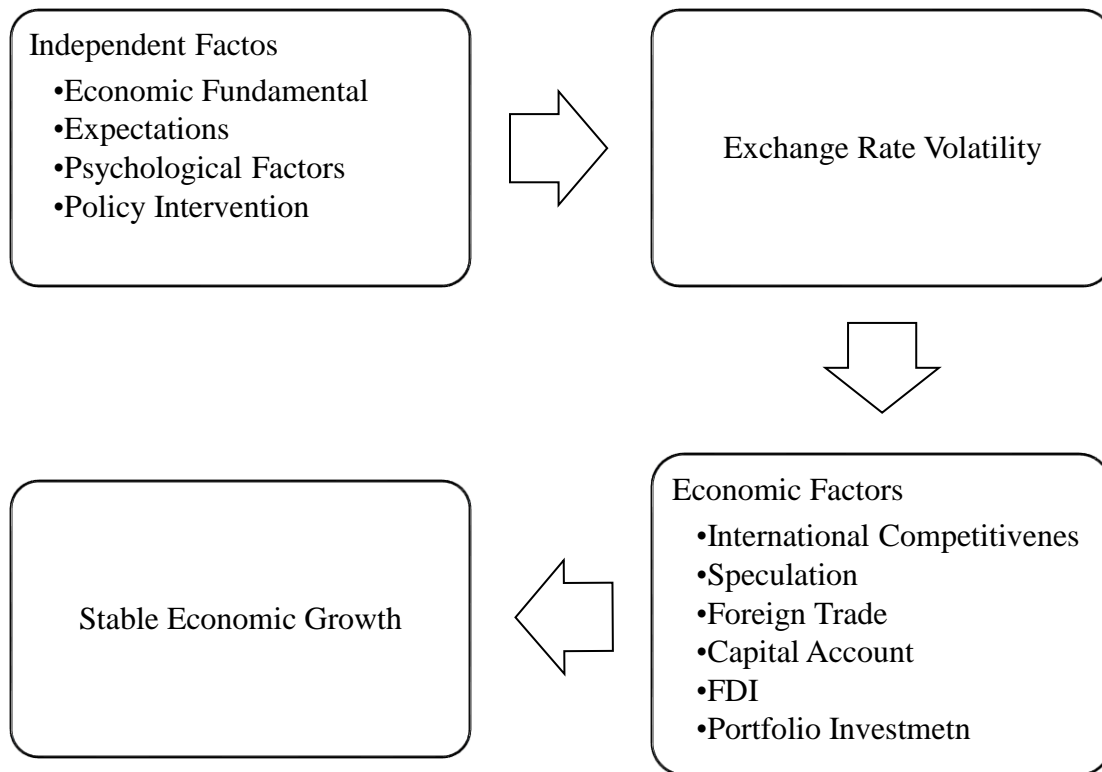**Figure 2.1 Sources of Exchange Rate Volatility and Its Impacts**

Figure 2.1 illustrates lists the factors affecting and affected by exchange rate volatility. The factors listed as independent factors are commonly found in the literature to have this role, but there is no consensus among the studies about the factors that significantly explain variation in exchange rate volatility. In research work of exchange rate, the lack of consensus leads to the difficulties especially for modelling and prediction of exchange rate. Representations of exchange rate found in the literature include mean or the first moment for the level of exchange rate and standard deviation or the second deviation for exchange rate volatility. In addition, three principle views are found, which are listed below:

- In out-of-sample forecasting, the macroeconomic fundamentals included in the exchange rate model perform no better than a random walk, at least for countries with high inflation and over a short time horizon (Meese and Rogoff, 1983). Frankel and Rose (1995) attempted to overturn the above result, but failed. According to Rogoff (1999), the empirical work does not succeed in overturning the random walk model generally for countries with low inflation and at least for major currencies. The author also argues that the problems faced in establishing a model that links financial variables to the fundamentals is more general in nature and not specific to the case of exchange rate volatility. Once the model is established, standard deviation of the error term is the simplest representation of exchange rate volatility.

Despite the significant explanation of the behavior of exchange rate by the macroeconomic fundamentals, their effect is more likely to be observed in the long run. Short run movement of exchange rate are little or not explained by the macroeconomic fundamentals. In this regard also, the consensus among authors is lacking. Some authors argue that explanatory power of macroeconomic fundamental is significant both tin the long run and the short run. McDonald (1999) gathered evidences from empirical researches that the possibility that macroeconomic fundamentals overturn the random walk in the short run is increasing.

- Behavior of exchange rate in the short run is subject to neither a random walk model nor the use of macroeconomic fundamentals. Rather, information aggregation and inventory management by foreign exchange dealers and other microstructure factors of the market are subject to exchange rate movement in the short run. In this way, non-dealers are able to place their orders with dealers as they learn about the fundamentals that affect exchange rate. Price formation results from the output of this two-stage learning process (Lyons, 2001).

- The above three different and somewhat contradicting principles of exchange rate behavior have made the research in this area interesting. The current study is an attempt to contribute in this interesting debate. Following section of literature review is a brief discussion of outcomes of recent studies done in Pakistan in this context.

2.2 Empirical Studies in Pakistan

Mustafa and Nishat (2006) conducted an empirical investigation of the effect of exchange rate volatility of Pakistan on trade with major trade partners. This paper, although taken the case of bilateral trade of Pakistan, the authors selected trade partners according to the regional economic blocks such as Asia-Pacific, European, ASEAN, and SAARC region. They used quarterly data from the third quarter of 1991 to the second quarter of 2004. Analysis of this quarterly data included cointegration and error correction to provide empirical justification of the findings. The results showed a significant but negative relationship between Pakistan's exchange rate volatility and its trade with the United Kingdom (UK) and the United States of America (USA). Results for other trade partners such as Singapore, Bangladesh, and Australia showed similar pattern but was less volatile and more consistent than that of UK and USA. Relationship between Effect of Pakistan's exchange rate volatility on the exports growth, in this study, was insignificant for trade with Malaysia and New Zealand while for trade with India; the effect was significant only in the long run.

Aqeel and Nishat (2006) also attempted to investigate the effect of exchange rate volatility of Pakistan on the growth of exports empirically using the similar same type of data and statistical methods used by Mustafa and Nishat (2006). However, Aqeel and Nishat (2006) used data from the first quarter of 1982 to the fourth quarter of 2000. The authors took world trade rather than bilateral trade. Results of this study were the same as that of the study of Mustafa and Nishat (2006).

Javed and Farooq (2009) investigated the relationship between Pakistan's economic growth and exchange rate volatility using quarterly data from the first quarter of 1982 to the fourth quarter of 2007. The results of error correction model and autoregressive distributed lag model showed that there is a significant long-run relationship between economic growth, exchange rate volatility, reserve money, and manufacturing in Pakistan. However, no such relationship was found between exchange rate volatility, exports, and imports, which contradict the findings of Mustafa and Nishat (2006) and Aqeel and Nishat (2006).

Capital inflows were largely studied in Pakistan in context of exchange rate due to the upsurge of capital inflows since the early 1990s. Another reason to do so is the mediating role of capital inflows to help filling up the investment-saving gap, allocating capital efficiently, and increasing efficiency. Rashid (2009) performed a bivariate analysis to study capital inflows of Pakistan as a determinant of nominal and real exchange rate volatility. The author used 18 years long data to test Granger causality between the indicators under investigation. The results affirmed that capital inflow in Pakistan Granger causes the exchange rate volatility and thus capital inflows are likely to play a controlling role in preventing high exchange rate volatility. This study was extended by Rashid and Husain (2010) including the factors of domestic price level and monetary expansion. In addition to bivariate analysis in Rashid (2009), the authors performed multivariate analysis. The conclusion drawn from the analysis states that capital inflow can be controlled in Pakistan to avoid, not only high exchange rate volatility, but also the inflation pressure for ultimate economic growth.

Parveen et al. (2012) attempted to identify the factors of Pakistani economy that contribute to high exchange rate volatility analyzing annual data from 1975 to 2010 using Ordinary Least Square (OLS) method. The authors ranked the factors influencing exchange rate volatility according to the degree of effect. According to the results, the strongest effect on exchange rate volatility in Pakistan is by inflation while the second strongest factor is economic growth. Effect of imports in Pakistan on exchange rate volatility is less than that of the exports. A comparison between the role that monetary policy and trade policy play to control exchange rate volatility, monetary policy dominates trade policy.

3. Methodology

As explained that the aim of study is to determine various factors that are responsible for volatility in exchange rates of Pakistan, we used various methods to reach at a significant conclusion.

3.1 Research Design

Initially we found out the macroeconomic factors that are theoretically related to exchange rate volatilities. Our aim is to verify these relationships empirically and to provide the variables that influence the economy of Pakistan. The variables we use to verify the impact on exchange rates are growth rate (GRATE), foreign direct investment (FDI), and GDP.

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3.2 Research Data & Sources of Data Collection

The data for the variables has been retrieved from the World Bank source (data.worldbank.org) to make our study reliable.
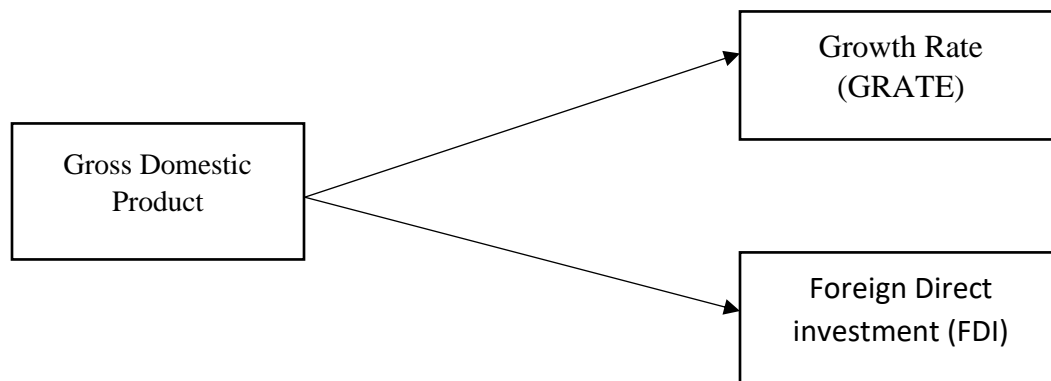
3.3 Sample Size

The sample size of the research is the Sample period of 1971-2012 retrieved from the World Bank source (data.worldbank.org).

3.4 Instrument

The research instrument is chosen "qualitative method" the qualitative trick of this research will be accepted through the usage of open-handed questionnaires.

3.5 Research Model

Initially we use a simple logarithmic OLS model to determine the impact of these independent variables on the exchange rates of Pakistan. We will use the following model:

$Exrate_t = f(FDI_t, GDP_t, GRATE_t, TO_t)$ --- (3.1)

Where, 't' represents the respective values at a particular time. Log linear form of the above function becomes:

$\ln(Exrate_t) = \gamma_0 + \gamma_1 \ln(FDI_t) + \gamma_2 \ln(GDP_t) + \gamma_3 \ln(GRATE_t) + \gamma_4 \ln(TO_t) + \varepsilon$ --- (3.2)

If the function of equation 3.1 is autoregressive, then the equation becomes:

$Exrate_t = f(FDI_t, GDP_t, GRATE_t, TO_t, Exrate_{t-1})$ --- (3.3)

$\ln(Exrate_t) = \gamma_0 + \gamma_1 \ln(FDI_t) + \gamma_2 \ln(GDP_t) + \gamma_3 \ln(GRATE_t) + \gamma_4 \ln(TO_t) + \gamma_5 \ln(Exrate_{t-1}) + \varepsilon$ --- (3.4)

We used Ordinary Least Square (OLS) method in this paper to estimate the model of exchange rate volatility. Once the estimates are obtained, the effects of factors included in the model are decomposed for macroeconomic fundamentals and autoregressive terms to compare via Wald F-Test. After determining the regression model (3.2), our basic aim would be to determine the exchange rate volatility in Pakistan. For this purpose, we have used the GARCH process to determine the stochastic volatility measure for a particular period and will further analyses the 1 step ahead forecast for the volatility in Pakistan's Exchange rates. We shall be using various GARCH models i.e. GARCH (1, 1), TGARCH (1, 1) and EGARCH (1, 1). The optimal model choice will depend on the AIC (Akaike Information criteria) and RMSE (Root Mean Square Error). We shall be using the following GARCH (1, 1) model:

$$\varepsilon_t = \sqrt{h_t} \cdot v_t; h_t = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 h_{t-1} \text{ ---------- (3.5)}$$

Where, $\{v_t\}$ is independent and identically distributed, and $v_t \sim N(0, 1)$. Parameters meet the condition $k_0 > 0, \alpha_1 \geq 0, \beta_1 \geq 0, \varepsilon_t \sim GARCH(1,1)$ is a stable process with a necessary and sufficient condition $\alpha_1 + \beta_1 < 1$. Moreover, using EGARCH (1, 1) we have:

$$\ln(h_t) = \alpha_0 + \sum_{i=1}^{q} \alpha_i g(\varepsilon_{t-i}) + \sum_{j=1}^{p} \beta_j \ln(h_{t-j}) \text{ ------------ (3.6)}$$

Where, $g(\varepsilon_t) = \theta_t \frac{\varepsilon_t}{\sqrt{h_t}} + \gamma_i \left[\frac{|\varepsilon_t|}{\sqrt{h_t}} - E\left(\frac{|\varepsilon_t|}{\sqrt{h_t}}\right) \right]$ and $\alpha_0, \alpha_i, \theta_i, \gamma_i, i = 1, \cdots q, \beta_j, j = 1,2, \cdots p$ are parameters. Finally, we shall go with the following TARCH (1, 1) model:

$$\sigma_t = w + \alpha \varepsilon_{t-1}^2 + r \varepsilon_{t-1}^2 I_{t-1} + \beta \sigma_{t-1} \text{ ------------ (3.7)}$$

Where, I_{t-1} is a dummy variable. If $\varepsilon_{t-1} < 0, I_{t-1} = 1$; otherwise, $I_{t-1} = 0$. In the above formula, term $r \varepsilon_{t-1}^2 I_{t-1}$ is called TARCH term. Equation (3.7) formula indicates that σ_t depends on the early stage residual square ε_{t-1}^2 and conditional variance h_{t-1}. The market falling $(\varepsilon_{t-1} < 0)$ has $(\alpha + r)$ times shock to conditional variance while the market rising $(\varepsilon_{t-1} > 0)$ only has α times shock. When $\gamma > 0$, it means the presence of leverage effect.

The further analysis in section 4 will determine the optimal model choice to determine the volatility in Pakistan's exchange rates. We have used monthly data from July 2001 – April 2013 to have a brief analysis on the volatility. We have broken the data partially to determine more important facts regarding the volatility of Exchange rates. The data has been broken down from July 2001 – Jun 2007 to determine the exchange rate volatilities in pre-Democratic regime. Similarly, the remaining data for July 2007 – April 2013 shows the volatility in the Democratic regime. This would provide a fair comparison of the success between the two regimes to keep the exchange rate less volatile. The overall volatility for the period July 2001 – April 2013 will certainly lead to determine that whether the exchange rate is highly volatile or not.

Next step is to analyses the Johansen cointegration between the Pakistan to US rates, India to US exchange rates and Chinese to US exchange rates. The purpose for analyzing the Johansen cointegration between the exchange rates of these neighboring countries is to analyses that the

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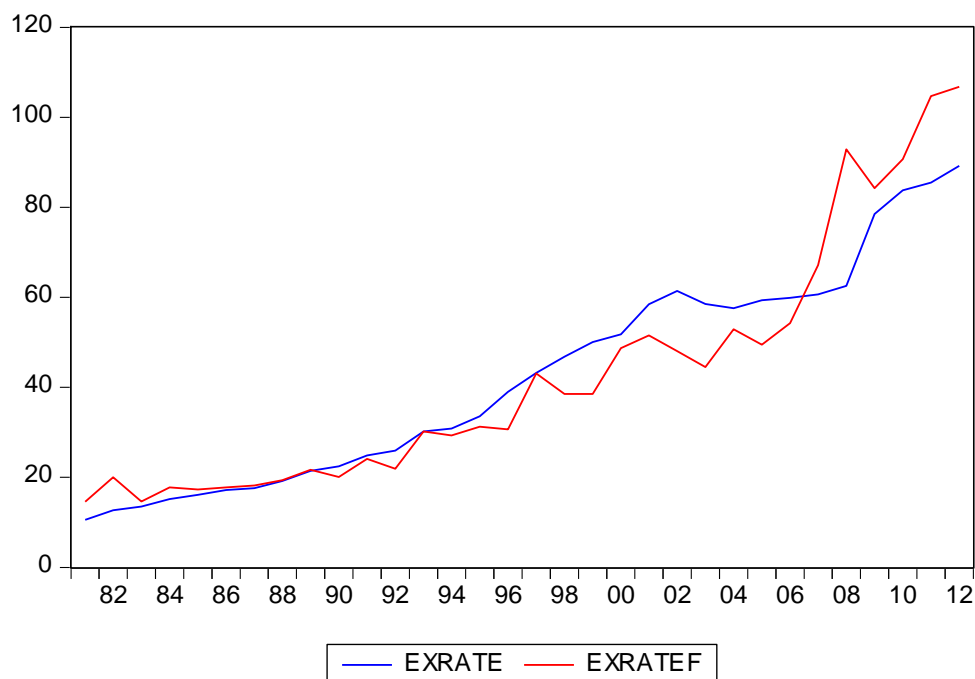
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place these countries attain in the region.

It is aimed at analyzing that whether the exchange rate movements in the countries work simultaneously or we have a random pattern depending on the socio-economic conditions.

4. Results

Table 1 below determines the OLS logarithmic regression to determine the impact of macroeconomic variables on the Exchange rates of Pakistan. The table briefly explains the factors, which are responsible for affecting the exchange rates. Trade openness significantly influencing the exchange rates of Pakistan with a significant negative sign [t = -2.445, p = 0.0213]. The resulting sign of TRADE is similar to the theoretical sign which was expected i.e. a highly opened country for trade tends to increase its money demand in the international market and therefore reduces the exchange rates. Growth rates (GRATE) is another variable which is statistically significant with a negative sign which was theoretically expected as well [t = -2.769, p = 0.0100].

Increasing GDP growth rates on the other hand increases the motivation of investors towards the home country (Pakistan) and therefore Exchange rates decline. Further, GDP plays the similar role as GRATE does i.e. the coefficient is highly significant at 1% level with a negative sign representing the same analysis as in GRATE. Foreign Direct Investment (FDI) has an insignificant coefficient with [t = 0.8042, p = 0.4283] a positive sign which is theoretically ambiguous. An increase in FDI directly affects the exchange rates but for Pakistan it is least affected. The individual significance of the variables shows that these macroeconomic factors significantly affecting the Exchange rates of Pakistan.

Figure 4.1

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Apart from the statistical significance, R2 will determine the correlation between the macroeconomic variables and the exchange rates. R2 = 0.918 showing that FDI, GRATE, GDP and TRADE are very much responsible for the variations in Pakistani exchange rates. F – statistic shows an overall significance of the model i.e. regressed to residual ratio is [F = 76.039, p = 0.000] which is significantly higher showing the model is well set for determining the Exchange rates. Graph 2 shows the original exchange rate series and the resulted forecasting series through OLS regression. We can clearly analyse that original and forecasted Exchange rates are not significantly far each other and an exponential smoothing can get it very much close to the original exchange rates.

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Table 2 shows the GARCH (1, 1) process we have used for determining the volatility in Exchange rates for the pre democratic regime in Pakistan i.e. until the end of 2007. Results from table 2 shows that the ARCH coefficient is statistically significant at 1% level with [Coeff = 0.3312, p = 0.000] i.e. volatility in Pakistani Exchange rates has a significant impact through lagged residual N ~ (0, 1). Similarly, GARCH coefficient found to be statistically significant [Coeff = 0.6142, p = 0.000]. Both the coefficients being positive shows that the volatility throughout 2001 – 2007 remains positive and the future volatility in the exchange will be increasing as well. Similarly, table 3 shows the next part of the volatility i.e. period from July 2007 – April 2013. TARCH (1, 1) process is used to determine the volatility through the AIC and RMSE criteria. The threshold term in the model explains the leverage effect which is negative in the model. Though the overall model is statistically stable as sum of all the coefficients is less than 1 but ARCH and GARCH coefficients are both positive. The volatility for the Democratic period reveals significantly higher coefficients magnitude [Coeff = 0.234, p = 0.000] and [Coeff = 1.44, p = 0.000] for ARCH and GARCH respectively. These high magnitude coefficients determine that the volatility in the democratic period is comparatively high than in pre democratic period.

The overall volatility measure for the exchange rates in Pakistan shows an overall positive impact i.e. table 4 shows that the future volatility will be increasing as determined by GARCH (2, 1) model. The coefficients in table 4 being positive with a relatively higher magnitude of ARCH and GARCH coefficients showing the similar results as obtained in table 2. Graph 1 determines the histogram of the squared residuals to determine whether the residuals remain white noise N ~ (0,

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1) during the whole process or not.

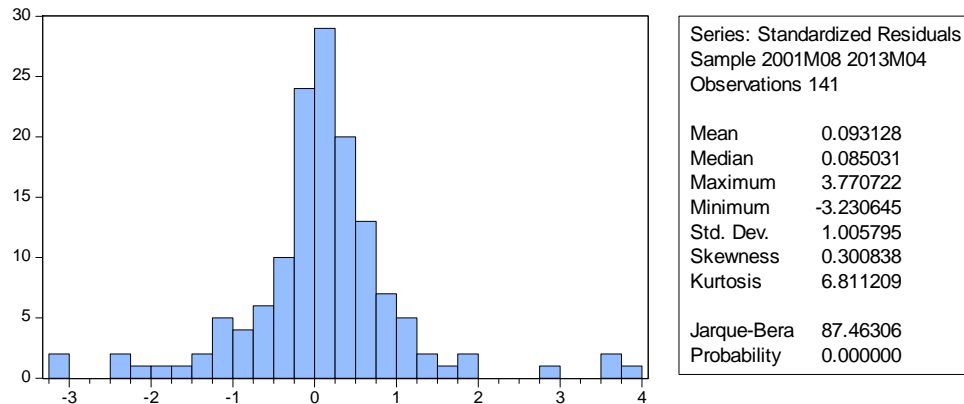**Figure 4.2: Squared residual plot for Pakistan Exchange Rates**

Table 5 presents the output of the ADF unit root test for the exchange rates of Pakistan, India, and China. The variables remain non – stationary at the level form. For this purpose, the first difference has been applied to make variables stationary. The resulting differenced exchange rates for Pakistan, India, and China found to be significant in case of India and China with $p < 0.05$. However, the second difference has been applied on Pakistan exchange rates and finally we get the stationary series for Pakistan with $p < 0.05$. Now, table 6 will provide the Johansen Cointegration test analysis between the three country's exchange rates. The resulting Johansen analysis shows that all the cointegrating Eigen values and Trace statistics are insignificant i.e. $p > 0.05$ for all the three equations. Thus, we can conclude with table 6 that there is no long run relationship between the exchange rates of these countries. Further, we can analyse that the time series shocks and regular fluctuations are certainly random and volatility in exchange rates occur due to the internal inconsistency and not any exogenous factor that is responsible for such sensitivity.

Figure 4.3: Pakistan, India and China Exchange rates plots
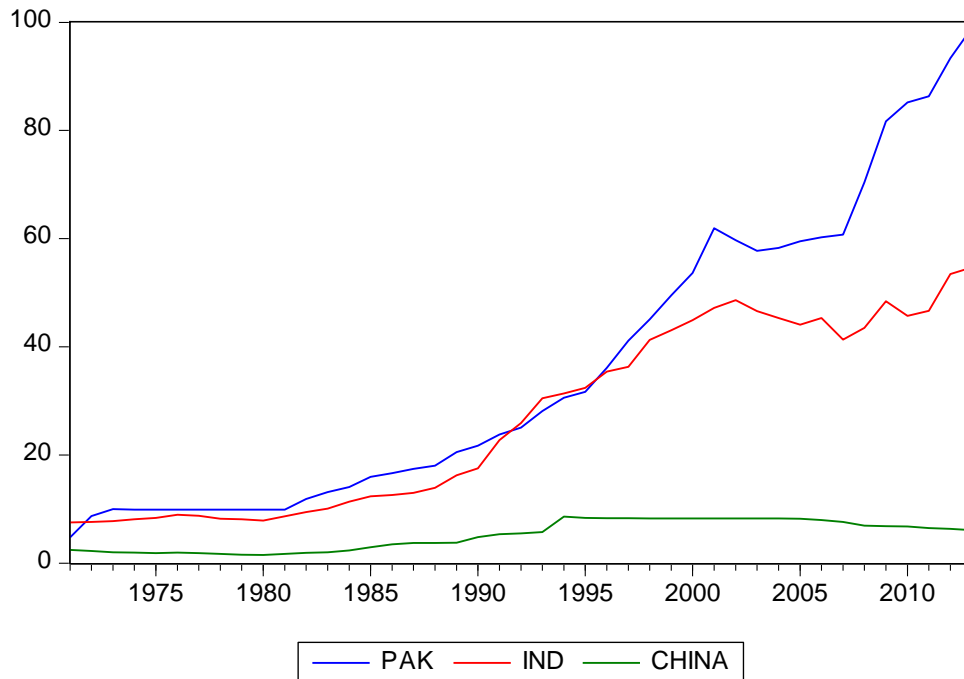
5. Discussion and Conclusion

The study aimed to determine three basic questions regarding the exchange rates of Pakistan. Initially, we found the reasons of high volatility (i.e. macroeconomic variable movements put pressure on the exchange rates). It was found that GDP, growth rate, and TRADE were highly significant and therefore certainly influencing the higher volatility in Exchange rates of Pakistan. We then moved towards the measurement of volatility through GARCH process where we use GARCH (1, 1) for pre democratic volatility in Exchange rates and similarly democratic volatility was determined by TGARCH (1, 1). The GARCH (2, 1) process then measured the overall volatility. The results showed that volatility in the democratic period remains comparatively high than in the pre democratic period. However, the overall future volatility will be increasing as ARCH and GARCH have positive and statistically significant coefficients.

Finally, we determine the cointegration of exchange rates between Pakistan, India, and China to analyze that whether the fluctuations are due to the exogenous factors or it is internal matter. The results showed that there was no cointegration between all the three countries exchange rates and there are endogenous factors, which are affecting the volatility in exchange rates. We can conclude that the reasons responsible for high exchange rate volatility are the macroeconomic variables used in the study. Further, throughout the 12-year period i.e., since July 2001 – April 2013 the volatility remains strictly positive on a year by year comparison and most importantly that this volatility is affected due to the endogenous changes in the Pakistan's policies and by the influence of internal

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political and economic factors otherwise, this higher volatility would affect the whole region including India and China.

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