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EXCHANGE RATE VOLATILITY AND ITS IMPACT ON PAKISTAN'S INTERNATIONAL TRADE

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ABSTRACT

The objective of this paper is to analyze the exchange rate volatility and its impact on Pakistan's economy. We used time series data in this study for the period 1970-2014 and it was collected from Economic Survey of Pakistan, State Bank of Pakistan, World Bank and IMF databases. The variables selected for this study include: Real Exchange Rate, Imports, Exports, FDI, GDP, Inflation, Government Spending, money supply and Foreign Reserves. To draw the results, firstly, ADF test was applied on data to check the stationarity problem. Then Co-Integration technique was applied to check whether the variables had long term sustained relationship or not by using simple Least Square Method. Data of 45 entries showed that real Exchange Rate Volatility has positive relationship with Exports, GDP and FDI, while it has negative relationship with imports, foreign reserves, Government spending, inflation and money supply. In the light of results, we recommend that Pakistan should expand its trade with middle income developing countries while using its own currency to avoid uncertainty in Exchange Rates and also provide required fiscal and other incentives to boost its exports.

Keywords: Exchange Rate volatility, Real Exchange Rate, Imports, Exports, FDI, GDP, Inflation, Foreign Reserves, ADF test, Co-integration, Least Square Method.

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1.INTRODUCTION

The term "Exchange Rate" refers to the relative price of a currency that can be converted into the price of another currency. An exchange rate contains a set of two currencies which includes the domestic currency and the foreign currency. When we measure the value of our domestic currency into the foreign currency then it is termed as indirect swapping. On the other hand, when foreign

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currency is measured in the value of domestic currency it is called direct swapping. At the point where the domestic currency is not converted in terms of a foreign currency but the exchange rate of two foreign currencies is evaluated then it is termed as exchange rate or cross currency. Exchange rate determines the international trade volume of an economy.

Exchange rate is characterized in two ways, and these are called nominal and real detects. A nominal exchange rate defines how many units of a domestic currency can be exchanged with a unit of foreign currency. Nominal exchange rate is characterized in monetary terms. Forex Markets determine nominal exchange rate. A real exchange rate defines that how much quantity of domestic products and services can be exchanged with foreign merchandise. It is characterized as purchasing power of a domestic currency at existing exchange rate and price level. Real exchange rate can be evaluated by getting product of the two nominal exchange rates and ratio of price level in two different countries.

Volatility can be defined as statistical measure of dissemination of return from a security or forex market index. Standard deviation is used to measure volatility or it can also be measured by analyzing difference of two monetary standards. If volatility is greater than risk factor also gets higher. Volatility is also characterized as instability because of the adjustment in securities or monetary terms.

The fundamental variables that result exchange rate volatility are the rate of interest, balance of trade, inflation, instable political situation, rift among people of that country, lack of transparency, inconsistency in economic policies, overall state of economy, law and order and quality of governance.

The impact of exchange rate volatility in long run can be seen on the volume of exports and imports because it brings adverse effect on economies. It has greater effects on growth rate and GDP of an economy. The effect of exchange rate volatility in medium term can be noticed by worsen balance of payment (BOP). It influences the local investors and markets in short run.

Mussa (1984) and Dornbusch (1996) stated that exchange rate fluctuations have their impact on international trade of an economy because it disturbs imports of that country. Freiden and Broz (2006) found whether an economy keeps its currency low itself or it is low due to external causes or origins then it depends upon the demands of buyers to boost the imports or to increase the exports. Goldberg and knetter (1977) said that exchange rate fluctuations have very bad impact

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upon those firms which had kept their prices fixed otherwise fluctuating the prices of goods can be very harmful for business of those firms.Hooper and Kolhagen (1978), De Grauwe (1988), Cavallero and Cobro (1989), Baum (2000), Arize, Osang and Siotije (2000) findings were different that showed fluctuations in exchange rate had negative impact upon the exports sector of economies, so exports go down due to volatility of exchange rate. It also helps markets to allocate resources to more profitable sectors. Zulfikar and Kauser (2012) showed that real exchange rate fluctuations had positive effects on exports of an economy. Franke (1991), Sercu and Vanhulle (1992) showed that international trade of a country and overall growth rate of an economy had a little influence of exchange rate volatility. Bailey, Travels and Ulan (1988) maintained that small exchange rate fluctuations had no significant impacts upon the international trade of a country. Akhtar and Hilito (1984), Pozo (1992), Person and Svenson (1989) argued that fluctuations in exchange rate showed negative effects on overall structure of trade of a country nationally and internationally. Awan and Khan (2014) emphasized that developing countries should keep stable their exchange rate otherwise their import bill would increase which would offset the gain from export due to depreciation of currency. Awan & Imran (2015) stated that inflation should be kept under control because it affects the competitiveness of a country in international trade. Awan (2016) has contended that globalization has increased in volatility in the exchange rate of weak currencies and accelerated speculative activities in foreign exchange market. This badly affect the economy of weak countries, because they could not keep their currencies stable due to their weak economic fundamentals.

1.1 Exchange Rate Systems

Currency of a specific country can be undervalued or overvalued in comparison with the currency of other country. So if these different currencies want to trade goods with each other than either of following exchange rate system will be followed.

- Fixed Exchange Rate
- Floating Exchange Rate

According to Hagen and Zhou (2002) “Exchange rate regime choice depends on the inflation, foreign reserves, economic stability and budget deficit. These factors play a vital role in the case of choosing either fixed exchange rate or floating exchange rate”. Fixed Exchange rate is either fixed by one currency or by the set of other different currencies. So it will only fluctuate when

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there is fluctuation in all the pegged currencies. While Floating exchange rate keeps on changing the currency value depending upon the supply and demand for this currency in the international market. It is also called "Self-correcting mechanism" and when the demand or supply for that currency in international market change so the value of that floating currency also changes.

1.2 Research Questions

The main research questions of this study are stated as under:

- What are the effects of exchange rate volatility for Pakistan's economy?
- How does exchange rate volatility affect international trade of Pakistan?
- How microeconomic variables of Pakistan performed over time period of 1970 to 2014 due to exchange rate volatility?

1.3 Objectives of Study

The objectives of the study are the followings: -

- ► To study the impact of Fluctuations in Exchange Rate upon economy of Pakistan.
- ► To measure performance of Pakistan's Macroeconomic variables during 1970- 2014.
- ► To analyze the effects of exchange rate fluctuation on the trade sector of Pakistan by using ECM (Error Correction Model) by using time series data.
- ► To suggest solutions to the problem of exchange rate volatility in Pakistani currency and how to keep it stable in the long run.

2.LITERATURE REVIEW

Sekkat and Varoudakis (1998) carried out research on "Exchange Rate Management and Manufacturing sector exports" relevant to Sub Saharan countries. Their findings of study show that volatility in exchange rate had negative effect on exports of factory-made trade commodities. Dell (1999) conducted study on "Exchange Rate Fluctuations and Trade Flows" by taking data of Western European Countries. The conclusion of the analyses was that rate of exchange unpredictability had negative effect on international trade.

Mustafa et.al (2004) looked into effect of unpredictability in rate of exchange on exports growth between Pakistan and its trade partners. His results show that there were negative effects in exchange rate unpredictability in the long term and short-term as well. He studied trade between Britain and United States of America. Similar effects were noted between trading partners

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Singapore, Australia and Bangladesh. No relationship was ascertained involving rate of exchange unpredictability and export growth for New Zealand and Malaysia.

Vergil (2001) stated in his article "Exchange Rate Volatility and its effects on Trade Flow: Case for Turkey" His research work focused on the real exchange rate fluctuations on export of goods from Turkey to U.S.A. He found that overall real exchange rate unpredictability had substantial negative effect on real exports. Clark et.al (2004) in his article “Exchange Rate Volatility and Trade Flows” showed negative impact of exchange rate volatility on total trade. Nishat and Aqeel (2004) declared that rate of exchange unpredictability has negative and statistically important affects upon exports and general business deal of developing nations particularly in case of Pakistan. Their results were also quite similar that exchange rate unpredictability had negative effect on gross exports of almost every country.

Sekmen et.al (2007) brought in example of Turkey and topic of study was “Co-integration and Causality among Exchange Rate, Exports and Imports”. The responses of the study were that rate of exchange did not determine the volume of trade. Chit et.al (2008) conducted research on “Rate of exchange unpredictability and Exports” in the perspective of East Asian countries. The results demonstrate that instable rate of exchange brought about negative effects upon exports. Kemal (2005) analyzed the “Outcomes of Exchange Rate Instability and Trade in Pakistan” and stated that Real Exchange Rate fluctuations played a crucial role in increasing and decreasing trade volume of a nation.

Shoaib (2009) reported "Exchange Rate Volatility and it Impacts on bilateral export growth: Evidence from Bangladesh" showed that there is no relationship between rate of exchange unpredictability and exports of Bangladesh. Javed and Farooq (2009) wrote on “Economic Growth and Exchange Rate Volatility in Pakistan”. His results demonstrate direct relationship between rate of exchange unpredictability and macroeconomic variables of Pakistan.

Najafov (2010) studied US exchange rate fluctuations and its impact on international trade. He concluded that volatility in US exchange rate had substantial impact on world trade. Mukhtar and Ahmed (2010) in their study on "Exchange Rate Volatility and Export Growth for selected South Asian Countries" declared that the volatility of exchange rate shows the macroeconomic direction for modification of growth rate of South Asian nations. Bakhromov (2011) concentrated on example of Uzbekistan in his paper “Exchange Rate Volatility and its Effects on the International

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Trade". Mahmood (2011) analyzed "The rate of exchange Volatility and Macroeconomic Variables in Pakistan". Mohammadi et.al (2011) defended "The Effect of Exchange Rate Uncertainty on Import". Auboin and Ruta (2011) analyzed "The Relationship between Exchange Rate and International Trade: A Literature Review". Tang (2011) also discussed effects of trade on South Asian countries in his paper "Intra Asia Exchange Rate Volatility and Intra Asia Trade". Maria (2012) conducted study on "Impact of Exchange Rate Uncertainty on Pakistan's exports". Parveen et.al (2012) in their paper studied "Analysis of Factors Affecting Exchange Rate Variability in Pakistan". Shaista et.al (2012) ascertained "Exchange Rate Volatility and Aggregate Exports Demand". Najia and Irfan (2012) studied "The Effect of Exchange Rate Volatility on the Trade Volume (Export)".

Shaheen (2013) analyzed the "Fluctuations in Exchange Rate and its Impact on Macroeconomic Performance of Pakistan". Jalil et.al (2014) assessed "Exchange Rate Volatility on Trade: A Panel Study on Pakistan's Trading Partners". Haseeb and Iqbal (2014) carried out research on "Exchange Rate Instability and Sectorial Exports for Special Case of Pakistan". Humayon (2014) conducted research which bears rate of exchange fluctuations and its impact upon trade. Ahmad (2014) measured the effects of exchange rate fluctuations balance of Payments by investigating Pakistan Economy. Ali (2015) in his study showed effect of rate of exchange unpredictability on interest rate and money supply in Pakistan.

Awan (2014) maintains that exchange rate volatility badly affects developing countries due to their weak macroeconomic variables. Continuous depreciation of their currencies do negatively affect their import while positive effect on their export is negligible because they have no surplus goods to export. In contrast, the advanced countries get benefit from their stable currency because their imports become cheaper and cheaper as the currencies of developing countries are depreciated. Awan (2016) stated that volatility in major currencies also affect the currencies of small countries. The fluctuations in currencies is the result of fluctuation in the international trade, volume of output and speculative activities and budget as well as trade deficit in the economies.

3.RESEARCH METHODOLOGY

We used secondary data in this study. The data was collected from IMF database, Economic Survey of Pakistan and it is time series for the period 1970-2014. ARCH technique was used for

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measuring unpredictability in the exchange rate. Autoregressive Conditionally Heteroscedastic model (ARCH) to detect divergence in time series data and selected variables

The variables that included in this analysis are: real exchange rate (rxcra), inflation (ifla), exports (xpo), Government spending (govsp), imports (ipr), FDI (fdin), GDP (gdpr), money supply (mosu) and foreign exchange Reserves (fores). Real exchange rate (rxcra) is the main variable of the study in which volatility was computed through ARCH Model. Real Exchange Rate (rxcra) is ostentation aligned exchange rate and was determined by nominative exchange rate and the ratio of Consumer Price Index (CPI).

Time series data for the period 1970-2014 was used in this study and number of observations were 45. The data was collected from the database of World Bank, IMF, State Bank of Pakistan and Economic Survey of Pakistan.

3.1 Econometric Model

The general equation of our econometric model is:

$$Y_t = \alpha_\circ + \beta_\circ X_t + \mu_t$$

Here Y is dependent variable, α is intercept that is greater than zero, β is slope that shows the percentage change in dependent variable due to change in independent variable. X is independent variable, μ is error term and t represents time, as we are using time series data. As we have more than one independent variables so we can write equation as:

$$Y_t = \alpha + \beta_1 X_{1t} + \beta_2 X_{2t} + \cdots + \beta_q X_{qt} + \mu_t$$

3.2 Model Specification:

$$RXCRA_t = \alpha + \beta_1 XPO_t + \beta_2 IPR_t + \beta_3 FDIN_t + \beta_4 FORES_t + \beta_5 GDPR_t + \beta_6 IFLA_t + \beta_7 MOSU_t + \mu_t$$

Here RXCRA is our dependent variable and XPO, IPR, FDIN, FORES, GDPR, IFLA and MOSU are independent variables.

4.DATA ANALYSIS

4.1 Real Exchange Rate

Real Exchange Rate is inflation corrected rate of exchange. The technique to acquire the values of real rate of exchange can be showed in the following formula, (PAK/USA),(CPI USA/CPI PAK), where PAK was nominal rate of exchange Pakistan with reference to US nominal rate of exchange.

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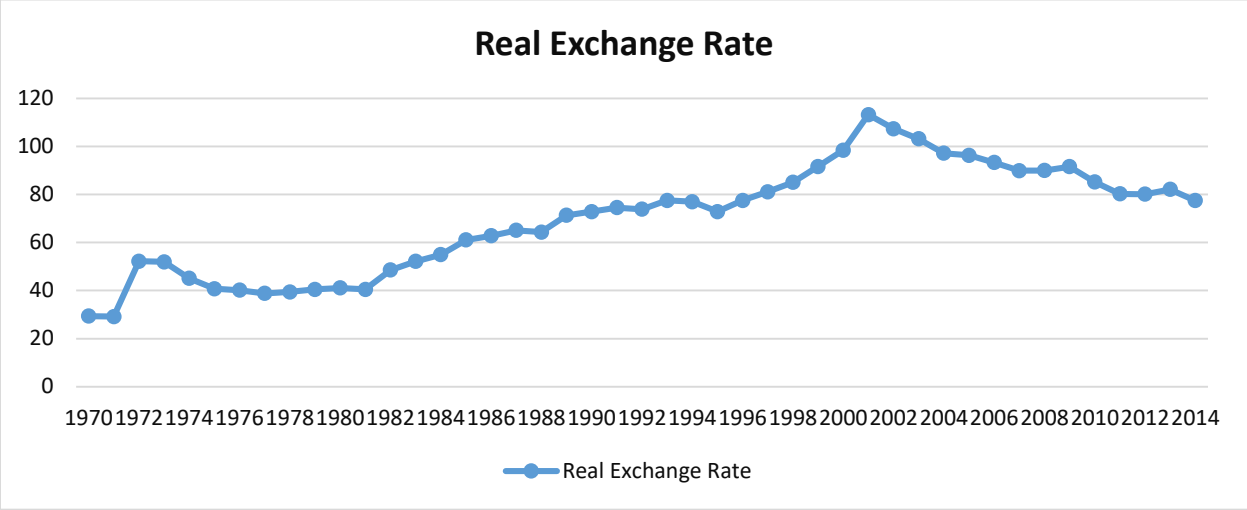
And it's multiplied by CPI of United States of America with regard to CPI of Pakistan. Figure 1 shows fluctuations in the real exchange rate during `970 and 2014.

Figure 1: Fluctuations in Real Exchange Rate,1970-2014



4.2 Exports:

Pakistan exported goods and services worth 29.91 billion USD in fiscal year 2014-2015, which was slightly less from previous year's exports of 30.69 billion USD. Pakistan's exports consist of rice, piece of furniture, cotton wool fiber, cement, tiles, marble, fabrics, garmenting, leather trade goods, sports trade goods (known for footballs/soccer balls), industrial instruments, electric appliances, software system, rugs, and carpeting, farm animal meat, chicken, dried milk, corn, seafood (particularly shrimp/prawns), veggies, processed nutrient items, Pakistani exported Suzuki vehicles, defense equipment (submarines, armored combat vehicle, microwave radar), common salt, marble, onyx, applied science trade goods, and a lot of additional items. The data in Figure 2 shows the growth of Pakistan's export over the period of 1970-2014.

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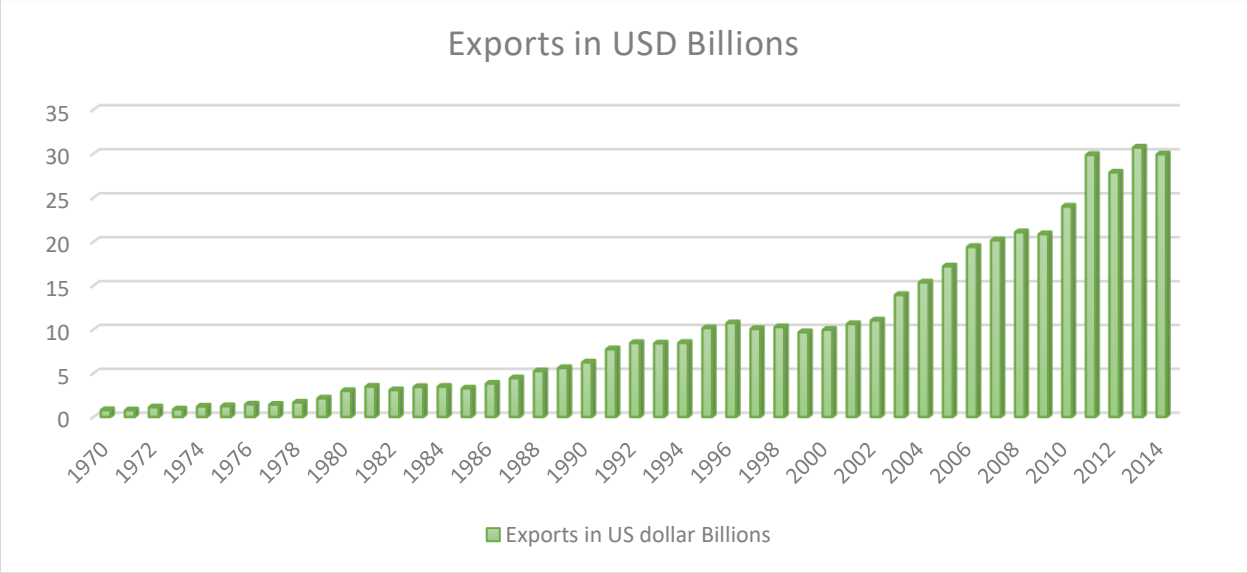
Figure 2 Exports, 1970-2014.



4.3 Imports:

Pakistan imports different goods and services to tune of 45.62 billion USD in fiscal year 2014-2015, which was less than 46.36 billion USD in 2013. The imported goods were airplanes and their relevant spare parts for civilian purposes, defense equipment, canned food products specially for babies, heavy machinery relevant to industry and construction, shoes, leather garments, trailers, lorry, cars, electronic equipment like television, refrigerator etc. laptops, computers along with their spare parts, medicinal drugs and other pharmaceutical products, industrial iron, steel pipes and other products like toys, cell phones and relevant electronic gadgets, microwave ovens etc. Pakistan's biggest imports were petroleum and allied products. With the help of China Pakistan has become self- sufficient in defense items but it is still importing latest defense equipment to counter growing Indian threat. Figure 3 shows growth of imports over the period

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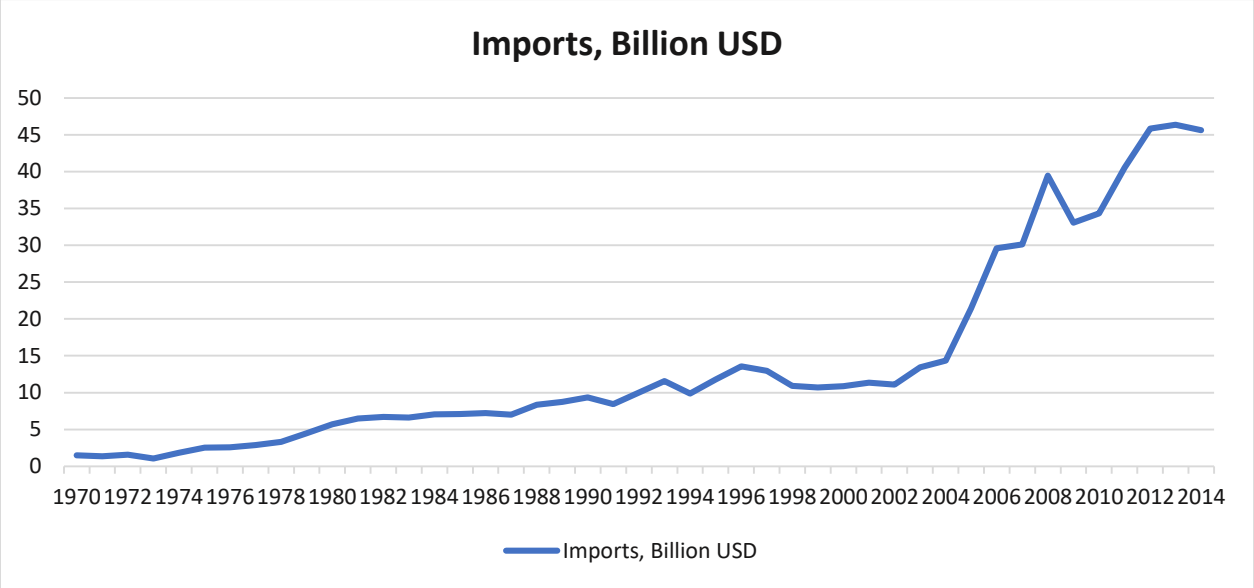
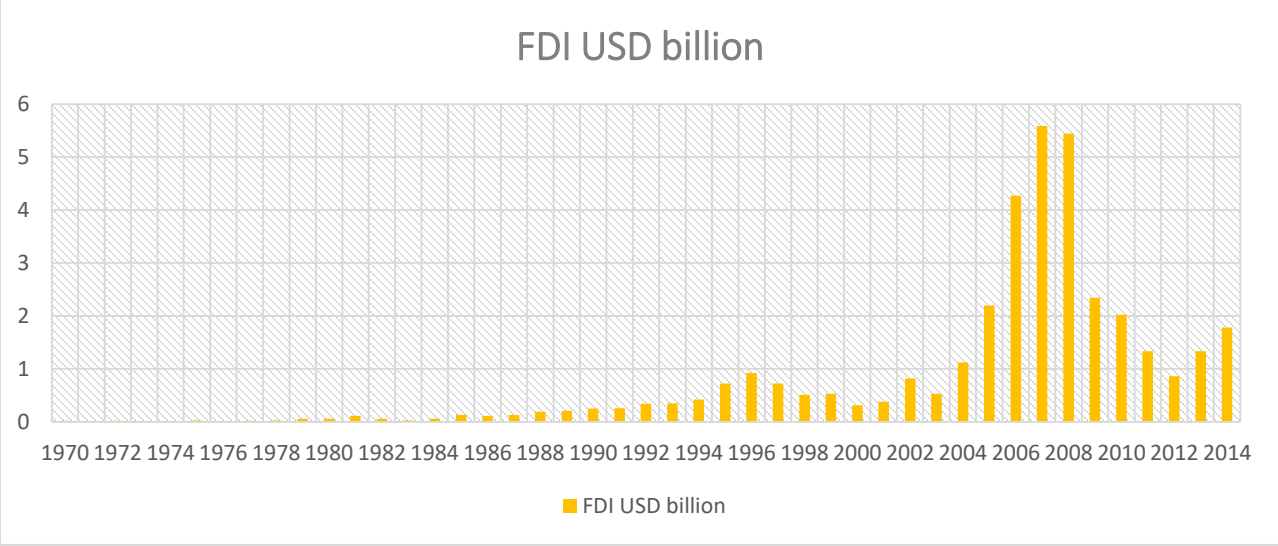
Figure 3 Pakistan's Imports during1970-2014



4.4. Foreign Direct Investment

FDI (Foreign direct investment) can be defined as direct investment of either an international company or individual foreigner for long run in a country. It can be in the form of establishing industrial firms or investment in business assets. Pakistan received (FDI) of $709.3 million in 2014-15. The data in Figure 5 shows highest FDI during 2006-2008.

Figure 4 Foreign Direct Investment in Pakistan during 1970-2014



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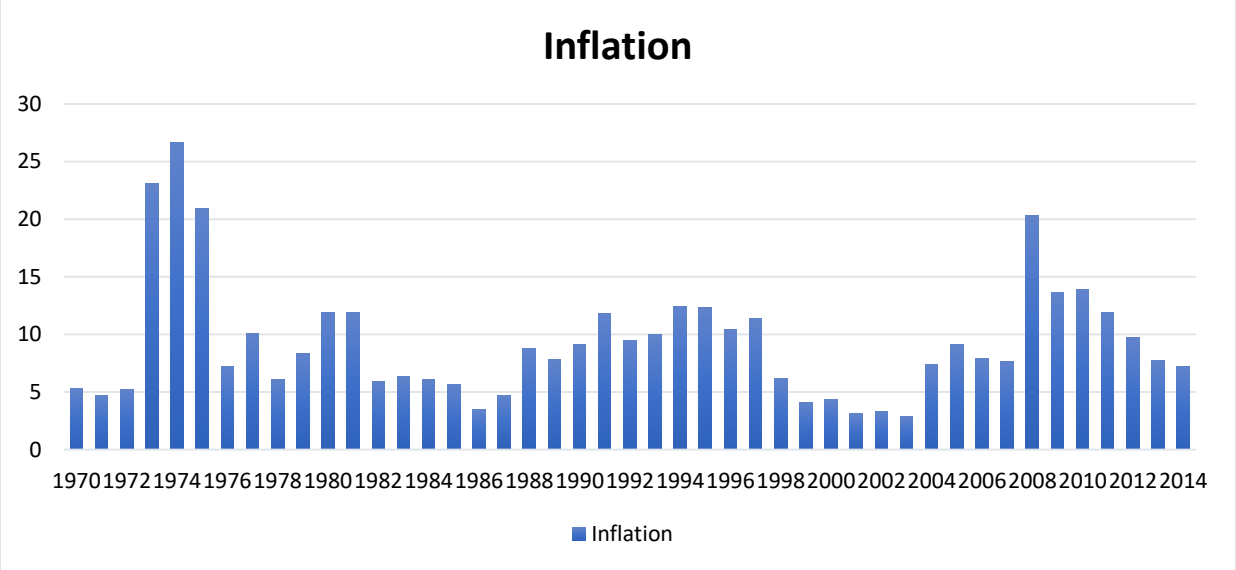
4.6 Inflation

Inflation is defined as increase in price level. It has different types such as cost push, demand pull, mixed, creeping, trotting, running, hyperinflation, or stagflation.

According to March 2016, Inflation rate in Pakistan was 3.94%. Pakistan Bureau of Statistics issues inflation rate statistics in Pakistan. The data in Figure 6 shows that inflation during 2008 was highest around 20 percent while it was lowest during 2001-2003. The fluctuations in inflation rate during 1970-2014 has been shown in Figure 5

Table 5 Inflation Rate during 1970-2014



4.7 Government Spending

It constitutes government's expenditures that include investment in manpower, infrastructural projects, providing subsidies to small firms, transfer of payments, etc. This expenditure is met through tax revenues of loans from domestic and foreign sources. The data in Figure 8 shows that government expenditures as compared to GDP ratio was ranged between 12 to 18 percent during study period, which are higher and this is the reason the government of Pakistan has to borrow loans from International Monetary Fund and other world financial institutions, besides borrowing from domestic commercial banks and national savings. Figure 8 shows that there are no big fluctuations in the government spending. It means that all governments followed expansionary policies and none of them took practical steps for financial austerity to cut its expenditures.

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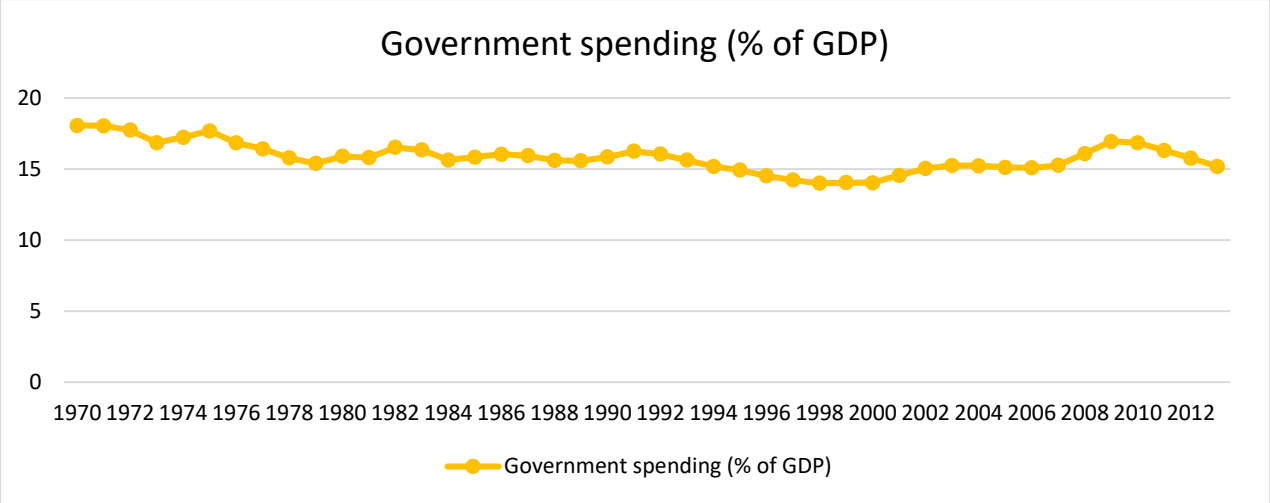
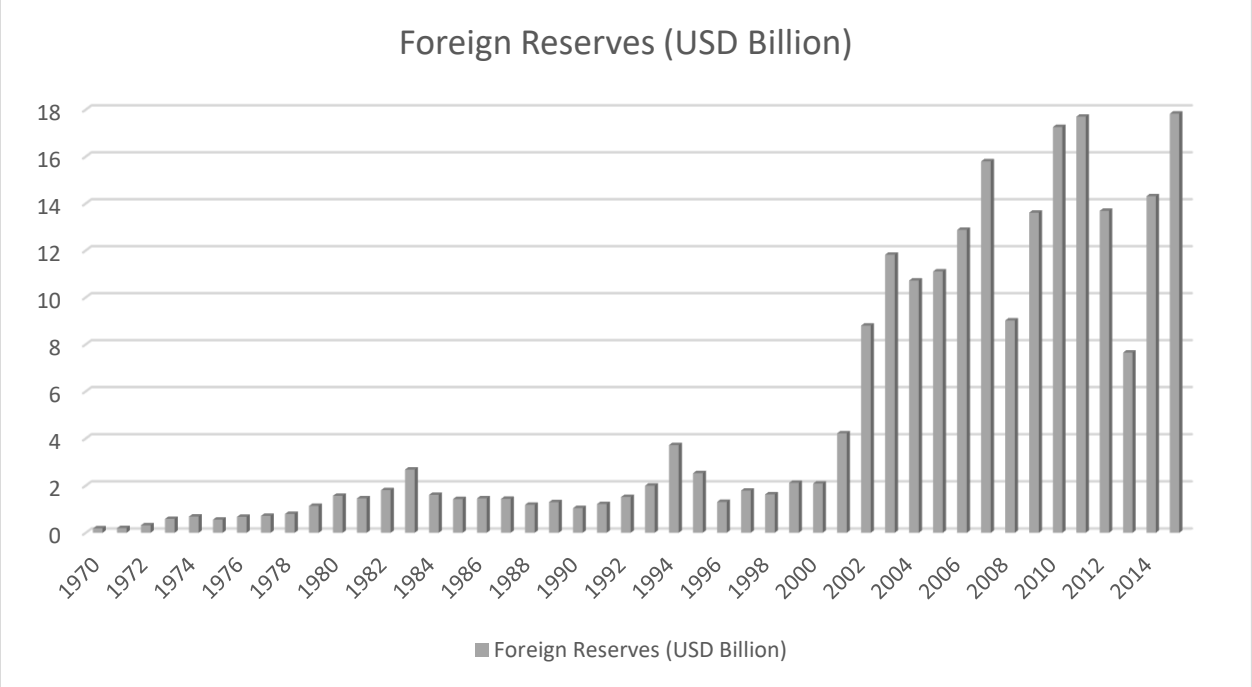
Figure 6 Volume of Government Expenditures during 1970-2012



4.9 Foreign Reserves

It is amount which is held by central bank of a particular state. This amount is in form of gold, special drawing rights, reserves of International Monetary Fund or currencies of different states like US dollar, Great Britain pound, Japanese yen, etc. Figure 9 shows that largest reserves in Pakistan history were 17.83 billion USD in 2014 while 0.2 billion USD in 1971.

Figure 7 Foreign Exchange Reserves during 1970-2014



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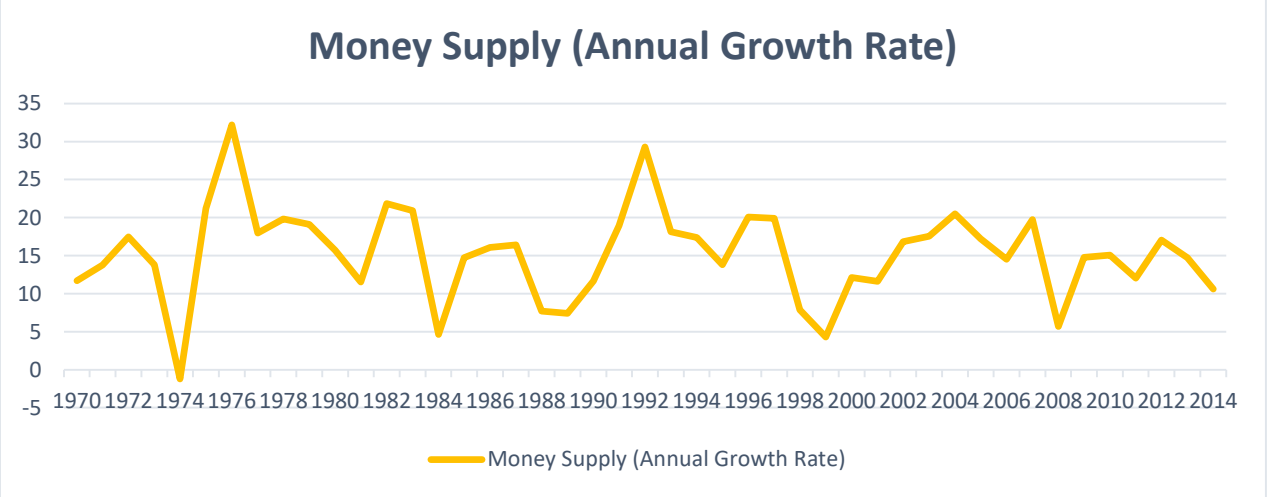
4.10 Money Supply:

Money supply is the quantity of money circulated in an economy. It consists of currency notes, coins, government bonds, etc. Central bank of every country is responsible for supply of money. In Pakistan, State Bank of Pakistan controls money supply. Data in Figure 8 shows money supply over the period. It was highest 32.2 percent in 1976 and lowest -1.2 percent in 1974.

Figure 8 Money Supply during 1970-2014



4.11. Gross Domestic Product:

The GDP (gross domestic product) is the quantity of goods and services produced in a country in a year. It includes all goods and services produced for consumption and export purpose. The size of Pakistan's GDP in 2014 was 243.63 billion USD. Pakistan's GDP growth was impressive from 1970 when it was only US$10.3 billion to 2014 when it reached more than 243 billion.

Figure 9 Growth of GDP (in billion US dollar) during 1970-2014.

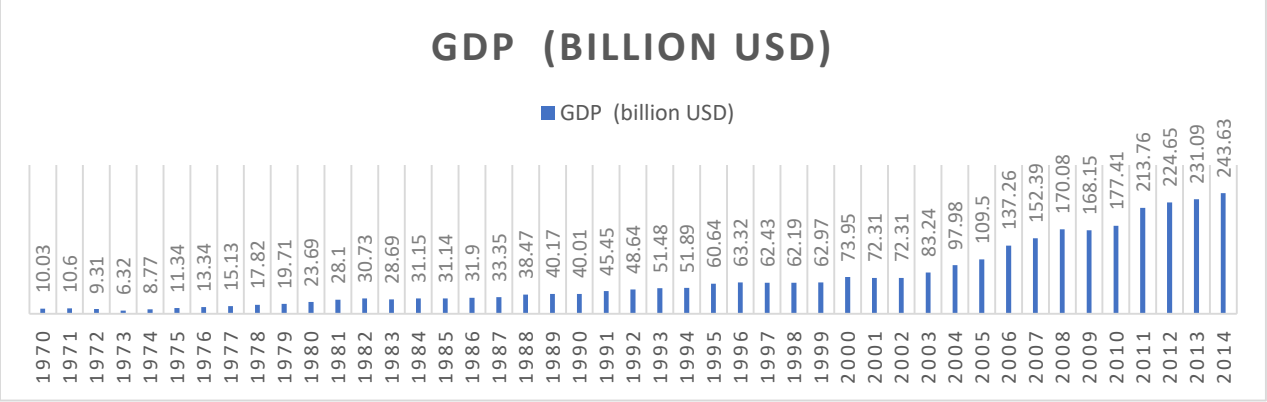


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Table 1 Descriptive Statistics

	RXCRA	XPO	IPR	FDIN	FORES	GDPR	GOPE	IFLA	MOSU
Mean	36.87089	9.841778	14.01222	0.813778	4.698	71.47756	11.15756	9.275556	15.20089
Median	25.08	8.39	9.88	0.31	1.63	48.64	10.84	7.9	15.7
Maximum	101.63	30.69	46.36	5.59	17.7	243.63	16.78	26.7	32.2
Minimum	4.76	0.76	1.03	0	0.19	6.32	7.78	2.9	-1.2
Std. Dev.	29.10583	8.839516	13.27904	1.320205	5.437593	66.90025	1.928054	5.228556	6.121889
Skewness	0.764917	1.013271	1.336894	2.486547	1.163959	1.285253	0.74089	1.518091	-0.01988
Kurtosis	2.362181	2.970521	3.508621	8.725607	2.808665	3.498536	3.759631	5.34488	4.117373
Jarque-Bera	5.151008	7.702018	13.88969	107.8392	10.22965	12.85507	5.198828	27.59411	2.343944
Probability	0.076115	0.021258	0.000964	0	0.006007	0.001616	0.074317	0.000001	0.309755
Sum	1659.19	442.88	630.55	36.62	211.41	3216.49	502.09	417.4	684.04
Sum Sq. Deviation	37274.56	3438.03	7758.647	76.68946	1300.967	196928.3	163.5652	1202.863	1649.011
Observations	45	45	45	45	45	45	45	45	45

Data in Table 1 shows a small degree skewed for the real exchange rate, government spending and money supply. Data is positively skewed for inflation, GDP, imports, exports, FDI and foreign exchange reserves.

5.CONCLUSION

ADF test were applied on data to check stationarity of variables. All variables were found stationary on different levels after applying ADF test. Then co-integration test was used to see whether variables have long term sustained relationship or not. We applied simple least square method to find that the nature of relationship between dependent and independent variables. The

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results show that real exchange rate volatility had positive relationship with exports, GDP and foreign direct investment. While it had negative relationship with imports, foreign exchange reserves, government spending, inflation and money supply. After co-integrating variables ECM had been applied which represents one period lag of residuals. It had been applied to correct any previous period disequilibrium. To avoid the violation of assumptions of CLRM, Breusch-Godfrey autocorrelation LM test, Harvey and ARCH tests for hetroskedasticity had been applied. And the results showed that there lie no issues of autocorrelation and hetroskedasticity in the variables.

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Contribution of Authors

This research paper is a part of the dissertation written by Asia Gul under the supervision of Prof.Dr. Abdul Ghafoor Awan. In this way, it is an original research paper. She chose the title of her paper, collected relevant material and finalized the paper. Prof. Dr. Abdul Ghafoor Awan provided necessary guide in selection of title, relevant material, research methodology and analytical techniques. He also edited the paper, corrected its language, punctuations and made its formatting as per research standards. He has given final shape to this paper as well**.** Thus, this paper is the joint efforts of both authors.