Factors effecting exchange rate: a case of pakistan

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Factors Effecting Exchange Rate: A case of Pakistan

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Abstract: *This paper investigate different macroeconomic factor that affect exchange rate of Pakistan. Macroeconomic factor include export, import, interest, inflation and current account. Data has been collected annually from 1991 to 2014. Augmented Dickey-Fuller test has been applied to check for stationarity in the data. Exchange rate and interest were found stationary at level, while rest of the variables were stationary at first difference. Johansen co-integration test has been applied to observe for long term relation among variables. Result revealed that there are three co-integrated equations, as there likelihood values are greater than the critical value both at 5% and 1%. So, Johansen co-integration test rejects the assumption of no co-integration. Two stages least square regression has been applied to observe relationship between dependent variable and independent variables. Export, interest and inflation found significant, while import and current account were insignificant.*

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I.   Introduction

Exchange rate is a vibrant macroeconomic factor and mainstay of trade. The change in exchange rate affect trade balance. Unstable exchange rate affects the capital movements, decelerates the trade process, and ruins the investor's confidence to invest in a country with unstable exchange rate, ultimately growth process is slowed down. A stable exchange rate helps financial institutions and enterprise to evaluate the investment activities, hedging and financing and to help them to reduce operational risks (Nieh and Wang, 2005; Rahman and Hossain, 2003).

Before World War I, most countries' currencies were linked with gold but after World War II, US dollar was fixed as reference currency for most of currencies. Pound Sterling was the reference currency for Pakistani rupee till 1970. In 1971, due to the rising influence of US Dollar, Pakistani Rupee was linked with US Dollar.

Since the last few years the world economy has confronted many challenges like increase in oil price, inflation and food prices. Lower interest rate is a sign of instable economy. Overvaluing the exchange rate can help to get rid of these tumults in developing counties, but this so called overvaluation differentiate against exports. As, according to (T.Ademola, 1986) export has a quick effect on exchange rate. There are other macroeconomic factors that affect exchange rate other than exports. These are, inflation, interest, current account balance, public debt and imports. When inflation in lower in any country, the value currency of that country appreciates because the purchasing power of that country increases. If inflation is high, supply of currency increases and demands decreases, with that currency depreciates.

Central bank affects exchange rate by manipulating interest rate. A country with high interest rate is very attractive for foreign investors because they can get higher return as compared to other countries. Foreign capital is attracted if the interest rate is higher and cause exchange rate to rise. If country's current account is in deficit, capital from foreign sources is borrowed to make up the deficit. Foreign currency excess demand depreciates local currency.

The objective of this paper is to investigate different factors that affect the exchange rate of Pakistan. Rest of the paper is organized as, section II discusses past literature, section III describes data, methodology and results and section IV concludes the results.

II.   Literature Review

Several studies have been conducted about the relationship among exchange rate and other macroeconomic variables like inflation, interest, term of trade, public debt, exports, imports and current account, mixed results.

A study was conducted by (Ahmed and Ali, 1999) in which they analyzed the association between domestic price level and exchange rate. They found a two directional association between price and exchange rate. They explored that when inflation is present then it is not suggested to manage exchange rate. Another study was conducted by Bhatti (2001) by using quarterly data over the period of 1982 to 2004. H applied Johansen multivariate maximum likelihood technique for co-integration and explored a long run association between exchange rate and interest rate, income and

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prices. According to De Grauwe (1988) variability in exchange rate and trade should have positive association and this association cannot be negative if the model used in the study is specified correctly. He further argued that negative influence on trade is because of a mechanism, which is called political economy of exchange rate variability.

Ejaz, Abbas and Saeed (2002) explored a direct association between budget deficits and exchange rate of Pakistan by conducting a study covering the period from 1982 to 1998. According to Galati and Ho (2003), any news play a vital role in exchange rate fluctuations. They explored that any positive and good news cause an appreciation in currency value, while currency is depreciated due to a bad news.

To investigate different factors that affect exchange rate of Pakistan, (Zada 2010) conducted a study by using multiple regression model, taking exchange rate dependent variable and GDP, trade balance, forex reserves, money supply, interest and inflation as independent variables. Data of these variable had been collected for the period 1979 to 2008. He found that interest, forex reserves and inflation had significant effect on exchange rate at 1% level, while money supply, GDP and trade balance were insignificant. Alam (2010) examined whether volatility in exchange rate has any effect on export aggregate demand? For this purpose he collected quarterly data from 1979 to 2005. He used co-integration test to observe any integration among the variables. He concluded that export was integrated with exchange rate instability, real exchange rate and economic activity. He found that there was a significant positive impact of economic activity on export. Export does not increase in long run when competition increases.

Tang (2011) investigated the association between trade and exchange rate. He used panel data procedure and single data set of ASEAN for the period 1980 to 2009. They explored a significant effect on inter south Asia trade of inter South Asia exchange rate. To investigate an association between trade and exchange rate, Auboin and Ruta (2011) conducted a study. The purpose was to analyze any impact that exchange rate has on international trade. They came to the conclusion that exports and imports were negatively affected by any variation in exchange rate. Pricing strategies and production networks had effect on exchange rate and international trade in short run. Demeza and Ustaoglub (2012) investigated the impact of variation of exchange rate on Turkey's export. Data was collect from 1992 to 2010 of top five importer countries. They concluded that export is affected negatively by exchange rate in long run and the impact was significant while in short run no significant impact of exchange rate on export had been observed. Relationship of commodity price inflation and monetary policy was investigated by Gregorio (2012). Annual data was collected from 1980 to 2007. They concluded that inflation was significantly affected by food and oil price.

III.   Data, Methodology and Results

To investigate different factor that affect exchange rate of Pakistan, annual data of variables like, exchange rate, inflation, interest rate, export, import and current account has been collected for the period 1991 to 2014. Stepwise procedure has been adopted to check the stationarity of the variables by using augmented dickey fuller test (Afshan and Batul, 2014; Parveen, Qayyum and Ismail, 2012). Stationarity was first checked by only including intercept

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without tend, then by including both the intercept and trend. To check any integration among the variables Johansen co-integration test has been used.

To analyze linear relationship between dependent variable and independent variables, the two stage least square method has been used (Parveen, Qayyum and Ismail, 2012). Following in given the regression model.

EXCH= β_0 + β_1(EXPO) + β_2(IMP) + β_3(INT) + β_4(INFL) + β_5(CA) + μ

Where EXCH is Exchange rate, EXPO is Export, IMP is Import, INT is Interest rate, INFL is Inflation, CA is Current account and μ is error term.

Augmented Dickey-fuller Test

Starting with the stationarity check by using Augmented dickey fuller (ADF) test. Following table-1 show the result of augmented dickey fuller (ADF) test.

Table-1 Result of Augmented Dickey fuller Test for Stationarity at Level

Variable	Without Trend	With Trend	Status
Exchange Rate	0.463557	-4.093536	I(0) Stationary
Exports	0.57067	-1.734178	I(0) Non Stationary
Imports	0.251418	-1.589655	I(0) Non Stationary
Interest	-3.66796	-4.798425	I(0) Stationary
Inflation	-2.178488	-2.133871	I(0) Non Stationary
Current Account	-2.441102	-2.354785	I(0) Non Stationary

Table-1 shows that all the variables are non-stationary but only interest is stationary when only intercept is included, but when both the intercept and trend is included, exchange rate also becomes stationary

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Table-2 Result of Augmented Dickey fuller Test for Stationarity at First Difference

Variable	Without Trend	With Trend	Status
Exchange Rate	-4.578213	-4.538899	I(0) Stationary
Exports	-5.13593	-5.622161	I(1) Stationary
Imports	-4.588521	-4.784937	I(1) Stationary
Interest	-4.798425	-6.135527	I(0) Stationary
Inflation	-5.563515	-5.435056	I(1) Stationary
Current Account	-4.138931	-4.031815	I(1) Stationary

According to table-2, all the variable become stationary at first difference.

Johansen Co-Integration Test

Results of Johansen Co-integration test is given below in Table-3

Table-3 Johansen Co-integration Test

Hypothesized No. of CE(s)	Eigenvalue	Likelihood	5 Percent	1 Percent
None **	0.968714	198.3607	102.14	111.01
At most 1 **	0.910248	122.1396	76.07	84.45
At most 2 **	0.828955	69.10418	53.12	60.16
At most 3	0.491270	30.25589	34.91	41.07
At most 4	0.365213	15.38746	19.96	24.60
At most 5	0.217267	5.389208	9.24	12.97

Trace test indicates 3 co-integrating equation(s) at both 5% and 1% levels

Johansen co-integration test, tests for long run relationship among time series variables. As four variables are non-stationary at level, so there is possibility of spurious results but Johansen co-integration test indicates that there are three co-integrated equations, as there likelihood value are greater the critical value both at 5% and 1%. So, Johansen co-integration test rejects the assumption of no co-integration.

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Regression Analysis

Following Table-4 shows the result of two stage least square (2SLS) method.

Table-4 2SLS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.965250	0.294405	6.675324	0.0000
EXPO	0.711605	0.292148	2.435772	0.0255
IMP	0.157310	0.233065	0.674963	0.5083
INT	0.183178	0.060285	3.038513	0.0071
INFL	-0.351910	0.065063	-5.408772	0.0000
CA	-0.002494	0.001473	-1.693772	0.1075
R-squared	0.939422			
Adjusted R-squared	0.922594			
S.E. of regression	0.121816			
F-statistic	55.82727			
Prob(F-statistic)	0.000000			
Durbin-Watson stat	1.747596			

Two stages last square regression analysis shows that exports, interest and inflation are significant variables, as their p values are less than 0.05, while imports and current account are insignificant. So, main factors that determine exchange rate are exports, interest and inflation. Export is significant variable with positive coefficient. With the increase in exports, the demand for local currency also increases and consequently local currency appreciates. Second significant variable is interest with positive coefficient. A country, where interest rate is high, is very attractive for foreign landers because they can get higher return as compared to other countries. Foreign capital is attracted if the interest rate is higher and cause exchange rate to rise. Table-4 exhibits that inflation significant negative influence on exchange rate. Rise is inflation reduces purchasing power, supply of local currency increases and demand decreases, ultimately currency depreciates.

Durbin- Watson value is 1.74, which is between no correlation region i.e. 1.70 and 2.30. Adjusted R-squared value is 0.9225, which shows that 92.25% variation is due to the variables that are included in this model. P value of F-statistic is 0.0000, which means that overall model is good.

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IV.   Conclusion

The aim of this paper is to investigate different factors that affect exchange rate of Pakistan. Data of variables has been collected from 1991 to 2014. Augmented Dickey-Fuller test has been applied to check for stationarity in the data. Exchange rate and interest were found stationary at level, while rest of the variables were stationary at first difference. Johansen co-integration test has been applied to observe for long term relation among variables. Result revealed that there are three co-integrated equations, as there likelihood values are greater than the critical value both at 5% and 1%. So, Johansen co-integration test rejects the assumption of no co-integration. Two stages least square regression has been applied to observe relationship between dependent variable and independent variables. Export, interest and inflation found significant, while import and current account were insignificant.

Export becomes cheaper when currency depreciates and ultimately export increases. Negative impact of this can be in the form of rise in inflation rate in short run but in long run economy boosts up in the form of increased output. But currency devaluation is not permanent solution for economy improvement. Government of Pakistan should consider that how variation in exchange rate can influence the performance of macro-economic factor while implementing trade policies. Government should implement such a plan that no external factors can adversely affect currency value unless government revises its economic plans.

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