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THE IMPACT OF EXPORTS AND IMPORTS ON EXCHANGE RATES IN INDIA

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Abstract:

Objectives: *In the era of a globalized world, the interdependence amongst countries in terms of international trade of goods and services and capital flows has increased considerably. There is a considerable change in the trade composition of the developing countries with a magnificent shift from exporting commodity to manufacturing product exports. This change in the trade composition has made the developing countries terms of trade more stable, but its exports are becoming more sensitive to exchange rate fluctuations.*

Methodology: *This study empirically examines the impact of India's export and import on exchange rate using time series data for the period from January 2006 to October 2015.*

Findings*: This study finds that there is positive relationship between export and exchange rate but negative relationship between import and exchange rate. Also, finds that the change in export will influence in positive changes in Indian Rupee against Euro, Pound, Dollar and Yen. But, Import is not positively influence on exchange rate between Euro, Dollar, Pound and Yen.*

Key Words: *Export, Import, Exchange Rate, Relationship, Granger Causality*

Introduction

In open economies, the policies of foreign exchange rate are some of the most important macroeconomic indicators, because the world's investment decisions are affected by them. Also the success of the policy is affected by the effect of foreign exchange rates on imports and exports, in terms of a reduction in the foreign trade deficit. Today, the trends in the world economy as well as the movement of goods and services, labor, technology and capital throughout the world, regardless of the geographical boundaries, affect the economies of countries. Trade transactions involving more than one region normally require the conversion of a currency to another currency.

The purpose of this research is to determine the impact of exchange rates on the imports and exports of emerging countries. The intention of this research was to develop an empirical study which will illustrate the nature of the relationship between imports-exports and exchange rates. The movement in exchange rates will be assumed to be as a result of exchange rate policies. Additionally, it is a chance for the researcher to apply theoretical knowledge to a

practical situation through critical and robust methodologies as described by Iqbal, Khalid & Rafiq (2011) and Bhattarai (2011). In the next section, the literature review is summarized with the objective of gaining adequate knowledge of the subject under research.

In the literature, there have been several studies indicating the relation between exchange rate and foreign trade i.e. Export and import. However, this study differentiates from previous studies in two aspects.

First, foreign exchange rate has been used as a dependent variable, in this study the foreign exchange rate was used as an indicator that considers inflation differences, as well. Second, although most of studies in the literature investigate the effect of foreign exchange rates on the foreign trade balance, in this study the effect of foreign exchange rates on imports and exports were analyzed separately.

In the second part of the study similar studies in the literature and different opinions are mentioned. In the third part, information about the empirical methodology and data are given and the empirical results are evaluated.

Data and Methodology

This study uses time series data. The main objective of study is to examine whether the import or export effect the exchange rate (USD, EURO, POUND and YEN) in India. The monthly exchange value of EURO, POUND, DOLLAR and YEN as well as EXPORT and IMPORT has been used for the study. The data period is from January 2006 to October 2015. All time series contains total of 118 observations. The data are collected from database of Reserve Bank of India and SEBI.

Empirical Results

Table: 1 Correlation matrix between all variables

	EURO	IMPORT	EXPORT	USD	POUND	YEN
EURO	1					
IMPORT	-0.2388	1				
EXPORT	0.0231	0.4630	1			
USD	0.5639	-0.2389	0.1772	1		
POUND	0.7655	-0.2698	-0.0209	0.6482	1	
YEN	0.5710	-0.2705	0.0880	0.7336	0.6029	1

Above table shows the liner correlation between Import, Export and Exchange rate. The correlation coefficient is positive and statistically significant at the 0.01 level. The correlation coefficient between import and EURO, USD, POUND and YEN are negative. Export has positive relationship between USD, EURO and Yen but there is negative relationship between POUND and Export. So, that Export plays a significant role in exchange rate volatility in India.

Regression Analysis

In the regression model India's EXPORT and IMPORT is used as the independent variable, and EURO, POUND, YEN and USD used as a depended variable. Globalization has long been a strong trend and foreign trade has

become even more important, which affects GDP growth, therefore India's Total Export, Total Import, and Foreign Exchange are also used as an independent variable.

The above reasoning is depicted below equation:

$$Yt = \alpha + \beta_1 export_{t-1} + \beta_2 exchnage\ rate\ + u_t$$

Researcher's main hypothesis for the study is that the impact of EXPORT and IMPORT in Exchange rate (USD, POUND, EURO and YEN).

This can either be confirmed or rejected based on the sign and significance of the estimated value of β_1 in the regression analysis. The null hypothesis is Ho: $\beta_1 = 0$ i.e. EXPORT does not contribute to change in exchange rate, while the alternative hypothesis is $\beta_1 \neq 0$.

Table: 2 Regression analysis between EXPORT and Foreign Exchange

Variable	Coefficient	t-Statistic	Prob.	R-squared	F-statistics	DW
Impact of EXPORT on EURO (Dependent Variable: EURO)						
Constant	49.8558	47.2909	0.000	0.7241	304.40 (0.0000)	0.2674
EXPORT	0.01658	17.4472	0.000			
Impact of EXPORT on POUND (Dependent Variable: POUND)						
Constant	69.11928	36.79935	0.000	0.6517	73.67 (0.0000)	0.2515
EXPORT	0.014530	8.582907	0.000			
Impact of EXPORT on USD (Dependent Variable: USD)						
Constant	35.0723	35.1750	0.000	0.7093	283.10 (0.0000)	0.1852
EXPORT	0.01512	16.8257	0.000			
Impact of EXPORT on YEN (Dependent Variable: YEN)						
Constant	32.84218	21.47931	0.000	0.6049	177.63 (0.0000)	0.1595
EXPORT	0.018368	13.32790	0.000			

From the table above, the null hypothesis can be rejected at the 5% significance level since the associated t-value is significant. The coefficient estimate for Export and Foreign Exchange are also statistically significant.

The Durbin-Watson statistics is less than 2 for all variables, for H_0: p=0 and H_1: p≠0, d_{crit} value is greater than d at 5 per cent significance level. Therefore null hypothesis is accepted and suggest the presence of autocorrelation in the series.

Coefficient of determination, R^2 has exceptionally high value which indicating that very good fit between the variables or in other words in all variables is more than 60.0% of the variance in EXPORT can be explained by USD, POUND, EURO and YEN.

According to regression analysis contribution of EXPORT in change in exchange rate volatility is very little and impact cannot be developed directly but indirectly impact can be measured and variation also happens the way of indirect effect in different segment of the economy.

Table: 3 Regression analysis between IMPORT and Foreign Exchange

Variable	Coefficient	t-Statistic	Prob.	R-squared	F-statistics	DW
Impact of IMPORT on EURO (Dependent Variable: DEURO)						
Constant	50.1218	40.9988	0.000	0.6517	217.01 (0.0000)	0.2515
D*IMPORT*	0.01072	14.7315	0.000			
Impact of IMPORT on POUND (Dependent Variable: DPOUND)						
Constant	70.1452	34.1347	0.000	0.3127	52.78 (0.0000)	0.1010
D*IMPORT*	0.0088	7.26533	0.000			
Impact of IMPORT on USD (Dependent Variable: DUSD)						
Constant	35.3690	30.6239	0.000	0.6339	200.84 (0.0000)	0.1819
D*IMPORT*	0.00974	14.1721	0.000			
Impact of IMPORT on YEN (Dependent Variable: DYEN)						
Constant	31.2550	21.3736	0.000	0.6608	225.96 (0.0000)	0.2464
D*IMPORT*	0.01301	15.0312	0.000			

From the table above, the null hypothesis can be rejected at the 5% significance level since the associated t-value is significant. The coefficient estimate for Import and Foreign Exchange are also statistically significant.

The Durbin-Watson statistics is less than 2 for all variables, for H_0: p=0 and H_1: p≠0, d_{crit} value is greater than d at 5 per cent significance level. Therefore null hypothesis is accepted and suggest the presence of autocorrelation in the series.

Coefficient of determination, R^2 has exceptionally high value which indicating that very good fit between the variables or in other words in all variables is more than 60.0% of the variance in IMPORT can be explained by USD, EURO and YEN but in case of POUND only 31% variance explain by Import.

According to regression analysis contribution of IMPORT in change in exchange rate volatility is very little and impact cannot be developed directly but indirectly impact can be measured and variation also happens the way of indirect effect in different segment of the economy.

Unit Root Test- Augmented Dickey-Fuller Test

The direction of relationship between two variables can be found out with help of correlation. The data set has been converted in 2nd difference for the further analysis. To establish relationship between export and import and exchange rate in India, the authors had applied Ganger Causality test. But before applying this test, it is essential to check stationarity for all variables. The ADF test is used to check stationarity of all time series.

Most time series data are non-stationary i.e., they tend to exhibit a deterministic and stochastic trend. Before apply any statistical test researcher need to be check whether the series is stationary or not. A more formal method of detecting non-stationarity is often described as testing for unit roots, for reasons that need not concern us here. The standard test, pioneered by Dicey and Fuller (1979), is based on the model

$$X_t = \beta_1 + \beta_2 X_{t-1} + \gamma_t + \varepsilon_t$$

Rewritten as:

$$\Delta X_t = \beta_1 + (\beta_2 - 1) X_{t-1} + \gamma_t + \varepsilon_t$$

Where $\Delta X_t = X_t - X_{t-1}$, the series will be non-stationary if either the coefficient of X_{t-1} is zero or the coefficient of *t* is non zero.

H_0 = There is a presence of unit root in the series. (non-stationary)

Table: 4 ADF test for all variables at Level and 2nd Difference

Variables	ADF Value	Probability	Critical Value	Decision	Durbin–Watson Statistics
DEXPORT	-9.7980	0.000	At 1%: -3.4900* At 5%: -2.8874 At 10%:-2.5804	Reject Null hypothesis	2.3305
DIMPORT	-7.7454	0.0000	At 1%: -3.4900* At 5%: -2.8874 At 10%:-2.5804	Reject Null hypothesis	1.9990
DEURO	-8.1937	0.000	At 1%: -3.4900* At 5%: -2.8874 At 10%:-2.5804	Reject Null hypothesis	2.0441
DPOUND	-6.7173	0.0000	At 1%: -3.4900* At 5%: -2.8874 At 10%:-2.5804	Reject Null hypothesis	2.0381
DUSD	-8.2708	0.0000	At 1%: -3.4900* At 5%: -2.8874 At 10%:-2.5804	Reject Null hypothesis	1.9792
DYEN	-7.3438	0.0000	At 1%: -3.4900* At 5%: -2.8874 At 10%:-2.5804	Reject Null hypothesis	2.0844

*MacKinnon critical values for rejection of hypothesis of a unit root.

The table-3 shows that all variables under study become stationary at 2nd difference. After taking 2nd difference, the ADF-test value is greater than critical value at 1% level of significance. The ADF-test value of all variables presented in above table. Thus, the all variables are stationary after 2nd difference and that means null hypothesis of unit root can be rejected. This result supported by Durbin – Watson statistics in all variables, which means there is no auto correlation found.

After ADF test for determine stationarity of data, the Ganger Causality test were performed between DEXPORT to DUSD, DPOUND, DYEN and DEURO as well as DIMPORT to DUSD, DPOUND, DYEN and DEURO to check direction of causality between them.

Granger – Causality test

A Granger – Causality test to find out whether IMPORT or EXPORT causes movements in Exchange rate. A Granger – Causality test is performed to give results that can be used to draw conclusions whether events in the past can cause events in the future, or predict movements in the future. (Gujarati, 2003)

Is it IMPORT or EXPORT that causes changes in exchange rate; that does EXPORT and IMPORT performance for the previous year have influence on exchange rate present year given information on previous exchange rate. Or can it be that it is the other way around? In a linear regression the dependence of one variable on other variables is tested. If this is true it does necessarily imply that causation is present. (Gujarati, 2003)

This test is used to further see any impact on IMPORT or EXPORT growth by Exchange rate movement. In the test we use only four explanatory variables: a one and two year lags of Y and a one and two year lags of *export or import.* On the left hand side of the equation we still have Y as the dependent variable.

The equation for the problem above can be expressed as:

$DEXPORT=\alpha+\alpha 1Y\ t\text{-}1 + \alpha 2Y\ t\text{-}2 + \beta 1\ dexchanerage t_{t-1} + \beta 2\ dexchanerage t_{t-2} + \mu_t$

Our null hypothesis for testing Granger causality is: H0: $\beta 1 = \beta 2 = 0$

Leg: 4 and observation after leg length is 112

Granger Causality @ 2nd Difference

Table: 5 Ganger Causality Test between EXPORT and Exchange rate

Null Hypothesis:	**F-Statistic**	**Probability**
DEXPORT does not Granger Cause DEURO	3.40462	0.01171
DEURO does not Granger Cause DEXPORT	4.51744	0.00211
DPOUND does not Granger Cause DEXPORT	2.63102	0.03851
DEXPORT does not Granger Cause DPOUND	*1.83846*	*0.12710*
DUSD does not Granger Cause DEXPORT	3.39402	0.01190
DEXPORT does not Granger Cause DUSD	3.62817	0.00829
DYEN does not Granger Cause DEXPORT	*1.31358*	*0.26991*
DEXPORT does not Granger Cause DYEN	2.88684	0.02601

The above table shows the F-statistics with p-value which conclude that null hypothesis of DEXPORT does not ganger cause on DEURO, DUSD and DYEN, which is rejected at 5% significance level but on DPOUND is not significant. Similarly, the null hypothesis of DEURO, DUSD and DPOUND does not ganger cause DEXPORT can be rejected at 5% significance level but DYEN is not significant on DEXPORT. Thus, it can be concluded that there is unidirectional relationship between EXPORT and YEN as well as POUND and bidirectional causality between EXPORT and EURO as well as USD in India.

Table: 6 Ganger Causality Test between IMPORT and Exchange rate

Null Hypothesis:	**F-Statistic**	**Probability**
DIMPORT does not Granger Cause DEURO	1.86770	0.12174
DEURO does not Granger Cause DIMPORT	*0.93633*	*0.44605*
DPOUND does not Granger Cause DIMPORT	2.22939	0.07091
DIMPORT does not Granger Cause DPOUND	*1.84202*	*0.12644*
DUSD does not Granger Cause DIMPORT	*1.79977*	*0.13455*
DIMPORT does not Granger Cause DUSD	*0.56215*	*0.69064*
DYEN does not Granger Cause DIMPORT	*1.17151*	*0.32779*
DIMPORT does not Granger Cause DYEN	*0.55748*	*0.69402*

The above table shows the F-statistics with p-value which conclude that null hypothesis of DIMPORT does not ganger cause on DEURO, which is rejected at 5% significance level but on DPOUND, DUSD and DYEN is not significant. Similarly, the null hypothesis of DEURO, DUSD and DYEN does not granger cause DIMPORT fail to rejected at 5% significance level but DPOUND is significant on DIMPORT. Thus, it can be concluded that there is bidirectional relationship between IMPORT and POUND but there is no causal relationship between IMPORT and EURO, USD & YEN in India.

Conclusions & Implications

Exchange rate is one of the essential indicators of economy's international competitiveness, and therefore, has a strong impact on a country's export and import development. The empirical literature so far in the relationship between exchange rate volatility and volume of trade provides mixed evidence. The only limitation of this study is that the seasonal effect in our model has been ignored because quarterly data is not available for Pakistan and India. It can be shown from analysis that the change in export will influence in positive changes in Indian Rupee against Euro, Pound, Dollar and Yen. But, Import is not positively influence on exchange rate between Euro, Dollar, Pound and Yen. It can be conclude that higher the export will result strong value of rupee against Euro, Dollar, Pound and Yen, but import will not create the strong value of rupee against the Euro, Dollar, Pound and Yen.

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