

IMPACT OF EXCHANGE RATE FLUCTUATIONS ON INDIA'S FOREIGN TRADE

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Abstract : Foreign exchange plays a vital role in the country's foreign trade. Foreign Exchange Rates and Foreign Trade are interrelated with each other and thus one variable has an impact on another in one way or other. The present paper studies impact of Exchange Rate fluctuations on India's Foreign Trade. The study used monthly time series data of Exchange Rates and India's Foreign trade for the period of 18 years. It was analyzed with the aid of econometric tools like Unit-root test, co-integration, VECM and Granger-Causality. The result stated that there is a long run co-integration between Exchange rate and India's foreign trade, and there is a unilateral causality between the Exchange Rate and India's Foreign Trade. The study concludes that the past values of India's Foreign trade are more likely to forecast future value of the Exchange rates for the short term. There exists a long run relationship between the exchange rates and India's Foreign Trade.

IndexTerms – Exchange Rate, Foreign Trade, Granger-Causality, VECM, Volatility

I. INTRODUCTION

Foreign Exchange has been the area of interest across the World. The performance of any nation in terms of growth rate is measured not only in terms of the goods that it can produce but also on the basis of its foreign exchange. It has been also said that foreign trade is the engine of the country's development and performance. The international trade plays an important role in developing the country's economy and shaping it so as to enable the country to procure goods and services from other countries which otherwise if it produced would be a costly affair. International trade has made entire world into one single market with any country having excess domestic production enter into global market. It enables one nation to sell their domestically produced goods to other countries across the World.

Foreign exchange plays a vital role in the country's foreign trade. The Indian Rupee has depreciated since 2009, breaking the ₹46/\$ mark. It has led to shrinking of the profit margins of the importers in the country. As the Rupee value has depreciated against US Dollar, the imports have become costlier and the burden has been passed on to the ultimate consumer. A weak currency may result into more stressed trade deficit since it makes imports more expensive for the domestic country. An individual is not concerned with the foreign exchange rate fluctuations until the business transactions are carried on in domestic currency. The focus comes only when the individual plans for foreign travel, import payments and overseas transactions.

India's foreign trade i.e. India's total import and export trade is an imperative sector in order to boost the growth of the country. It can be said that India's economic growth can be enhanced by increasing the exports trade of India, it will lead to increase in the earnings of the country as reflected in foreign currency. When the US Dollar appreciates against Indian Rupee there is a possibility of increase of export trade of India, since the imports for US from India would become economical to certain extent. Whereas, when India's imports increase it would lead to appreciation in the value of foreign currency which lead to more expensive imports to India and finally it results in trade deficit. The inter-relationship between India's foreign trade and exchange rate is complex as the fluctuations in the exchange rate will affect the foreign trade and vice-versa. This paper makes an attempt to investigate the impact of fluctuation in exchange rate on India's foreign trade. For this purpose, USD-INR and India's total foreign trade values are considered.

II. Review of Literature

The review of literature has been carried out to arrive at the objectives of the study.

(Suthar, 2006) investigated the impact of bank rate policy of the Reserve Bank of India and interest yield differentials between the India and the US Securities. Impact of broad money supply and foreign exchange reserves is also analyzed. The findings of his study hold that, the determinants have a significant impact on the exchange rates between Indian Rupee and US dollar. (Cheung & Sengupta, 2013) explored the real effective exchange rate (REER) effects on the share of exports of Indian non-financial sector firms for the period of 10 years. Finding of the study holds that, on an average, there has been a strong and significant negative impact from currency appreciation and currency volatility on market shares of India's exporting firm. (Suresh, 2012) studied the Exchange Rate Impact on Bilateral Trade between India and China. The main objective of the study was to find the impact of valuation i.e., appreciation of Chinese Renminbi (RMB) on India's trade with China. The findings of the paper hold that appreciation in RMB will affect the bilateral trade between India and China. (Azeez, Kolapo, & Ajayi, 2012) This study examines the effect of exchange rate volatility on macroeconomic performance in Nigeria from 1986 to 2010. The findings of the study displayed that, oil revenue and balance of payment exert negative effects while exchange rate volatility contributes positively to GDP in the long run. (Saha & Zhang, 2012) has explored whether the exchange rate pass-through to import prices is complete and investigate whether there is any association between the pass-through and the average inflation rate across these countries over the period 1990-2011, by using VAR model. The finding of the study hold that exchange rates have less effect in the rising domestic prices in China and India. (Okosodo & Imosili, 2012) examined the deregulation of foreign exchange market and its impact on the growth of the Nigerian economy. It appraised the objectives of the deregulation of foreign exchange market and the growth of the Nigerian economy. The study revealed that the deregulation of the foreign exchange market has a direct impact on the growth of the Nigerian economy. Exchange rate management adopted by Nigeria has been effective in solving the problem of inflation in Nigeria. Government should put machinery in place through the Central Bank to monitor the valuation of money to curb the trend of inflation in Nigeria. (Chellasamy, 2013) study analyzed the effects on Indian currency depreciation against

the dollar between Pre and Post Liberalization. It concluded that Post-liberalization period of Indian currency exchange rate is not satisfactory and the exchange rate was highly depreciated in the Post-liberalization period. (Grewal, 2013) explored the impact of Rupee – Dollar fluctuation on Indian economy. This paper presents different challenges due to these fluctuation and steps triggered by central bank and government to create stability. (Singh, 2013) explored the real implications and causes of the depreciation of the rupee on the Indian economy and it estimated that the Indian economy has more to lose and less to gain with depreciation of rupee in long run. (Jayachandran, 2013) investigated the impact of exchange rate volatility on the real exports and imports in India. Using annual time series data, the empirical analyses has been carried out for the period 1970 to 2011. The study results confirm that real exports and imports are co-integrated with exchange rate volatility, real exchange rate, gross domestic product and foreign economic activity.

(Soni & Parashar, 2013) studied Rupee Dollar relationship in terms of Rupee appreciation and depreciation and Pros and Cons of currency appreciation and depreciation. (Sabade, 2014) studied causes of fluctuations in India's exports and imports, connect them with Rupee depreciation over the years and offer recommendations to ease the problem of rising trade deficit. (Choudhari & Hakura, 2015) found out that the exchange rate pass-through to import prices for a large number of countries is incomplete and larger than the pass-through to export prices by using regression and VAR based estimates. (Debi Prasad Bal, 2015) studied the nonlinear causality between exchange rate and crude oil prices in the context of India and China. By applying the Hlemstra and Jones (1994) nonlinear Granger Causality test to the VAR residuals the findings suggested that, the nonlinearity of oil price influence the exchange rate irrespective of the exchange rate regimes. (Hatane & Stephanie, 2015) aimed towards the understanding of variables such as; inflation through GDP, interest rate through GDP, exchange rate through GDP, interest rate through inflation, and inflation through exchange rates by using Partial Least Square (PLS). They concluded that there is a significant negative relationship of interest rates on GDP and a significant positive relationship of the exchange rates on the GDP, while inflation is not a significant influence on GDP. (Jakob, 2016) studied the Impact of Exchange Rate Regimes on Economic Growth of a 74 countries for the year 2012. His findings revealed that, there is a positive and significant correlation between pegged exchange rate and growth in GDP. (Lu, Xiao, Humini, & Shigeyuki, 2016) studied co-movement among foreign exchange markets using the returns of exchange rates (GBP/USD, EUR/USD, and JPY/USD) and also focussed on the interdependence among returns of exchange rates during the recent global financial crisis and European debt crisis, by using wavelet analysis. They have concluded that there is a strong interdependence between the euro and pound sterling at all frequency bands of scale over the sample period. With regard to the yen–pound pairwise, co-variation is localized at high scales. Further, the finding stated that interdependence is more pronounced during crises. (Cláudia, Antonio, & Marcelo, 2016) aimed to show the impact of changes in monetary and exchange rate policy, and changes in the composition of exports on the performance of Brazilian economy by using model based in structuralist approach and the data are organized by a Social Accounting Matrix (SAM).

Based on the review of literature, we arrive at the objective of this study. The objective is to examine the impact of Exchange Rate on India's foreign trade. This study is mainly concerned with the fluctuation in the exchange rates and its impact on the foreign trade of India. It also focuses on the concept whether there is any short-run or long-run relationship exists between exchange rates and India's foreign trade.

III. METHODOLOGY

Data Sources: For the purpose of this study. Secondary data was obtained. The monthly values of exchange rates and foreign trade were extracted from Reserve Bank of India website. The monthly values of exchange rate and India's import and export trade has been converted into Quarterly and only one country is taken i.e. India and variables taken are exchange rate, foreign trade of India i.e. India's import and export trade.

Period of the study: The study is carried out using Monthly data of Exchange Rate i.e. USD-INR and India's Foreign Trade i.e. India's Export trade and India's Import trade from January 2000 to September 2018.

Statistical Tools and techniques: The following statistical tools and techniques are used in order to obtain the accurate findings and to test research hypotheses which include;

Descriptive Statistics of exchange rate, India's Import Trade and Export Trade.

Unit Root Test (Augmented Dickey Fuller Test (ADF): Unit root test is used to know whether the time series is stationary or non stationary. It indicates the order of integration. The variable y_t may be tested for presence of unit root, where u_t is the white noise error term. The ADF Unit root is based on null Hypothesis $H_0: -Y_t$ is Not $I(0)$. If the calculated ADF Statistic is less than the critical value, then the null Hypothesis is Rejected; otherwise accepted.

Johansen Co-integration Test: has been applied to check whether the long run Equilibrium relation exists between the exchange rates and India's foreign trade. It is based on two test statistic, i.e. Trace Test Statistic and the Maximum Eigen value test statistic.

Granger Causality Test: is a statistical hypothesis test for determining whether one time series is useful in forecasting another. It helps to determine whether Exchange Rate helps to determine the India's Foreign trade in short run.

IV. RESULTS AND DISCUSSION

Table 1: Descriptive Statistics of Exchange Rate , India's Export Trade And India's Import Trade

	EXCHANGE RATE	EXPORT	IMPORT
Mean	3.390030	9.443361	9.793911
Median	3.865681	9.652272	10.15383
Std. Dev.	0.162952	0.730029	0.826179
Skewness	0.581632	-0.578150	-0.668608
Kurtosis	1.928007	1.861322	1.944739
Jarque-Bera	23.459552	24.69018	27.20363
Probability	0.000008	0.000004	0.000001

Analysis: Table 1 presents the descriptive statistics of exchange rate and India's foreign trade. The data has been converted to logs due to uniformity. It gives information about the Mean , Median, standard deviation , Skewness and Kurtosis values of exchange rate and India's foreign trade for the period from 2000-01 to 2017-18. The dependent variable import trade has the highest standard deviation i.e. 0.826179 that means it is highly fluctuate. Whereas the independent variable exchange rate has the lowest standard deviation i.e. 0.162952 among all other variables. The value of kurtosis is highest for the exchange rate i.e. 1.928007 which is almost near to 3 which shows that the exchange rate is normally distributed. Export Trade and Import Trade are Negatively Skewed whereas Exchange Rate is Positively Skewed. As per Jarque Bera test Null hypothesis states that data is Normally Distributed, by using probability values of Jarque Bera test null hypothesis is rejected for all the variables as p-value is less than 5 % significance level normally distributed.

Table 2: Unit Root Analysis of Exchange Rate and India's Foreign Trade

Unit root NULL HYPOTHESIS	At level		At 1 st difference	
	t-statistic	Prob	t-statistic	Prob
Exchange rate has a unit root	0.248644	0.9751	-10.54818	0.0000**
India's Export trade has a unit root	-0.950454	0.7705	-4.048741	0.0014**
India's Import trade has a unit root	-0.908904	0.7842	-21.75025	0.0000**

Analysis: The variable in the time series data normally has a possibility that its value today is dependent on its past values which can lead to non-stationary data. In order to convert this data into stationary the unit root test has been conducted with help of Augmented Dickey Fuller Test. Table 2 shows the Unit Root test At the first, the data has been run on its original value at the level, where by looking at probability values which is more than 0.05 it can be concluded that the data has been non-stationary at the level hence the data has been run again on its first difference where the p-values are less than 0.05 so here the null-hypothesis has been rejected and concluded that the data is stationary at the 1st difference.

Exhibit 3: Johansen Co-integration between Exchange Rate and India's Foreign Trade

Null hypothesis Trace rank test	Alternative Hypothesis	Eigenvalue	Trace Statistic	Critical values (0.05%)	P-values
EXCHANGE RATE WITH INDIA'S FOREIGN TRADE					
$H_0:r=0$	$H_1:r=0$	0.145397	44.64403	29.79707	0.0005**
$H_0:r \leq 1$	$H_1:r > 1$	0.040463	9.763685	15.49471	0.2994
$H_0:r \leq 2$	$H_1:r > 2$	0.002672	0.594031	3.841466	0.4409
Max-Eigen Statistic	Alternative Hypothesis	Eigenvalue	Max-Eigen Statistic	Critical values (0.05%)	P-values
EXCHANGE RATE WITH INDIA'S FOREIGN TRADE					
$H_0:r=0$	$H_1:r=0$	0.145397	34.88034	21.13162	0.0003**
$H_0:r \leq 1$	$H_1:r > 1$	0.040463	9.169653	14.26460	0.2723
$H_0:r \leq 2$	$H_1:r > 2$	0.002672	0.594031	3.841466	0.4409

Analysis: Table 3 shows Co-integration test which is used to see whether there is any long run relationship between the exchange rate and foreign trade i.e. to determine the existence of co-integrating equation within the variables with the help of trace rank test and max-Eigen statistic. If the critical value is less than the trace statistic and if one co-integrating is found than there is a need to run Vector Error Correction model and if no co-integrating equation is found then there is a need of running unrestricted VAR model to see if there is any short term relationship between them or not . Test shows that Critical Value is less than the Trace statistics then we can say that there is a co-

integrated equation between the variables i.e. there is a co-integration equation between Exchange rate, India's Export Trade and India's Import trade (or p value <0.05).

1. Vector Error Correction Between Exchange Rate and Export and Import

EQUATION 1

$$D(\text{EXPORT}) = 253.52737C - 0.021899EC^* - 0.553168\Delta\text{EXPORT}_{t-1}^* - 0.323263\Delta\text{EXPORT}_{t-2} - 0.110379\Delta\text{IMPORT}_{t-1}^* + 0.050735\Delta\text{IMPORT}_{t-2}^* - 217.8968\Delta\text{EXCHANGE RATE}_{t-1}^* - 120.5237\Delta\text{EXCHANGE RATE}_{t-2}$$

The above stated is First VECM equation with Export as dependent variable and with Exchange Rate and Import trade. After getting co-integration between the variables we go for VECM model

(* denotes significant variables) In the Equation 1 The coefficient of Error correction, Export trade is negative; while coefficient of Exchange Rate and Import is positive. The intercept term is Positive. The error correction term helps to determine the speed of correction within the variables. The error correction term in case of Export Trade is Negative and significant, and hence error correction is happening.

EQUATION 2

$$D(\text{IMPORT}) = 272.8022C - 0.383558EC^* - 0.209364\Delta\text{IMPORT}_{t-1}^* + 0.023387\Delta\text{IMPORT}_{t-2} - 0.386073\Delta\text{EXPORT}_{t-1}^* - 0.036472\Delta\text{EXPORT}_{t-2} - 80.65984\Delta\text{EXCHANGE RATE}_{t-1} - 137.2893\Delta\text{EXCHANGE RATE}_{t-2}$$

Second VECM equation with Import Variable as Dependent with Exchange Rate and Export trade after getting co-integration between the variables we go for VECM model.

(* denotes significant variables) In the Equation 2 The coefficient of Error correction Import trade is negative; while coefficient of Exchange Rate and Import is positive. The intercept term is Positive. The error correction term helps to determine the speed of correction within the variables. The error correction term in case of Import Trade is Negative and significant, and hence error correction is happening.

Table 4: Granger Causality Test

NULL HYPOTHESIS	Obs.	F-Statistic	Prob.	Decision	Nature of Causality
EXPORT does not Granger Cause EXCHANGE RATE	223	6.95902	0.0012	Rejected	Causality
EXCHANGE RATE does not Granger Cause EXPORT	223	0.00069	0.9993	Accepted	No Causality
IMPORT does not Granger Cause EXCHANGE RATE	223	5.10859	0.0068	Rejected	causality
EXCHANGE RATE does not Granger Cause IMPORT	223	1.39940	0.2490	Accepted	No Causality

Analysis: Table 4 presents the results of Granger Causality Test between Exchange Rate and India's foreign trade. And If the Probability value is less than 5% then we reject the null hypothesis i.e. there is no Causality between the variables. This test shows that the export trade does cause the exchange rate as the p-value is less than 0.05 we reject the null hypothesis and it can be seen that the exchange rate does not cause the export trade as the p-value is more than 0.05 we accept the null hypothesis and state that past values of export trade effect the present values of Exchange Rate and past values of exchange rate does not effect the present value of export trade so there is unilateral Causality between the export trade and exchange rate. Where as in the case of causality between Exchange Rate and India's Import trade it can be seen that as the p-value is less than 0.05 we reject the null hypothesis and state that Import Trade cause the Exchange Rate in the short run i.e. the past values of India's Import Trade effect the present value of Exchange Rate. And the Exchange Rate does not cause the India's Import Trade as the p-value is more than 0.05 hence we failed to reject the null hypothesis. Hence there is unilateral causality between exchange rate and Import trade.

Findings

This study analyses the impact of the exchange rate fluctuations on India's Foreign Trade. We use the time series data from January 2000 to September 2018 of Exchange Rate and India's Foreign Trade and used Unit root test, Co-integration Test, Vector Error Correction Model, and Granger causality test. The result of this study presented that, there is a long run co-integration equation between the exchange rate and India's export trade and even between exchange rate and India's import trade, hence with the help of VECM we analyzed the long-run equations and found that Error Correction Term is negative and significant which shows the existence of long-term relations between the Exchange rate and India's Foreign trade. There exists short-run causality between exchange rate and India's foreign trade which shows unilateral causality relationship.

Conclusion

This Study contributes to the literature by investigating the Impact of exchange rate on India's foreign trade. In this study we have used, Co-integration, Vector Error Correction, and Granger Causality model. It has been found that exchange rate is co-integrating between Foreign trade that conclude there is a long run relationship between them, the reason could be as an exchange rate changes it has the effect on foreign trade mostly on import as due to whenever there is appreciation in foreign currency imports fall by a certain percentage i.e. in 2012-13, 11% appreciation in USD against INR leads to 8% decrease in India's Import during that period. From the study, it can be concluded that the past values of foreign trade can forecast the future value of the exchange rate for the short term period.

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