A Study of Factors Affecting Exchange Rate Variability in India

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Abstract:

Exchange rate is very crucial for the economic development of any developing country. Stability in the countries exchange rate is very important. There are enumerable factors causing variability in the exchange rate. The research paper attempts to find out the factors affecting exchange rate variability in India. Quarterly data has been taken for the study. The results of the study showed that inflation and interest rates have positive impact on exchange rate of India during the study period.

Keywords: Exchange Rate, Inflation, Interest rates, GDP, Oil prices

1. Introduction

Exchange rate is very crucial for the economic development of any developing country. Foreign exchange market is a market where in currency of one country is exchanged for the currency of other country. Exchange rate stability is very important for the stable growth of the economy. There exits many players in the foreign exchange market who are actively involved in foreign exchange transactions namely exporters, importers, investors, bankers, financial institutions, firms, commercial banks, foreign employees, NRIs, etc. In India exchange rate changes constantly. There is lot of variability in the exchange rate. There are various macro economic factors affecting exchange rate in India. In this research paper attempt is made to study macroeconomic factors causing variability in exchange rate in India.

2. Literature Review

Monica S, Dr. Santhiyavalli (2017) studied determinants of exchange rate of Indian rupee against us dollar and found that three variables balance of payment–current account, foreign exchange reserves and GDP at factor cost are the most significant variables affecting the exchange rate of Indian rupee against US dollar during the period of study.

Vidyavathi B., Kulkarni Keerti & Ainapur Pooja (2016) studied macro economic indicators and their impact on exchange rates. Interest rates, inflation, GDP, current account deficit, external debt and FDI were taken for the study.

Dr. Akshay Damani, Vidhi Vora (2018) studied factors affecting the exchange rate fluctuation in India. The results of study indicated that interest rate differential; foreign net investment inflows to India and crude oil prices have proved to have a significant impact on the exchange rate in the short run.

Raja Sher Ali Khan (2014) studied factors affecting exchange rate variability in Pakistan and found that inflation in Pakistan is an important factor that affects the exchange rate variability. With the increase in the inflation money supply increases and the currency of the country depreciates and because of that exchanges rate changes.

3. Objectives of Study

The main objective of the study is to find out the factors affecting exchange rate variability in India.

4. Research Methodology

To find the factors affecting exchange rate variability in India quarterly data have been taken for the study. Variables that are considered for the study are GDP, oil prices, interest rates and inflation in India. Eight years data have been taken for the study.

5. Tools and Techniques

Firstly unit root test was applied to find out whether the variables are stationary or not. For unit root test Augmented Dickey Fuller (ADF) test have been used. After checking for unit root regression analysis is done. The dependent variable for the regression analysis is taken as exchange rate whereas independent variables taken for the study are GDP, oil prices, interest rates and inflation rates in India. At last Granger Causality test was applied to find out cause and effect relationship among the variables taken for the study.

6. Sources of data

Data for the study is gathered from the Reserve Bank of India website and World Bank database. Data have been collected from various journals and books.

7. Results and Discussions

Table 1: Augmented Dickey Fuller (ADF) test

Variable	Original Level		Difference Level	
	t stat	**p value**	**t stat**	**p value**
Crude Oil	-1.371603	0.5831	-5.041062	0.0003
Exchange Rate	-1.506564	0.5171	-5.607821	0.0001
GDP	-1.228820	0.6474	-8.739088	0.0000
Inflation	-1.804677	0.3714	-4.708856	0.0007
Interest Rate	-2.052998	0.2640	-5.711278	0.0001

Source: Author's Compilations

Table 1 shows the results of ADF statistic for the variables considered for the study. The above table shows that crude oil, exchange rate, GDP, inflation and interest rate are non stationary at level. However both this variables are stationary upon differencing of data. ADF test was applied at level data for all the variables and it is found that the p values of all the variables were more than 0.05 which means they are not significant. However when the ADF test was applied at differenced data the p value is less than 0.05 which are significant. Therefore variables are stationary at differenced data.

Table 2: Descriptive Statistics

Particulars	Crude Oil	Exchange Rate	GDP	Inflation	Interest Rate
Mean	4467.89	58.37	3014276	111.18	7.05
Median	4336.22	61.72	2987526	115.53	7.16
Maximum	6685.29	67.75	4533638	136.96	8.86
Minimum	2208.51	44.67	1744175	80.00	4.13
Std. Dev.	1290.83	7.90	788389	18.82	1.11
Skewness	0.17	-0.58	0.15	-0.29	-0.44
Kurtosis	1.73	1.87	1.89	1.62	2.82
Jarque-Bera	2.32	3.48	1.75	2.99	1.07
Probability	0.31	0.18	0.42	0.22	0.59
Observations	32	32	32	32	32

Source: Author's Compilations

Table 2 shows the descriptive statistics of the factors affecting exchange rate of INR/USD. The mean, standard deviation, co-variation, Skewness, Kurtosis, Jarque bera test and number of observation for the period of the study are presented.

Table 3: Correlation

	Crude Oil	Exchange Rate	GDP	Inflation	Interest Rate
Crude Oil	1.00	-0.33	-0.44	-0.38	0.58
Exchange Rate	-0.33	1.00	0.92	0.97	0.00
GDP	-0.44	0.92	1.00	0.97	-0.25
Inflation	-0.38	0.97	0.97	1.00	-0.15
Interest Rate	0.58	0.00	-0.25	-0.15	1.00

Source: Author's Compilations

Table 3 shows the results of correlation among the variables taken for the study. The Pearson correlation coefficient ranges from +1 to -1. If the value is zero that means there is no association among the variables. If the value is greater than 0 then it indicates positive association whereas if it is negative than it implies negative association among the variables.

Table 4: Regression Analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	0.035143	0.030550	1.150340	0.2597
Inflation	0.736591	0.073120	10.07369	0.0000*
Interest Rates	0.161816	0.041549	3.894547	0.0006*
Crude Oil	-0.028584	0.023145	-1.234980	0.2271
R-squared	0.958461	Mean dependent var		4.057351
Adjusted R-squared	0.954010	S.D. dependent var		0.142450
S.E. of regression	0.030549	Akaike info criterion		-4.022527
Sum squared resid	0.026130	Schwarz criterion		-3.839310
Log likelihood	68.36043	Hannan-Quinn criter.		-3.961795
Durbin-Watson stat	2.411703			

Source: Author's Compilations

Table 4 shows the regression results that the inflation and interest rates have positive impact on exchange rate of Indian rupee against US dollar.GDP and crude oil price are not significant. R square value was at 0.958461 percent implying the extent of influence of significant variables on exchange rate. Durbin-Watson statistic is a test for first-order serial correlation and it measures the linear association between adjacent residuals from a regression model. DW statistics of 2.411 shows that there is no serial correlation.

Table 5: Granger Causality Test

Null Hypothesis:	Obs	F-Stat	Prob.	Nature of Causality
Exchange Rate does not Granger Cause Crude Oil	29	0.20	0.81	No Causality
Crude Oil does not Granger Cause Exchange Rate		0.23	0.79	No Causality
GDP does not Granger Cause Exchange Rate	29	0.80	0.46	No Causality
Exchange Rate does not Granger Cause GDP		0.77	0.47	No Causality
Inflation does not Granger Cause Exchange Rate	29	8.03	0.01	Unidirectional Causality
Exchange Rate does not Granger Cause Inflation		0.18	0.83	No Causality
Interest Rates does not Granger Cause Exchange Rate	29	3.59	0.04	Unidirectional Causality
Exchange Rate does not Granger Cause Interest Rates		0.83	0.44	No Causality

Source: Author's Compilations

Table 5 shows the results of granger causality test. It can be seen from the above table that there is unidirectional causality between inflation and exchange rate and Interest rate and exchange rate. There is no cause and effect relationship among the variables apart from the said variables.

8. Conclusion

The attempt of the study was to find out the key factors affecting exchange rate in India. GDP, oil prices, inflation and interest rate were taken as independent variable. GDP and oil prices were found insignificant. Inflation and interest rate were found to have positive impact on exchange rate of India. The results of granger causality test also suggest that there is unidirectional causality between Inflation and exchange rate and interest rate and exchange rate.

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