EFFECT OF MACRO ECONOMIC FACTORS ON RUPEE VALUE

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THE price of one currency in terms of another currency (exchange rate) is a very important variable for an open economy in the global market, because it affects the overall economic performance and growth of the economy. So, the relationship between exchange rate and the related macro-economic factors causing variability in the value of the former carries a high degree of significance for any open economy. The present paper aims to identify those macro-economic factors that affect the price of Indian currency (Rupee) and their inter-relationship with the latter. Also, the study includes the fluctuations of Indian currency against the Dollar (INR/USD) post globalization and suggests measures to control the devaluation of the Indian rupee.

Purpose: *To analyze the effect of select macro-economic factors influencing the IndianRupee value against US Dollar post- globalization.*

Design/Methodology/Approach: *The nature of research is Exploratory & Analytical that generates a posteriori hypothesis by analyzing a data-set and looking for potential relations between variables.*

Findings: *Exchange rate is highly dependent on the five select independent variables taken up for this study.*

Research Implications: *A strong relation between the dependent & independent variables suggests that steps taken to compress imports and promote FDI in explored & unexplored sectors can help improve the current rupee value.*

Key Words: *Exchange Rate, Indian Rupee, US Dollar, Macro-economic, Post-globalization.*

Introduction

Currency's price, like any commodity, is determined by its demand and supply in the international market. When the supply of a currency increases, its value will fall. The opposite holds true when demand for currency increases.Currency price of an economy is affected by a variety of factors prevailing at a given time. Some of the most important factors affecting currency price generally include interest rates, international trade, inflation, political stability, and the like. Jorion found that Currency exchange-rates are typically four times as volatile as interest rates and ten times as volatile as inflation cited by (Krishnamoorthy, Patel, Shetterly & Maheshwari, 2012). The higher the volatility in exchange rate, higher will be difficulty in making investment and international business decisions which indicates a higher exchange rate risk. Hence, it becomes important for participants in the international market to know about such risks and make a choice between the two alternatives available i.e., either to invest in

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the domestic market and earn a specific return or to invest in international market with higher level of uncertainty where they can reduce their risk through various hedging mechanisms available.

India has recently witnessed high levels of volatility leading to sharp depreciation of the Indian Rupee against the US Dollar. In 2014, the Indian Rupee breached the 60.50 per dollar. The government is trying to narrow the current account deficit by making use of certain structural measures.

Rupee Depreciation and Appreciation

Devaluation means decreasing the value of a nation's currency relative to gold or currencies of other nations. Devaluation is usually undertaken as a means of correcting a deficit in the balance of payments, Inflation and economic growth of a nation.

Rupee depreciation means that rupee has become relatively less worthy with respect to dollar i.e., rupee has lost some value w.r.t. the dollars. If the Indian Rupee moves from Rs. 50 a dollar to Rs. 60 a dollar then the rupee is said to have depreciated.

Rupee appreciation means that the rupee has become more valuable in comparison to the dollar. If the Indian Rupee moves from Rs. 60 a dollar to Rs. 50 a dollar then the rupee is said to have appreciated. It means that we can buy more dollars now with the same amount of rupees.

This is important because when goods are imported, we first buy dollars and then the goods. So if dollars become expensive, it follows that imports are expensive.

Reasons for Variation in Rupee Value

The main reasons responsible for the Indian rupee depreciation are:

- **Foreign Institutional investors (FII):** As per the data reported, FIIs (Foreign Institutional investors) is showing some disinterest in Indian markets lately. The slowdown in the developed economies like the US and Japan is believed to be the key reasons.
- **High inflation:** During periods of high inflation, Indian goods become more expensive in the global markets, thus making them less competitive as compared to goods from other countries like China. Increasing gold imports adds even more to the deficit.
- **Widening current account deficit:** This also contributes to high demand for dollars in the foreign exchange market.
- **Demand and supply rule:** If the demand for the dollar is greater than its supply in India, then the dollar will appreciate i.e., the rupee depreciates and vice-versa.
- **Oil price:** India has to import a bulk of its oil requirements to satisfy local demand, which is rising year-on-year. In International markets, prices of oil are quoted in dollars. So, whenever the domestic demand for oil increases or when the price of oil increases in the international market, there will be a rise in demand for dollars to pay for the oil so imported which depreciates the rupee further.
- **Policy inaction:** Perception of lack of clarity on the policy pulls up the speculative.
- **Low forex reserves:** The forex reserves have declined in the recent months. Due to this, the RBI is unable to intervene aggressively in the markets for foreign exchange.
- **Growth slow-down:** India's economic growth fell to a decade low of 5 per cent in 2012-13 due to which foreign investors have started pulling money out of the Indian markets speedily.
- **Capital controls:** The decision by the Reserve Bank and the government to impose temporary restrictions on capital flows has only discouraged foreign firms from pumping money into India.

- **Recession in the Euro zone: India's largest supply market:** Due to the Euro-crisis, risk averse investors are selling Euro and buying Dollars thereby leading to appreciation of the dollar in comparison to other currencies.

Literature Review

Chellasamy (2013) analyzed the effects on rupee depreciation against the dollar covering the area of currency growth, foreign investment, and macro-economic factors that affected Indian currency during the study period from 1989-1970 to 2012-2013.

Kotai (2013) studied that currency markets is the most volatile & liquid in all financial market in the world. The paper analyzed the volatility behavior of select five markets (INR/USD, JPY/USD, EURO/USD, GBP/USD, and CNY/USD) to find out which currency market is most volatile & sensitive. The study found that Indian currency market is more volatile and sensitive compared to other select countries and results show that Indian currency market is more sensitive due to the external factors.

Kaur & Sirohi (2013) studied the after-effects of rupee depreciation i.e., change in pattern of spending and savings of people who are getting affected by rupee depreciation; like people having to pay more for their foreign education, costlier imports and slow consumption, upturn in unemployment rate because of reduction in earnings of companies, costlier foreign travel, high inflation because of currency depreciation, etc.

Mirchandani (2013) The study identifies the causes of depreciation of the Rupee and analyzed different macroeconomic determinants that have an impact on the volatility of exchange rate and their extent of correlation with the same. Study tries to identify the various probable reasons associated with it, likelower capital inflows and uncertainty over Indian economy.

Bhandari (2014) This paper relates to the causes & impact of rupee depreciation against dollar on Indian economy in the recent period when on August 28th 2013, the rupee closed to 68.80 against dollar resulting in the fear of Indian economy returning to 1991 scenario.

Smriti (2013) The paper explored the dynamics, factors influencing and effects of fluctuations in the exchange rate of Indian Rupee, exchange rates being the most monitored, analyzed, and governmentally manipulated economic measure.

Kareethedath & Shanmugasundaram (2012) An attempt has been made to understand the behavior of the Indian foreign exchange rate and its volatility characteristics by using a daily observation of Indian Rupee against the US Dollar from 1st April 1973 to 31st March 2012.

Sahoo, Satyananda (2012) Study analyzed volatility spillover effects from the exchange rates of the Brazilian Real, the Russian Ruble, the South Korean Won, the Singapore Dollar, the Japanese Yen, the Swiss Franc, the British Pound Sterling and the Euro to the exchange rate of the Indian Rupee during 2005-11.

Dua & Sen (2006) Study examines the interactions between the variables namely real exchange rate, level of capital flows, volatility of flows, fiscal and monetary policy indicators, and the current account surplus for Indian economy for the period 1993 to 2004. The study finds that determinants of the real exchange rate, in descending order of importance, include net capital inflows and their volatility (jointly), government expenditure, current account surplus and the money supply.

Raithatha (2012) The paper studies effects of currency appreciation and depreciation as boon and bane for economic growth &provides suggestions to overcome ill-effects of excessive fluctuations between rupee and dollar keeping in view current trends.

Singh (2013) explained how Indian economy will enlarge loss and shrink its gain with depreciation of

rupee in long run and suggested that imports of unnecessary items such as gold, needs to be restricted in India to improve the value of INR by lowering the import bill.

Rationale of Study

Fluctuations in exchange rate between currencies of two countries can cause either good or bad impact on an economy's overall performance and growth. Hence it becomes relevant to study the factors that bring such fluctuations so that rational economic and investment decisions can be taken by the individuals and/or government in order to avoid too many fluctuations that cause risk in international operations. The study of relationship between exchange rate &macroeconomic variables causing fluctuations in it, can help control resultant ill effects.

Research Methodology

Research Objectives of Study

- To give an overview of theoretical approaches to Indian Currency Market & Rupee position in the global foreign exchange market.
- To study the fluctuation in Indian rupee against the dollar (INR/USD) post globalization.
- To find out the dependency of exchange rate on the causal macro-economic factors.
- To find out the factors affecting Rupee value and their relation with exchange rate.

Nature of Research

The nature of research is Exploratory & Analytical that generates a posteriori hypothesis by analyzing a data-set and looking for potential relations between variables.

Methods of Data Collection

Secondary sources were referred for data collection for the analysis. The required data for the study were collected and compiled from the *RBI and World Bank Website/Bulletin*. The study covers a period of 22 years from 1991-1992 to 2012-2013.

Hypotheses Development

There are several factors affecting the exchange rate like the inflation, interest rates, current account deficits, public debt, the terms of trade, economic and political factors, FDI, FII, etc. From these, five independent variables have been identified for the purpose of the study:

1) Inflation Rate
2) Lending Interest Rate
3) Foreign Direct Investment (FDI)
4) Gross Domestic Product (GDP) Growth Rate
5) Current Account Deficit

So, following 5 *Null hypothesis* was formed:

1^{st} H_o: Inflation rate do not have relation with the exchange rate of Indian Rupee.

2^{nd} H_o: Lending Interest rate does not have relation with the exchange rate of Indian Rupee.

3^{rd} H_o: FDI do not have relation with the exchange rate of Indian Rupee.

4^{th} H_o: GDP Growth Rate does not have relation with the exchange rate of Indian Rupee.

$5^{Th}H_o$: Current Account Deficit does not have relation with the exchange rate of Indian Rupee.

The corresponding *Alternative Hypotheses* are listed below:

H1: Inflation rate has relation with the exchange rate of Indian Rupee.

H2: Lending Interest rate has relation with the exchange rate of Indian Rupee.

H3: FDI has relation with the exchange rate of Indian Rupee.

H4: GDP Growth Rate has relation with the exchange rate of Indian Rupee.

H5: Current Account Deficit has relation with the exchange rate of Indian Rupee.

Statistical Methods and Techniques Used for Data Analysis

- Tables, Line Graphs, and Pie-charts have been made using MS Excel.
- SPSS software has been used for running correlation and regression test.

Analysis and Interpretation

Since last decade the Indian foreign exchange market has undergone significant changes and has been subjected to few shocks. It is clearly reflected by the ups and downs of Indian Rupee exchange rate against the US Dollar.

Table No. 1: Macroeconomic Variables in India for the Period of 1991 to 2013

Years	Exchange Rate against $	Inflation Rate (CPI)	Lending Interest Rate	FDI (Current US $ Billion)	GDP Growth rate (%)	Current Account Deficit (US $ Billion)
1991-92	22.6890	13.9	17.9	0.74	1.1	-1.178
1992-93	25.9206	11.8	18.9	2.77	5.5	-3.526
1993-94	31.4439	6.4	16.3	5.5	4.8	-1.159
1994-95	31.3742	10.2	14.8	9.73	6.7	-3.369
1995-96	32.4198	10.2	15.5	21.44	7.6	-5.912
1996-97	35.4280	9	16	24.26	7.5	-4.619
1997-98	36.3195	7.2	13.8	25.77	4	-5.499
1998-99	41.2665	13.2	13.5	26.35	6.2	-4.038
1999-2000	43.0552	4.7	12.5	21.69	8.8	-4.698
2000-01	44.9401	4	12.3	34.8	3.8	-2.666
2001-02	47.1857	3.7	12.1	66.15	4.8	3.4
2002-03	48.5993	4.4	11.9	88.03	3.8	6.345
2003-04	46.5818	3.8	11.5	88.86	7.9	14.083
2004-05	45.3165	3.8	10.9	102.02	7.9	-2.47
2005-06	44.1000	4.2	10.8	260.32	9.3	-9.902
2006-07	45.3070	6.1	11.2	677.42	9.3	-9.565
2007-08	41.3485	6.4	13	756.43	9.8	-15.738
2008-09	43.5049	8.4	13.3	905	3.9	-27.917
2009-10	48.4049	10.9	12.2	718	8.5	-38.18
2010-11	45.7262	12	8.3	783	9.3	-48.053
2011-12	46.6723	8.9	10.2	526.79	6.2	-78.155
2012-13	53.4368	9.3	10.6	387.22	4.7	-88.163
2013-14	59.08	10.9	8	400.6	4.675	-90.3

Source: *RBI Publications and World bank website.*

Factors Affecting Exchange Rate of Rupee against the Dollar

The exchange rate of any currency gets affected by many factors (variables) that have positive or negative impact. The main variables of Exchange rate are:

1) Current Account Deficit;
2) Inflation Rate;
3) Gross Domestic Product (GDP) Growth Rate;
4) Lending Interest Rate; and
5) Foreign Direct Investment (FDI).

Inflation Rate: High inflation means high prices for goods and services which affect the country's exports by decreased demand from other countries, causing in decreased demand for the rupee leading to depreciated rupee value.

Table No. 2: Correlation of Inflation with Exchange Rate

		Exchange Rate against $	Inflation Rate (CPI)
Exchange Rate against $	Pearson Correlation	1	**-0.335**
	Sig. (2-tailed)		0.118
	N	23	23
Inflation Rate (CPI)	Pearson Correlation	-0.335	1
	Sig. (2-tailed)	0.118	
	N	23	23

Result: Inflation has negative correlation with Exchange Rate of an Indian currency since the value of r is - 0.335. This correlation is significant at 0.01 level.

Lending Interest Rate: A high interest rate is one of the factors, that attracts foreign investors to gain out of this situation. Through the arbitrage process, an investor takes the advantage of high interest rate in another country. This factor affects the exchange rate positively though it appreciates the value of currency.

Table No. 3: Correlation of Lending Interest Rate with Exchange Rate

		Exchange Rate against $	Lending Interest Rate
Exchange Rate against $	Pearson Correlation	1	**-0.906****
	Sig. (2-tailed)		0.000
	N	23	23
Lending Interest Rate	Pearson Correlation	-0.906**	1
	Sig. (2-tailed)	0.000	
	N	23	23

**. Correlation is significant at the 0.01 level (2-tailed).

Result: Correlation between Exchange Rate of an Indian currency and lending Interest rate is negative since the value of r is – 0.906.

Foreign Direct Investment (FDI): Foreign direct investment (FDI) is one of the popular source of investment into a business in a country other than the home country by a company or individual of another country. It has been seen that FDI affects the exchange rate to strengthen.

Table No. 4: Correlation of FDI with Exchange Rate

		Exchange Rate against $	FDI (Current US $ Billion)
Exchange Rate against $	Pearson Correlation	1	**0.0462***
	Sig. (2-tailed)		0.026
	N	23	23
FDI (Current US $ Billion)	Pearson Correlation	0.0462*	1
	Sig. (2-tailed)	0.026	
	N	23	23

*. Correlation is significant at the 0.05 level (2-tailed).

Result: Relationship between exchange rate and FDI is positive as the value of r is 0.0462.

Gross Domestic Product (GDP) Growth Rate: GDP is the total of the market value of finished goods and services produced in a country in a stipulated time period (year). To determine the country's standard of living, GDP per capita is considered as good indicator.

Table No. 5: Correlation of GDP, Growth rate with exchange rate

		Exchange Rate against $	GDP Growth rate (%)
Exchange Rate against $	Pearson Correlation	1	**0.0182**
	Sig. (2-tailed)		0.405
	N	23	23
GDP Growth rate (%)	Pearson Correlation	0.0182	1
	Sig. (2-tailed)	0.405	
	N	23	23

Result: The relationship between GDP Growth rate and exchange rate is positively correlated as the value of r is 0.0182 and it is significant at 0.05 level.

Current Account Deficit: When country's revenue income gets short of revenue expenses then it leads to the situation of current account deficit.To settle this problem, a country takes foreign loans which impact the exchange rate as it increases the demand for foreign currency. In case of current account surplus, the opposite happens.

Table No. 6: Correlation of Current account Deficit with exchange rate

		Exchange Rate against $	Current Account Deficit (US $ Billion)
Exchange Rate against $	Pearson Correlation	1	**-0.558****
	Sig. (2-tailed)		0.006
	N	23	23
Current Account Deficit (US $ Billion)	Pearson Correlation	-0.558**	1
	Sig. (2-tailed)	0.006	
	N	23	23

**. Correlation is significant at the 0.01 level (2-tailed).

Result: The relationship between Current account deficit and exchange rate is negatively correlatedas the value of r is -0.558 and it is significant at 0.01 level.

Regression

Table No. 7: Model Summary[b]

						Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	Sig. F df2	Change	Durbin-Watson
1	0.923[a]	0.852	0.809	3.7834667	0.852	19.637	5	17	0.000	1.993

a. Predictors: (Constant), Current Account Deficit (US $ Billion), GDP Growth rate (%), Inflation Rate (CPI), FDI (Current US $ Billion), Lending Interest Rate

b. Dependent Variable: Exchange Rate against $

Result: The R and R^2 value are provided by the Model Summary table. The R value is 0.852, which signifies the simple correlation. It shows a high degree of correlation. How much of the dependent variable, "Exchange Rate", can be explained by the independent variable, "Lending Interest Rate, Inflation, FDI, GDP, Current account Deficit". is indicated by R^2 value. In this case, 85.2% can be explained, which is very large. The exchange rate is 85.2% dependent on Independent variables.

Table No. 8: ANOVA[a]

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	1405.451	5	281.090	19.637	0.0045[b]
Residual	243.349	17	14.315		
Total	1648.800	22			

a. Dependent Variable: Exchange Rate against $

b. Predictors: (Constant), Current Account Deficit (US $ Billion), GDP Growth rate (%), Inflation Rate (CPI), FDI (Current US $ Billion), Lending Interest Rate

Result: This table shows that the regression model forecasts the outcome variable significantly well. This specifies the statistical significance of the regression model that was applied. Here, $p < 0.0045$, which is less than 0.05, and indicates that, overall, the model applied can statistically significantly predict the outcome variable i.e., Exchange Rate.

Findings and Implications

Table No. 9: Correlation Conclusion

Hypothesis No	H0: Null Hypothesis	H1: Alternative Hypothesis	Significance Level	Decision	Conclusion
1	Inflation rate do not have relation with the exchange rate of Indian Rupee	Inflation rate has relation with the exchange rate of Indian Rupee	-0.335	Reject Null hypothesis	Inflation has negative correlation with Exchange Rate of an Indian currency since the value of r

Contd....

					is -0.335. This correlation is significant at 0.01 level.
2	Lending Interest rate do not have relation with the exchange rate of Indian Rupee	Lending Interest rate has relation with the exchange rate of Indian Rupee	-0.906	Reject Null hypothesis	Lending Interest rate has negative correlation with Exchange Rate of an Indian currency since the value of r is – 0.906. This correlation is significant at 0.01 level.
3	Foreign Direct Investment (FDI) do not have relation with the exchange rate of Indian Rupee	Foreign Direct Investment (FDI) has relation with the exchange rate of Indian Rupee	0.0462	Reject Null hypothesis	FDI has positive correlation with the exchange rate of rupee as the value of r is 0.0462 & this relationship is significant at 0.05 level.
4	GDP Growth rate does not have relation with the exchange rate of Indian Rupee	GDP Growth Rate has relation with the exchange rate of Indian Rupee	0.0182	Reject Null hypothesis	GDP Growth rate has positive correlation with Rupee value as the value of r is 0.0182 & this relationship is significant at 0.05 level.
5	Current Account Deficit does not have relation with the exchange rate of Indian Rupee	Current Account Deficit has relation with the exchange rate of Indian Rupee	-0.558	Reject Null hypothesis	Current account deficit has negative correlation with rupee value as the value of r is -0.558 & this relationship is significant at 0.01 level.

Regression Conclusion

- The exchange rate is 85.2% dependent on Independent variables, i.e., Lending Interest Rate, Inflation, GDP, Current account Deficit, and FDI.
- The regression model predicts the outcome variable i.e., exchange rate, significantly well. Significance is 0.0045 which is less than 0.05.

Research Implications

There is a need to take some actions to control the devaluation of the Rupee, for which following suggestions are given:

- Oil import is one of the reason for which country needs to demand the foreign currency, the government has to stagger the demand.
- The flow of foreign investments into India impacts the exchange rate to appreciate as it has positive relation. So, the government should take initiatives which encourage and increase foreign investments into India.
- The government can consider temporary import compression.
- There are many sectors which are untapped by the FDI. The government needs to provide the platform through which these types of investments could reach to India.
- FDI, especially Greenfield investment will provide new and better opportunities in many investment avenues.
- Inflation has negative correlation with Exchange Rate of Indian currency.
- Lending Interest rate has negative correlation with Exchange Rate of an Indian currency.
- GDP Growth rate has positive correlation with Rupee value and Current account deficit has negative correlation with rupee value. Hence inclusion of these variables in government's plan of action can help improve rupee value.

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