



EMPIRICAL STUDY ON DETERMINANTS OF FOREIGN EXCHANGE RATES WITH REFERENCE TO INDIAN RUPEE V/S US DOLLAR

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Abstract

Foreign exchange rate is the price of a unit of foreign currency in terms of the domestic currency. The Indian Rupee (INR) was never highly valued in comparison to the United States Dollar (USD). Fluctuation in the currency exchange rates has had serious ramifications for the Indian economy. Therefore, exchange rates are among the most monitored analyzed and governmentally manipulated economic measures. There are various factors influencing for fluctuations in the exchange rate of Indian Rupee such as, Gross Domestic Growth Rates (GDP), Average Inflation Rate (WPI), Balance of Payment, Interest Lending Rates, Forex Reserves, Foreign Investment, etc.,

The study is based on secondary data covering thirteen annual year information from 2000-2001 to 2012-13. This has been collected from official websites of Reserve Bank of India, Planning Commission of India, Central Statistical Organisation and various other reports. The statistical tools applied for data analysis is descriptive and inferential statistics. It is concluded that Global economic outlook (Gross Domestic Product Growth Rates) along with unfavorable balance of payment and Foreign Investment flows which will determine the future of INR.

Foreign exchange rate is the price of a unit of foreign currency in terms of the domestic currency. Foreign exchange rate is determined much in the same way as the price of any commodity in a free market economy. For an emerging economy like India, an appropriate balance among stability in the price level, highly sustainable economic growth, and reduction in the exchange rate volatility is required for the growth and development of the economy and also reflection of sound state of the economy to the rest of the world. These three objectives cannot be achieved simultaneously.

The Indian Rupee (INR) was never highly valued in comparison to the United States Dollar (USD). Until sub-prime crisis of 2008, the exchange rate of the USD against the INR was roughly steady at around 45.00, thereafter some effects of the crisis, as well as responses to the crisis by regulatory authorities all over the world led to a fluctuation in the currency exchange rates, hitting nearly one-seventieth of the US Dollar. This has had serious ramifications for the Indian economy, as the US Dollar is one of the most widely used global currencies. Grim global economic outlook (GDP Growth Rates) along with unfavorable balance of payment and Foreign Investment outflows has contributed to this Forex determinants.

Very important monetary policy tool is the exchange rate for emerging economies like India. Quite frequent intervention in the foreign exchange market than their advanced economy counterparts reflects economies' greater vulnerability to exchange rate shocks and less developed financial markets. Exchange rates play a vital role in a country's level of trade, which is critical to almost every free market economy in the world. Therefore, exchange rates are among the most monitored analyzed and governmentally manipulated economic measures.

Exchange rate matters impacts the real return of an investor's portfolio, profitability of firms, purchasing power of income, capital gains from domestic securities, income factors, FDI and growth of specific sectors. Exchange rate affects trading relationships between two nations.

There are various factors influencing for fluctuations in the exchange rate of Indian Rupee such as, Gross Domestic Growth Rates (GDP), Average Inflation Rate (WPI), Balance of Payment, Interest Lending Rates, Forex Reserves, Foreign Investment, etc.

OBJECTIVES OF THE STUDY

1. To study the determinants of forex rates of Indian Rupee (INR) against United States Dollar (USD).
2. To provide findings/ results based on analysis.

RESEARCH DESIGN: In view of the objectives of the study listed above, exploratory research design has been adopted. Exploratory research is one, which largely interprets the already available information, and it lays particular emphasis on analysis and interpretation of the existing and available information and it makes use of secondary data.

RESEARCH METHODOLOGY

The study is based on secondary data covering thirteen annual year information of Gross Domestic Product Growth Rates (GDP%), Average Wholesale Price Index (WPI), Balance of Payment (BOP), Forex Reserves, Lending interest Rates, Foreign Investment (FI) from 2000-2001 to 2012-13. This has been collected from official websites of Reserve Bank of India, Planning Commission of India and Central Statistical Organisation. Various other reports like magazines, journals, published books are also referred to for the present study.

Sources of data

Tools of analysis: The data collected for the study is analysed logically and meaningfully to arrive at meaningful conclusions. The statistical tools applied for data analysis is descriptive and inferential statistics like t, F Durbin Watson Collinearity Statistic measures like Variance Inflation Factor (VIF) & Tolerance and Multiple Regression.

Based on objectives, the hypotheses formed for analysis are:

H_0 = Overall there is no significant in determining dependent variable (Forex rates) by all independent variables like Gross Domestic Product (GDP), Wholesale Price Index (WPI), Balance of payment (BOP), Forex Reserves, Lending interest Rates, Foreign Direct Investment (FDI). $B=0$

H_1 = Overall there is significant in determining dependent variable (Forex rates) by independent variables like Gross Domestic Product Growth Rates (GDP%), Wholesale Price Index (WPI), Balance of payment (BOP), Forex Reserves, Lending interest Rates, Foreign Investment (FI). $B \neq 0$

H_0 = There is no significant in influencing dependent variable (Forex rates) by independent variables like Gross Domestic Product Growth Rates (GDP %). $B_1 = 0$

H_1 = there is significant in determining dependent variable (Forex rates) by independent variables like Gross Domestic Product Growth Rates (GDP %). $B_1 \neq 0$.

Similarly other independent variables like Average Wholesale Price Index (B_2), Balance of payment (B_3), Forex Reserves (B_4), Lending interest Rates (B_5), Foreign Direct Investment (B_6), individually.

Assumptions of F test:

1. The values in each population are normally distributed.
2. All the other factors that influence rupee fluctuation besides Gross Domestic Product Growth Rates, Wholesale Price Index, Balance of payment, Forex Reserves, Lending interest Rates, Foreign Investment are held constant

RESULTS / FINDINGS

1. Forex reserves have been highly correlated with other two independent variables like WPI and FDI and hence, forex reserves have been eliminated in determining forex rates out of six variables to follow the rule of parsimony. On removal of forex reserves, interest rates also have high positive correlation with other two variables such as FI and WPI. Therefore, interest rates have also been eliminated to follow the rule of parsimony. On analyzing rest of the four variables like GDP, WPI, BOP and FI, R^2 is increased and adjusted R^2 is also increased. However, by dropping WPI from the said four independent variables, R^2 is decreased by 1% but adjusted R^2 is increased by 2.8% and there is contribution of all three variables such as GDP BOP and FI to forex rates.
2. R^2 is 74.4% of the variation in forex rates around estimates rates is explained by the independent variables namely Gross Domestic Product Growth Rates (GDP %), Balance of payment (BOP) and Foreign Investment (FI).
3. Overall goodness of fit measured by P value of F statistic is 0.005. It is lesser than significance level of 0.05. Hence, it is model of good fit.
4. Collinearity Statistic Measure of Variance Inflation Factor (VIF) of all selected variables namely Gross Domestic Product Growth Rates (1.303), Balance of payment (1.238) and Foreign Investment (1.061) are far less than five. Hence, there is no collinearity.
5. Another collinearity statistic measure of Tolerance of all selected variables such as Gross Domestic Product Growth Rates (0.767), Balance of payment (0.808) and Foreign Investment (0.943) are far bigger than 0.2. Hence, there is no collinearity.
6. "t" statistic measure of all the three independent variables namely GDP Growth Rates (0.020) Balance of payment (0.045) and FI (0.031) are less than the significance level of 0.05. Hence, they are predicting abilities of forex rates.
7. Durban Watson test of serial correlation is 1.931. It is closer to two. Hence, it is free from serial correlation.
8. Predicted value of forex rates are given by regressors are
$$Y = 50.985 - 0.779X_1 (\text{GDP Growth Rates}) - 0.00001188X_2 (\text{Balance of payment}) + 0.00223X_3 (\text{Foreign Investments})$$

CONCLUSIONS

Reform processes are needed to be accelerated to make economy resistant to external shocks and changes in economy cycles and currency fluctuations. Incentive for innovations, promotion of entrepreneurship and enhancement of capability in

manufacturing should be focused with which unique value to India can be crated. Significant depreciation of Indian Rupee against the US Dollar marks a new risk for Indian economy. Grim global economic outlook along with unfavorable balance of payment and Foreign Investment outflows have contributed to this fall. To attract investments, RBI should ease capital controls by increasing the FII limit on investment in government and corporate debt instruments and introduce higher ceilings in ECB's. Government should have a stable political and economic environment. In times of global uncertainty, investors prefer USD as a safe haven. However, a lot depends on the Global economic outlook (Gross Domestic Product Growth Rates) along with unfavorable balance of payment and Foreign Investment flows which will determine the future of INR.

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Appendix-1: Selected Factors Determining Forex Rates

Year	Forex Rates	Gross Domestic Product Growth Rate (%)X1	Wholesale Price Index Average X2	Balance of payments X3	Exchange Reserves X4	Lending Interest Rates X5	Foreign investment Inflows X6
2000-01	45.6844	4.15	7.1	276.43	1972.04	11.5	267.44
2001-02	47.6919	5.39	3.6	565.93	2640.36	11.5	319.2
2002-03	48.3953	3.88	3.4	82037	3614.7	11.125	200.98
2003-04	45.9516	7.97	5.5	143993	4901.29	10.625	628.42
2004-05	44.9315	7.05	6.5	115907	6191.16	10.625	580.57
2005-06	44.2735	9.48	3.7	65896	6763.87	11.5	687.82
2007-08	45.2849	9.57	6.5	163634	8682.22	13.5	667.91
2008-09	40.241	9.32	4.8	369689	12379.65	14	1743.95
2009-10	45.917	6.72	8	-97115	12838.65	14.125	349
2010-11	47.4166	8.59	3.6	64237	12596.65	13.375	2398
2011-12	45.5768	8.91	9.6	595	13610.13	8.875	1935
2012-13	47.9229	6.69	8.8	-685	15061.3	10.375	1872.63
2001-02	54.4091	4.47	7.5	207	15884.2	9.975	2544.19

Appendix-2: Correlations

		Forex rates	GDP Growth Rates	BOP	Average WPI	Forex Reserves	Interest rates	FDI
Pearson Correlation	Forex rates	1.000	-.629	-.638	.238	.187	-.534	.277
	GDP	-.629	1.000	.438	.033	.332	.332	.238
	BOP	-.638	.438	1.000	-.407	-.068	.355	.085
	WPI	.238	.033	-.407	1.000	.578	-.437	.360

	Forex Reserves	.187	.332	-.068	.578	1.000	-.103	.828
	Interest rates	-.534	.332	.355	-.437	-.103	1.000	-.285
	FDI	.277	.238	.085	.360	.828	-.285	1.000

Appendix-3: ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	87.097	3	29.032	8.716	.005 ^b
	Residual	29.980	9	3.331		
	Total	117.077	12			

a. Dependent Variable: Forex Rates
b. Predictors: (Constant), FI, BOP, GDP

Appendix-4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.863 ^a	.744	.659	1.825	.744	8.716	3	9	.005	1.939

a. Predictors: (Constant), FI, BOP, GDP
b. Dependent Variable: Forex Rates

Appendix-5: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error				Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
		1	(Constant)	50.985	1.865		27.332	.000	46.765	55.205			
	GDP	-.779	.276	-.543	-2.822	.020	-1.404	-.155	-.629	-.685	-.476	.767	1.303
	BOP	-1.188E-05	.000	-.437	-2.331	.045	.000	.000	-.638	-.614	-.393	.808	1.238
	FI	.002	.001	.444	2.553	.031	.000	.003	.277	.648	.431	.943	1.061

a. Dependent Variable: Forex Rates