



## ANALYSIS OF MACROECONOMIC DETERMINANTS OF EXCHANGE RATE IN INDIA

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### **Abstract**

*The Foreign Exchange Market is undergoing substantial changes over the years. This research is to carry out in order to investigate various macroeconomic variables or determinants that leads to variation in Exchange rate of a currency. This is an attempt to review the portable reasons for the appreciation or depreciation of Rupee and analyze different macroeconomic determinants that have an impact on the exchange rate. This paper deals with the determinants of the exchange rate and develops a monetary view (or more generally, an asset view) of the exchange rate determination. The direct measure of expectations builds on the information that is contained in data from the foreign exchange market. The empirical analysis also provides estimates and the impact of Exchange rate; Balance of payment, Inflation, Interest rate, Money supply, National Income. This research is carried out to investigate the impact of various macroeconomic variables of foreign exchange rates in India. The research is based on the secondary data.*

**Keywords:** *Exchange Rate, Inflation (CPI), Interest Rate (Lending Rate), External Debt (Current US\$), GDP (Current US\$), FDI (Current US\$).*

### **1. Introduction**

#### **India**

An acronym for the economies of Brazil, Russia, India and China combined. This was devised by Jim O'Neill of Goldman Sachs in 2001 paper titled "The World Needs Better Economic BRICs". The general consensus is that the term was first prominently used in a Goldman Sachs report from 2003, which speculated that by 2050 these four economies would be wealthier than most of the current major economic powers.

The BRIC thesis posits that India will become the world's dominant suppliers of services. Due to lower labor and production costs, many companies also cite India as a source of foreign expansion opportunity. So this study is concentrated in India.

#### **Foreign Exchange Market**

After successful independence and followed by constitution of India from 26<sup>th</sup> January 1950, India followed a exchange rate system which Indian rupee linked to the British Pound sterling. In 1975 the system of Indian Rupee ties with Pound sterling was broken and India started a managed or controlled floating exchange rate regime with which Indian rupee linked to a number of currencies. The Indian market, like other developing countries market is not yet very deep and broad, and can sometimes be characterized by uneven flow of the demand and supply over different periods. The Reserve bank of India commences a sequential process to regulate the exchange rate system.

Banks in India were first permitted to undertake intraday trading in FOREX in 1976. In the early 1990's the exchange rate was pegged to a basket of currencies, which can be considered as the first step towards current account convertibility. In August 1994, current account convertibility was permitted,

Under current account convertibility, residents of India can make or receive foreign currency payments related to export and import trade, sundry remittances and gain access to foreign currency for education, travel, medical treatment, gifts and so on. On the other hand, when investments and borrowings in foreign currency are also



freely permitted at market determined exchange rates, it is called capital account convertibility. This essentially means that anyone can move freely from local to foreign currency and back. Residents of India are even now subject to capital controls even though a gradual process of liberalization has been initiated.

Though the FOREX market has seen a substantial increase in average daily turnover from the 1990's the market dominated by spot transactions. This coupled with the global financial turmoil of 2007, resulted in increased volatility.

On this ground, the present study is an attempt to understand and analyze the macroeconomic factors and its behaviour in Indian foreign exchange rate.

## **2. Purpose and Scope of the Study**

There are various probable reasons associated with the fluctuating Indian currency over the years this study helps to recognize such reasons.

## **3. Objective of the Study**

1. This study also helps to analyze and find which macroeconomic determinant is highly correlated with Exchange rate.
2. To find which macroeconomic determinant is directly correlated and indirectly correlated with Exchange rate.

## **4. Literature Review**

“Analysis of Macroeconomic determinants of exchange rate volatility in India” this paper was written by Anita Mirchandani (2009) this was published in the Journal of Economics and Finance Issues (Vol. 3, No. 1, 2013). The three important objectives of this paper was to investigate various macroeconomics variables leading to acute variations in exchange rate of a currency, to review the probable reason for depreciation of rupee and to analyse different macroeconomic determinants that have impact on the volatility and their extent of correlation. Analytical research using statistical tool i.e. correlation analysis. After analysis she has concluded that Indian rupee has shown high volatility over the years, due to uncertainty in domestic economy investors are nervous their capital flows reduced as a result depreciation increased.

“Determinants of foreign exchange rate in Nigeria” this paper was written by Emmanuel Olusola Oke (2009) and it was published in the journal Institute of social studies (No.155).the objectives of this study is to investigate the long run relationship between exchange rates and oil prices in Nigeria. Specifically, to understand the impact of oil price variation on exchange rates fluctuations in Nigeria – oil volatility. The main question of this study is, is the relationship between Nigeria exchange rates and oil prices in a long-run or short-term equilibrium?. The sub question was what are the effects of other economic factors such as interest rates, consumer price index and foreign reserves on Foreign exchange market in Nigeria. Here the author has concluded that this paper examined most of the determinants of exchange rate volatility but mainly focused on oil prices, foreign reserves, CPI, interest rates. Then he found that oil prices have short run effect on exchange rates.

## **5. Research Methodology**

This research is carried out to investigate the relationship of various macroeconomic variables with foreign exchange rate in the India. The research is based on the secondary data.

### **5.1 Type of Research**

Descriptive research is the study used here to depict the relationship between the macroeconomic variable and the exchange rate of India.

**5.2 Data Collection:** The research is based on the secondary data.

**5.3 Data source:** The Data is collected from World development indicators and from OECD countries website.

**5.4 Time period of Data:** 10 years i.e., from 2004 to 2013 annual data.

**5.5 Statistical tool used for data analysis:** Correlation analysis using SPSS.

## 5.6 Hypothesis

H<sub>0</sub>: Exchange rate is not reliant on macroeconomic variables like inflation, Interest rates, Foreign Direct Investment and GDP.

H<sub>1</sub>: Exchange rate is reliant on macroeconomic variables like inflation, Interest rates, Foreign Direct Investment and GDP.

## 5.7 Limitation of the study

- Time period was limited.
- There are many other macroeconomic determinants but in this study only five variables is taken into consideration.
- External debt value of 2013 was not available.

## 6.Data Collection & Analysis

Since last decade Indian foreign exchange market has undergone significant changes. It is imperative by the fluctuation in Indian Rupee exchange rate against US Dollar. Table 1 summarizes various macroeconomic variables in India for the period of 2004 to 2013.

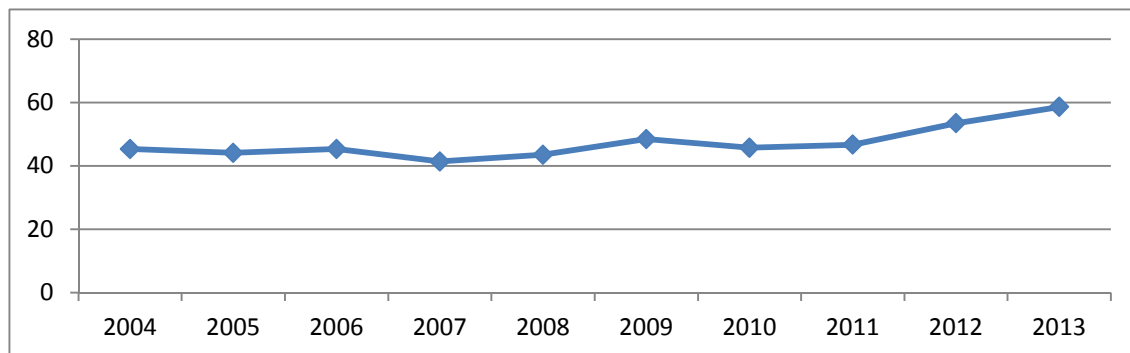
**Table -1 Various Macroeconomic Indicators in India (2004-2013)**

Year	Exchange rate (against \$)	Inflation (CPI)	Interest rate (Lending rate)	External Debt (Current US\$)	GDP (Current US\$)	FDI (Current US\$)
2004	45.316	3.8	10.9	44,256,636,000	721,585,608,184	5,771,297,153
2005	44.1	4.2	10.8	40,700,897,000	834,215,013,605	7,269,407,226
2006	45.307	6.1	11.2	42,525,327,000	949,116,769,619	20,029,119,267
2007	41.349	6.4	13	44,554,028,000	1,238,700,195,644	25,227,740,887
2008	43.505	8.4	13.3	47,254,322,000	1,224,097,069,460	43,406,277,076
2009	48.405	10.9	12.2	48,351,738,000	1,365,372,433,342	35,581,372,930
2010	45.726	12	8.3	51,934,413,000	1,708,458,876,830	27,396,885,034
2011	46.67	8.9	10.2	54,903,505,000	1,880,100,141,185	36,498,654,598
2012	53.437	9.3	10.6	53,561,905,000	1,858,744,737,180	23,995,685,014
2013	58.598	10.9	10.3		1,876,797,199,133	28,153,031,270

### 6.1. Macroeconomic Determinants of Exchange Rate (Operational Definitions)

**6.1.1. Exchange Rate:** Exchange rate has been defined in its book “exchange rate risk measurement and management” as exchange risk relates to the effect of unexpected exchange rate changes on the value of the firm. In particular it is defined as the possible direct loss or indirect loss in the firm’s cash flows, asset and liabilities, net profit and in turn its stock market value from an exchange rate moves.

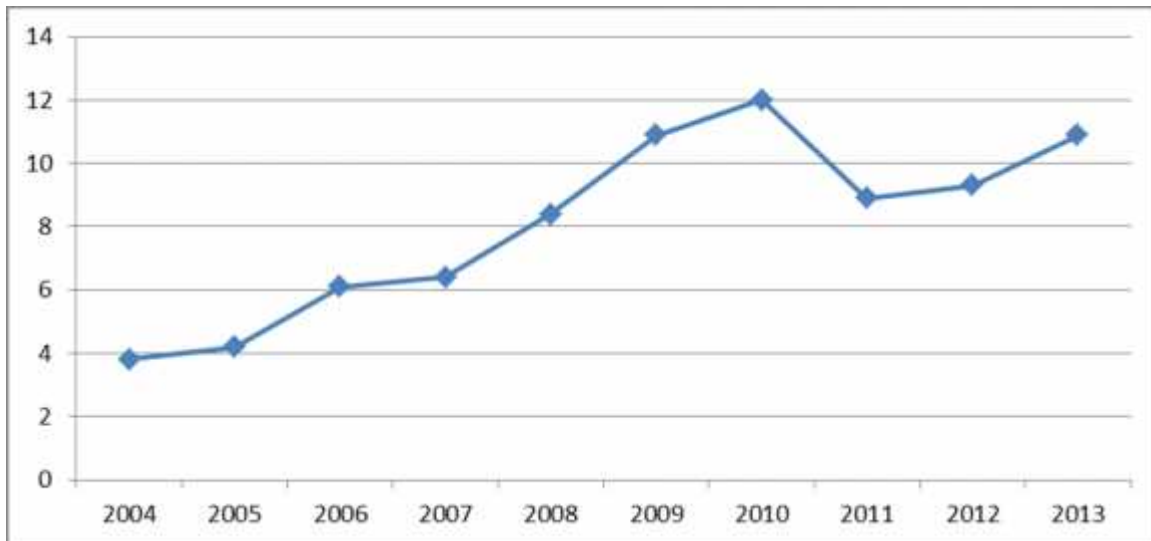
**Figure- 1. Exchange Rate of Indian Rupee (against \$) from 2004-2013.**



**6.1.2 Inflation-** According to Webster's New Universal Unabridged Dictionary published in 1983 the definition of "inflation" after "the act of inflating or the condition of being inflated" is

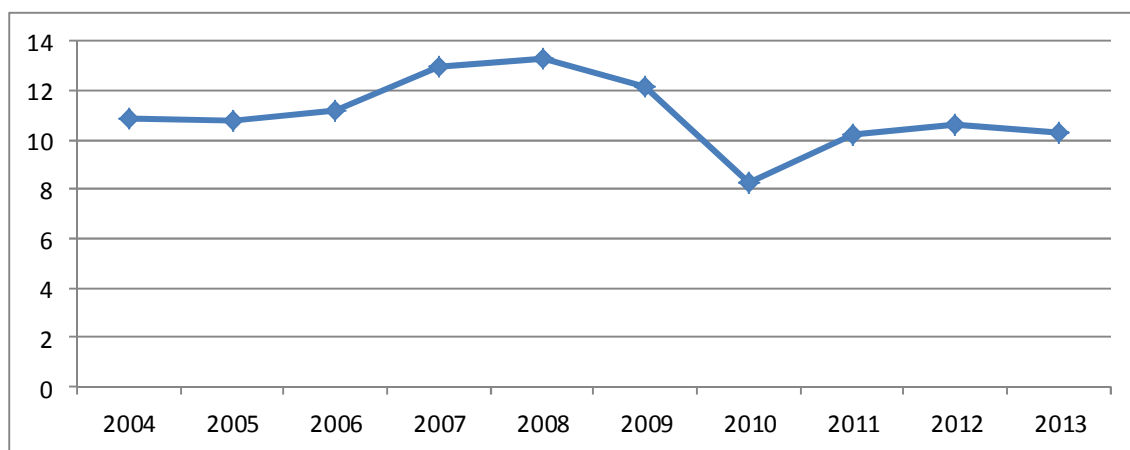
"An increase in the amount of currency in circulation, resulting in a relatively sharp and sudden fall in its value and rise in prices, It may be caused by increase in the volume of paper money issued or of gold mined, or a relative increase in expenditure as when the supply of goods falls to meet the demand."

**Figure -2. Inflation Rates in India from 2004-2013**



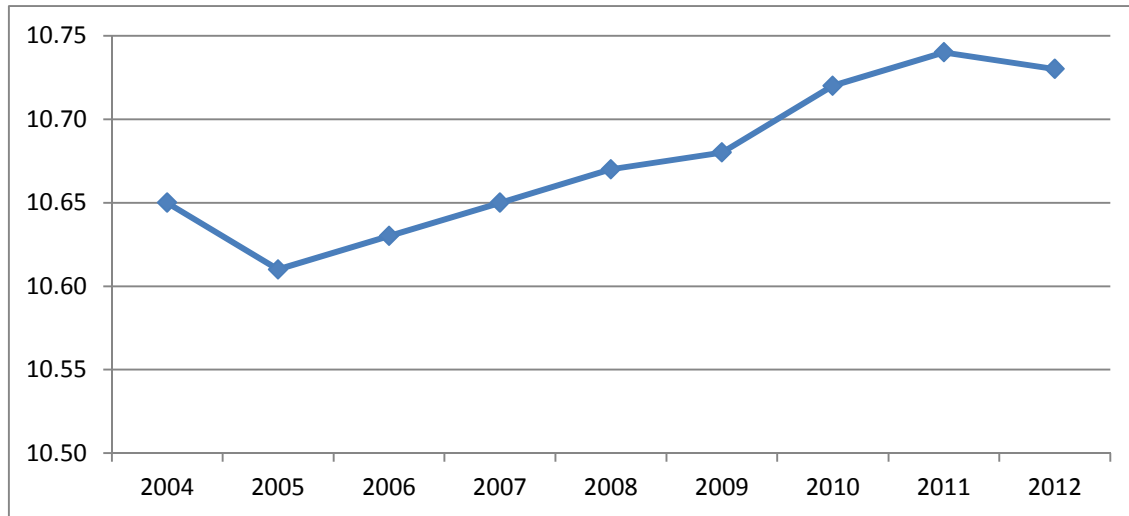
**6.1.3 Interest rate (lending rate) -** J.M. Keynes treats interest rate as "a purely monetary phenomenon and defines it as the premium which has to be offered to induce people to hold their wealth in some forms other than hoarded money."

**Figure -3. Interest rate (lending rate) in India from 2004-2013**



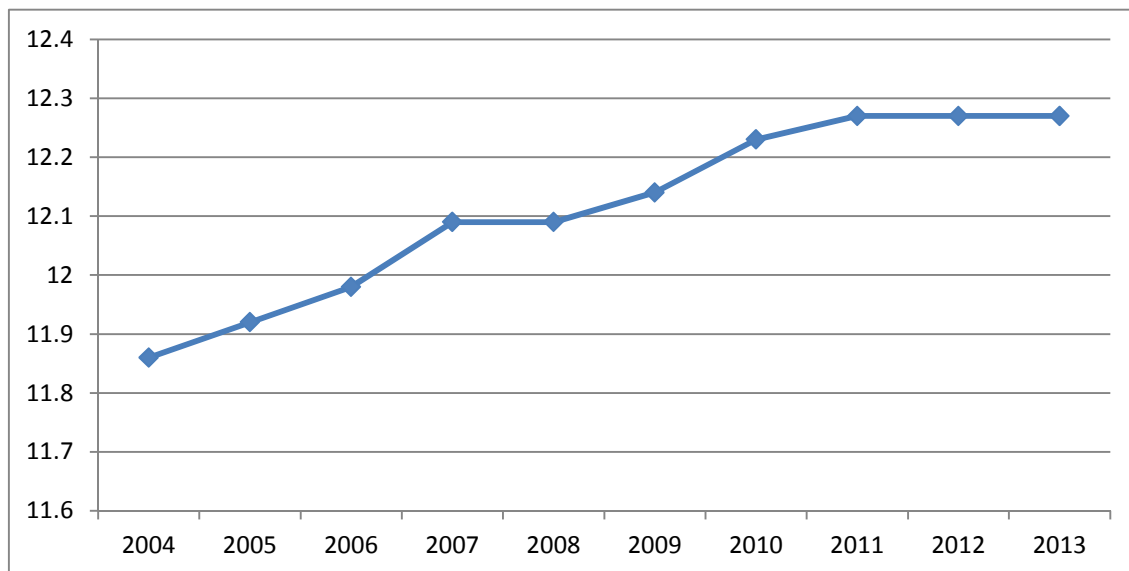
**6.1.4 External debt (current US\$) -** U.S International Trade Commission defines external debt as total external debt is debt owed to nonresidents repayable in foreign currency, goods or services. Total external debt is the sum of public, publicly guaranteed and private nonguaranteed long term debt, use of IMF credit, and short term debt, short term debt includes all debt having an original maturity of one year or less and interest in arrears on long term debt. Data are in current U.S dollars.

**Figure -4. External debt (current US\$) in India from 2004-2013**



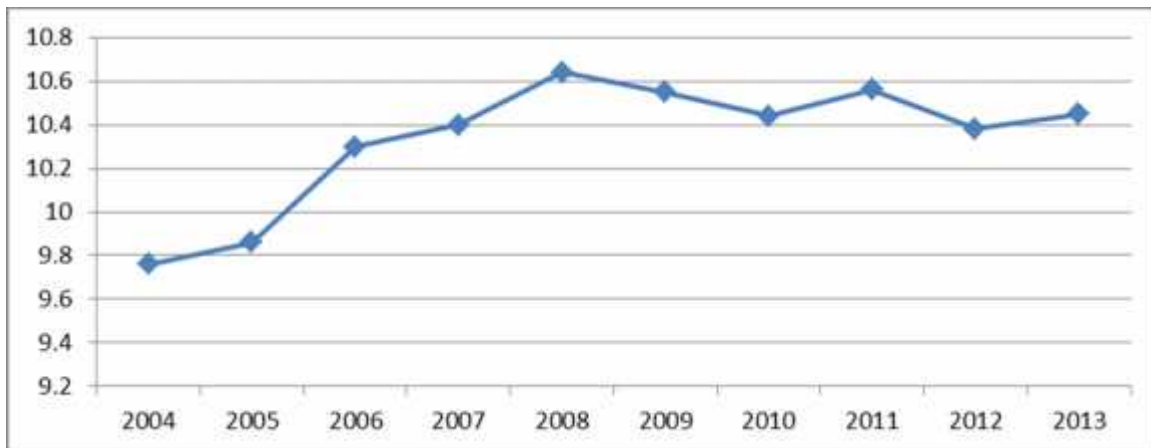
**6.1.5 GDP (Current US\$)** – U.S International Trade Commission defines GDP (Current US\$) as GDP at purchaser’s prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current US dollars. Dollar figure for GDP are converted from domestic currencies using single year official exchange rate.

**Figure- 5. GDP (Current US\$) in India from 2004-2013**



**6.1.6 FDI (Current US\$)** – Dipak Das Gupta and Mustapha K. labli in their book “Trade, Investment and Development in the Middle east” defines the FDI current US\$ as foreign direct investment is net inflows of investment to acquire a lasting management interest(10% or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, long term capital, and short term capital. This series shows net inflows in the reporting economy. Data are in current U.S dollars.

**Figure 6. FDI (Current US\$) in India from 2004-2013**



## 7. Findings

Through correlation analysis between the exchange rate and macroeconomic determinants it is found that:

- **Inflation Rate vs. Exchange Rate:** The inflation rate and exchange rate is strongly correlated, and the statistical analysis shows that there is direct correlation between inflation rate and exchange rate since the value of  $r$  is 0.525.
- **Interest Rate vs. Exchange Rate:** The interest rate and exchange rate is moderately correlated, and the statistical analysis shows that there is indirect correlation between interest rate and exchange rate since the value of  $r$  is -0.369.
- **External Debt vs. Exchange Rate:** The external debt and exchange rate is strongly correlated, and the statistical analysis shows that there is direct correlation between external debt and exchange rate since the value of  $r$  is 0.608.
- **GDP vs. Exchange Rate:** The GDP and exchange rate is strongly correlated, and the statistical analysis shows that there is direct correlation between GDP and Exchange rate since the value of  $r$  is 0.632.
- **FDI vs. Exchange Rate:** The FDI and exchange rate is weakly correlated, and the statistical analysis shows that there is direct correlation between FDI and Exchange rate since the value of  $r$  is 0.115.

## Conclusion

On the basis of analysis it can be concluded that Indian rupee has shown a high fluctuations over the years. There are various probable reasons associated with it. When we analyze each of the variables such as Exchange rate, Inflation (CPI), Interest rate (lending rate), external debt (current US\$), GDP (current US\$), FDI (current US\$). There are comparatively high variations in the variables. Firstly, the reasons which causes a increase or decrease in **GDP** many demand side factors, supply side factors, weather, political instability and commodity prices also influences the growth or contraction of the economy. Secondly the fluctuations in the **exchange rate** may be due to differential in **inflation rate** which exhibits a rising currency value, as its purchasing power increases relative to other currencies, differentials in interest rates are all highly correlated. If inflation in the country is much higher than in others or if additional factors serve to drive the currency down. The opposite relationship exists for decreasing interest rates - that is, lower interest rates tend to decrease exchange rates. The depreciation of a country's currency refers to a decrease in the value of that country's currency. The appreciation of a country's currency refers to an increase in the value of that country's currency. Volatility in **external debt** is due to the development is essentially due to the increase of new debt commitments, and particularly of private capital investments in the "new emerging economies." There are various reasons for the fluctuations in the **FDI**, due to the political instability and the policies and restrictions that are introduced by the new government in a country.

On the basis of analysis it can be concluded that all the macroeconomic factors are correlated with Exchange rate. The relationship between exchange rate with GDP, External Debt and Inflation are strongly correlated and has a





direct relationship. By statistical analysis we can conclude that  $H_0$  is rejected and  $H_1$  is accepted that is Exchange rate is reliant on macroeconomic variables like inflation, Interest rates, Foreign Direct Investment and GDP. By this analysis it can be concluded that all variables are directly correlated with exchange rate except Interest rate.

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