Chapter VIII

Summary of Findings, Suggestions and Conclusion

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Foreign exchange market is the globally integrated financial market in the world. It plays a prominent role in international trade and foreign investment activities. The day to day transactions that have taken place in the foreign exchange market are the essence of the economy which deals with different currencies. The main functions are transfer of money, purchasing power and converting one currency into other currency. The fluctuation of exchange rate is an observing factor for the players of the foreign exchange market to take investment and business decisions. Regulatory actions have been brought to control the exchange rate fluctuations. Many multinational currencies have been used and traded in the market for the cross border activities. In the trade, the currency depreciation affects the price of goods and thereby affects the purchasing ability in the economy. Indian currency is the major phenomenon for the sustainable growth of the Indian economy. Macroeconomic determinants influence the appreciation and depreciation of the currency. For every movement of the exchange rate, the changes in macroeconomic determinants affect the exchange rate. It perpetually affects the trade balance and depreciation of the currency has shown a scenario of trade deficit in the Indian economy. In this backdrop, considering the research gap an attempt has been made to conduct a study entitled, "Indian foreign exchange market: A study on Exchange rate volatility, Macroeconomic determinants and Trade balance".

Based on the title the following objectives have been framed:

- To study the Indian rupee appreciation and depreciation against select foreign currencies in India during the study period
- To analyse the volatility of Indian rupee against select foreign currencies in India
- To identify the macroeconomic determinants affecting the fluctuations of Indian rupee against select foreign currencies.
- To examine the impact of exchange rate fluctuations of select foreign currencies on trade balance in India.

Based on the results obtained, the present chapter offers the summary of findings of the study.

8.1 FINDINGS

Chapter I presents the statement of the problem, objectives of the study, hypotheses, scope of the study, importance of the study, research methodology, and limitations of the study along with the chapter scheme. The study has been done with the four major currencies, such as, US dollar, Pounds Sterling, Euro and Yen given in Reserve Bank of India website with continuous data from 2007-08 to 2016 - 17. The data have been collected from Handbook of statistics on Indian economy, Reserve Bank of India monthly bulletins and World Bank websites. The statistical tools, namely, Descriptive statistics, Correlation and Regression analysis have been applied for the study. The econometric tools, namely, Unit root test, GARCH models, Vector Autoregression model, Autoregressive Distributed Lag model, have been applied to analyse the data.

Chapter II presents the review of literature based on Indian and foreign study on movement of currencies, macroeconomic determinants affecting the exchange rate and the impact of exchange rate fluctuation on trade balance.

Chapter III deals with the overview of Indian foreign exchange market, Macroeconomic determinants taken for the study, exchange rate system and trade performance in India.

Chapter IV presents the results of Appreciation and Depreciation of Indian rupee against US dollar, Pound Sterling, Japanese Yen and Euro for the ten year period from 2007-08 to 2016-17. Percentage change has been calculated for the monthly exchange rate of Indian rupee against foreign currencies. The results of mean values on month on month basis for the four major currencies are given below:

Appreciation (+) and Depreciation (-) of Indian rupee against major currencies on Month over Month basis (M-O-M basis)

Year / Currencies	INR/USD	INR/GBP	INR/EURO	INR/YEN
2007-08	Appreciation	Appreciation	Appreciation	Appreciation
2008-09	Depreciation	Appreciation	Depreciation	Depreciation
2009-10	Depreciation	Appreciation	Depreciation	Depreciation
2010-11	Appreciation	Appreciation	Appreciation	Depreciation
2011-12	Depreciation	Depreciation	Depreciation	Depreciation
2012-13	Depreciation	Depreciation	Depreciation	Depreciation
2013-14	Depreciation	Depreciation	Depreciation	Appreciation
2014-15	Depreciation	Depreciation	Appreciation	Appreciation
2015-16	Depreciation	Depreciation	Appreciation	Appreciation
2016-17	Depreciation	Appreciation	Depreciation	Depreciation

Taking a cue of movement of Indian rupee against major currencies from 2007-08 to 2016-17, Rupee has shown a depreciating trend in most of the years against the foreign currencies. In the year 2007-08, huge capital inflows through foreign direct and portfolio investments and depreciation of US dollar against world currencies in the foreign exchange market have made Indian rupee to appreciate against the major currencies.

Global financial crisis, in the middle of the year 2008 – 09, has weakened the external position of the country revealing fall in foreign investments, rise in inflation rate, and widened trade deficit in the Indian economy. The strength of USD against international currencies has made Indian rupee depreciate against USD, Euro and Yen except Pound sterling. It has appreciated due to monetary easing action taken by Federal Reserve Bank of America as recovery of the crisis.

The fiscal year 2009 – 10 had been a challenging one for the policy makers in developing the Indian economy after the global crisis. There was a recovery possession in the growth of an Indian economy along with pattern of depreciation trend among the currencies, namely, euro, Yen and USD, while it has appreciated only against Pound sterling. At the end of the year 2009, there was a Euro debt crisis in European nations which has weakened the currency euro and become depreciated.

India has remarked with a strong economic growth in the year 2010-11 comparatively with the previous years due to global issues in the economy. The factors, namley, domestic consumption and rise in investments, inflation rate and growth of exports have made the rupee to appreciate against US dollar, Pounds sterling and Euro and depreciated against Yen. Due to Euro debt crisis, the euro has found to be strong against Indian rupee due to the monetary policies taken by European Central Bank.

There was a depreciation trend in the movement of Indian rupee against foreign currencies. During 2011-12, the sovereign rating downgraded the US economy and deepening of Euro debt crisis in emerging economies have made the rupee volatile. In 2012 -13, Indian rupee has faced huge depreciation due to outflow of foreign investment, high current account deficit, decline in economic growth and rise in crude oil prices in the Indian economy.

During the fiscal year 2013-14 the announcement of withdrawal of quantitative easing by Federal Reserve has made the currency to depreciate in emerging economies. The widened current account deficit has made Indian rupee to depreciate against USD, GBP and EURO, while it has appreciated against YEN

The high foreign investment inflows in the equity market and appreciation of USD among other foreign currencies in the international market due to growth in the US economy has made Indian rupee depreciate against USD and GBP during subsequent years 2014 - 16. Due to weak economic outlook in European and Japanese economy, Indian rupee has appreciated against Euro and Yen

In 2016-17 there was a depreciation pattern of Indian rupee against USD, EURO and YEN and appreciation against Pounds sterling. Indian rupee depreciated hugely due to rise in crude oil prices and rise in trade deficit.

To conclude, Indian rupee has faced similar trend of appreciation and depreciation against the foreign currencies. In most of the years, rupee depreciated against USD on month to month basis. Similar findings are related to the earlier studies of **Sumanjet Singh, 2009** and **Vandana Kotai, 2015.**

Chapter V depicts the second objective of the study - To analyse the volatility of the exchange rate of Indian rupee against major currencies. The currencies, namely, US dollar, Pounds Sterling, Euro and Yen have been taken for the study. Descriptive statistics and the econometric tools, namely, Unit root test, ARCH - LM (Autoregression Conditional Heteroscedasticity – Lagrange Multiplier test), GARCH (Generalised Autoregression Conditional Heteroscedasticity) model have been applied to study the volatility of the currencies.

Descriptive statistics

The mean value of exchange rate of Indian rupee against pound sterling is found to be higher among the other currencies during the study period.

Exchange rate volatility is an important factor in the foreign exchange market. It is a measure of how the current exchange rate deviates from the previous exchange rate. So, it is necessary to predict the returns of exchange rate volatility. Unit root test has been employed for the currencies, namely, Indian rupee against USD, GBP, EURO and YEN and it has revealed that the currencies are stationary and also found that there is absence of heteroscedasticity. GARCH models have been applied to measure the volatility clustering in the exchange rate. The major notes of volatility for the four currencies have been summarised below:

Exchange rate volatility of Indian rupee against USD

Indian rupee has faced excessive volatility leading to huge depreciation against USD during the post recession period from 2008 to 2017.The rupee has ranged between Rs.39 to Rs.68 per USD on an daily average. Before the crisis, it stood at Rs.39 per USD where as after the recession during September 2008, rupee has depreciated to Rs.48 per USD which have shown a higher volatility against USD. After the recovery of crisis, due to an increase in foreign inflows and growth of exports the rupee has appreciated to

Rs.44 per USD during the year 2010 - 11 respectively. There was a depreciating trend after 2011 -12 till 2016-17 because of rise in outflow of foreign investments and high trade deficit. The Indian rupee depreciated by Rs.62 per USD and stood at Rs.66 per USD during the year 2017 which has shown that there is a presence of high volatility.

Exchange rate volatility of Indian rupee against GBP

Among the currencies taken for the study, Indian rupee has shown a higher volatility towards Pound sterling during the study period. On an daily average, the exchange rate of Indian rupee against Pounds sterling has been appreciated to Rs.80 in the year 2007-08. After the crisis, due to monetary easing action taken by Federal Reserve Bank of America, the rupee has appreciated against pounds from Rs.78 to Rs.70 during the year 2008-09 to 2010-11. There was a depreciation in the exchange rate of rupee against pounds for the period of five years from 2011-12 to 2015-16. On an daily average, the rupee has depreciated from Rs.76 to Rs.102. This was the highest volatility period in the exchange rate of rupee against pounds. At the end of the year 2016-17 rupee has appreciated against pounds to Rs.87.

Exchange rate volatility of Indian rupee against EURO

The currency Euro has shown extreme variations leading to sudden appreciation and depreciation of Indian rupee against euro. Before the crisis, on a monthly average, euro has ranged from Rs.57 to Rs.84 in the post crisis period during the year 2007-08 to 2016-17. After the crisis, rupee against euro stood at Rs.64 during the year 2008-09 and rupee appreciated to Rs.67 in 2009-10 which have shown a phase of volatility. There was depreciation in the exchange rate of rupee against euro from Rs.60 to Rs.70 during the year 2012 - 13. Rupees have been highly volatile in the year 2013-14 with depreciation to Rs.84. At the end of the year, from 2014 - 15 to 2016 - 17 rupee has appreciated from Rs.77 to Rs.73.

Exchange rate volatility of Indian rupee against YEN

Exchange rate of Indian rupee against Yen has mostly shown a pattern of depreciation during the study period. In 2008, rupee stood at Rs.35 and from the year 2008-09 rupee has shown a higher depreciation from Rs.46 to Rs.65 during the year

2012-13. It has remarked a high volatility leading to huge depreciation against yen during the post recession period. Due to weak economic position in the Japanese economy, there was appreciation in the exchange rate of rupee against yen from 2013-14 to 2015-16, the rupee has ranged from Rs.60 to Rs.54. At the end of the year Rupee has depreciated to Rs.62 which has depicted that the rupees against yen have shown both high and low volatility during the study period.

To conclude, exchange rate returns of Indian rupee against US dollar, Pound sterling, Euro and Yen are highly persistent in Indian foreign exchange market due to unpredictable economic events prevailing in the economy leading to volatility clustering during the study. It also indicates that the current exchange rate volatility is significantly influenced by the previous exchange rate volatility. The results of the study were substantiated with the research studies of **Sanjeev Gupta and Sanchin Kashyap (2014**), **Shanmugasundaram and Samsudheen (2012), Satyanandha Sahoo (2012)** which have confirmed the presence of volatility clustering in the exchange rate.

Chapter VI presents the third objective of the study - To identify the Macroeconomic determinants affecting the currency fluctuations during the study period. The major currencies against Indian rupee, namely, US dollar, Pounds Sterling, Euro and Yen have been considered as dependent variables. Macroeconomic determinants, such as, Foreign exchange reserves, Foreign direct investment, Interest rate, Inflation rate, Index of industrial production, Crude oil prices, Gold prices and Money supply have been taken for the study as independent variables. Unit root test, Vector Autoregression (VAR) and Autoregression Distributed Lag model (ARDL) have been applied.

Unit root test

The exchange rate of Indian rupee against USD, GBP, EURO and YEN and the Macroeconomic determinants considered for the study are stationary

Macroeconomic determinants affecting exchange rate of Indian currency against select foreign currencies

To identify the macroeconomic determinants affecting the exchange rate, the analysis has been done separately for each currency. Exchange rate of Indian rupee against US dollar, Pounds Sterling, Euro and Yen have been taken as dependent variables and the variables, such as, Foreign exchange reserves, Foreign direct Investment, Interest rate, Inflation rate, Index of Industrial Production, Crude oil prices, Gold prices and Money supply have been taken as independent variables. The results are:

Vector Autoregression and ARDL model

Macroeconomic determinants affecting Exchange rate of INR/USD

There exists a significant influence on the variables, such as, exchange rate of USD to USD, exchange rate of USD to Foreign exchange reserves, exchange rate of USD to gold prices, Foreign exchange reserves to USD and FDI. Interest rate has a significant influence on its own variable and also to IIP. The two variables, namely, Crude oil prices and IIP have a significant influence on their own variable. IIP has a significant influence on money supply.

Among the other significant variables taken for the study, the variables, such as, foreign exchange reserves, Gold prices and Interest rate are the significant predictors of exchange rate of USD.

Macroeconomic determinants affecting Exchange rate of INR/GBP

There exists a significant influence between exchange rate of GBP to foreign exchange reserves, exchange rate of GBP to crude oil prices. FDI has a significant influence on its own variable and also to foreign exchange reserves. Interest rate has a significant influence on its own variable and also to IIP. The variables, namely, inflation rate and crude oil prices have a significant influence on their own variable. IIP has a significant influence on their own variable and also to money supply.

The variables, such as, Foreign Exchange Reserves and Gold prices are the significant predictors of exchange rate of Indian rupee against GBP among the other significant variables.

Macroeconomic determinants affecting Exchange rate of INR/EURO

It is found that there exists a significant influence between exchange rate of euro to the variables, namely, foreign exchange reserves, FDI, crude oil prices and IIP. Interest rate has a significant influence on their own variable.

The variables, such as, Foreign Exchange Reserves and Crude oil prices are the significant predictors of exchange rate of Indian rupee against euro among the other significant variables.

Macroeconomic determinants sffecting Exchange rate of INR/YEN

Presence of significant influence between exchange rate of yen to yen, exchange rate of yen to Foreign Exchange Reserves, FDI and Interest rate have a significant influence on its own variable. Interest rate to IIP and Crude oil prices have a significant influence on its own variable and also to Interest rate, IIP has a significant influence on their own variable and also to money supply.

The variables, such as, Foreign Exchange Reserves, Crude oil prices and Gold prices are the significant predictors of exchange rate of Indian rupee against yen among the other significant variables. **Similar findings are related to earlier studies of Divyang Joshi (2011), Sajal Ghosh (2011), Yamini Karmarkar and Muskan Karamchandani (2012)**

Foreign exchange reserves, Foreign direct investment, Interest rate, Inflation rate, Index of Industrial Production, Crude oil prices, Gold prices and Money supply are the Macroeconomic determinants influencing the movements of exchange rate. Out of these variables, some of the macroeconomic determinants individually and jointly influences the exchange rate volatility in the foreign exchange market.

To conclude, the results of Vector Autoregression and ARDL models have identified that the Macroeconomic determinants, namely, Foreign exchange reserves, Gold prices, Index of Industrial Production and Crude oil prices as the major predictors of the exchange rate of Indian currency.

Chapter VII presents the results of the analysis for the fourth objective of the study “To find the impact of currency fluctuations on trade balance” The major currencies against Indian rupee, such as, US dollar, Pounds Sterling, Euro and Yen have been considered as independent variables and trade balance has been taken as dependent variable. Correlation analysis, Granger causality and regression analysis have been applied to find the relationship of currencies on trade balance.

Descriptive statistics

The mean value of Imports are found to be high among the other variables

Results of Correlation Analysis

Correlation analysis has been used to identify the relationship between the four major currencies and trade balance.

Year	Variables	Positively correlated	Negatively correlated
2007-08	Exports	Yen, Euro	
2008-09	Exports	Pounds, Euro	US dollar, Yen
	Imports	Pounds	US dollar Yen
	Trade balance	Yen	Pounds
2009-10	Exports		US dollar, Pounds
	Imports		US dollar, Pounds
	Trade balance	US dollar	
2010-11	Exports	Euro	
	Imports	Euro	
2011-12	Exports	USD, Pounds	
	Imports	US dollar, Pounds Yen and Euro	
	Trade balance		Yen
2012-13	Exports		Yen
2013-14	Exports	US dollar, Pounds, Euro and Yen	
	Trade balance	US dollar, Pounds, Euro and Yen	
2014-15	Exports	Euro	
2015-16	Imports		US dollar and Yen
	Trade balance	US dollar, Yen and Euro	
2016-17	Imports		Pounds And Yen
	Trade balance	Pounds and Yen	

It is found that the exchange rate fluctuations of Indian rupee against US dollar, Pounds, Euro and Yen have a positive effect on the exports, imports and trade balance in most of the years. The currencies, namely, US dollar, Pounds and Yen are negatively correlated with exports, imports and trade balance.

GRANGER CAUSALITY TEST

Granger causality test has been applied between the currencies, export, import and trade balance to know the causality relationship between the variables. The variables, namely Exports, Imports and Trade balance cause the movement of exchange rate of USD, Currency Yen causes movement of Pounds. Pounds with exports and Imports with trade balance have a causal effect. The variables, Exports, Euro and Imports have a causality relationship between each other. Exports and trade balance have unidirectional relationship with the variables. It is also found that the variables Yen and Trade balance, Euro and Trade balance, Imports and trade balance are affected by each other.

REGRESSION ANALYSIS

Regression analysis has been done to identify the impact of select foreign currencies on exports, imports and trade balance.

Exports Vs Foreign currencies - The currencies, such as, USD, POUNDS and EURO have a positive effect on exports

Imports Vs foreign currencies – The currencies POUNDS and YEN have a positive effect on imports.

Trade balance Vs foreign currencies- To identify the currencies affecting trade balance, among the currencies taken, the coefficient of YEN has a positive effect and is found to be statistically significant. There is no presence of multicollinearity in the regression analysis.

8.2 SUGGESTIONS

Based on the findings of the study, the following suggestions are offered. The suggestions can be considered for the development of Indian foreign exchange market and for sustainable economic development.

- Appreciation and Depreciation of the Indian currency is one of the most important factors in determining the exchange rate in the economy and it affects the international transactions. The depreciation trend of the Indian currency has constantly continued after the global recession which has affected the economy from time to time. If the supply of the foreign currency is more than the demand of the foreign currency, then the value of Indian currency will increase. The inflow of foreign currency can be accelerated by high Foreign Direct Investment and Foreign Portfolio Investment.
- Ease of External Commercial Borrowings for the manufacturing companies and levying exemption of tax for Government bonds to the foreign investors will result in an increase inflow of foreign funds into the country and reduces the pressure on rupee.
- Depreciation of rupee against foreign currencies has shaken the hope of the investors and also the other players of the foreign exchange market. The Government can take measures for overseas borrowing through non resident Indian deposits or bonds schemes with high attractive rates for a longer period to control the fall in the value of Indian rupee.
- The exchange rate volatility affects the tourists, investors, non residents of the country, students abroad and traders to exchange their currency into foreign currency. So a proper elasticity of market forces has to be maintained in the economy to have an adequate supply of foreign currencies.
- Speculative transaction is one among the factors for the frequency of volatility in the foreign exchange market. High exchange rate volatility leads to presence of high risk in the currency. Due to exchange rate volatility, traders move for a hedging option which increases the demand for the foreign currency in the foreign

exchange transactions. Instead, RBI can bring new financial products with short term liquidity for the players in the market.

- Economic reforms policies can be taken by economists and policy makers to control exchange rate fluctuations and to maintain economic stability in the country.
- A Foreign Exchange Reserve is one of the major economic indicators of the economy. The reserves can be accelerated through investments in foreign currency assets and by increasing of exports. Adequacy of reserves is essential to meet the external debt and also during the unpredictable events in the economies.
- India is the largest importer of crude oil which is the major cause that raises the demand for foreign currency. An increase in crude oil price would bring an effect of high inflation rate and widen trade deficit in the country. The government has to stabilise the prices.
- Government can offer bonds directly to the oil companies, so that the crude oil products can be bought in terms of rupee and so the demand for the foreign currency can be reduced.
- Gold is an international traded commodity in the country and the prices inversely affect the exchange rate volatility in all the period of time. A proper mechanism of fixing daily gold prices and reduction of custom duties for import of gold can be taken in the international market.
- Currency depreciation and trade deficit are the serious concerns of the economy for an elongated period of time which leads to financial instability in the economy. The financial stabilisation can be improved through liberalisation of the trade barriers and by boosting up the exports to the developed nations.
- For a favourable position of trade balance in a developing country like India, New technologies can be adopted by the industries to produce the innovative products and to improve the domestic production which leads to an increase in the gross domestic production and to reduce the level of imports. There will be more supply of foreign currency in the economy and thereby increase in the trade agreements with the other nations to increase the exports of commodities.

- A broad banded export promotion schemes can be taken at macro level to solve the problems faced by trade and industry.
- The traders should have a control on import of non essential items to lower down the import bills for reducing the trade deficit.
- To promote the initiatives of "Make in India" programme among the exporters on focusing to raise the exports of commodities from different sectors of the economy and also to have cross border trade relations, the trade ministries can organise workshops related to the foreign trade portals.
- The Government should encourage entrepreneurs to produce alternative products for crude oil in order to reduce the consumption of import of crude oil products.
- The exporters should be encouraged to have a regular participation for the trade fairs and exhibitions, workshops organised by FEDAI related to foreign trade and foreign exchange business for gaining knowledge about export finance, credit facility and technologies to promote their commodities to other nations.

8.3 CONCLUSION

In a country, Foreign Exchange Market has been considered as the backbone for the international trade and investments which is fundamental for the nation's economic health. Exchange rate is a vital aspect for the foreign exchange market and also to the government in framing fiscal and monetary measures. Appreciation and depreciation is not a stable phenomenon in the external sector of the economy which have made extensive changes in the foreign exchange market. In Indian scenario, after the global recession, the trend of rupee depreciation has been observed in the Indian foreign exchange market. Among the four major currencies taken for the study, Rupee has a high depreciation against US dollar. The extreme depreciation of Indian currency has shown a phase of higher volatility against all the select foreign currencies during the study period. Therefore, the general hypothesis, namely, there is absence of exchange rate volatility of select foreign currencies in the Indian foreign exchange market has been disproved.

The study has revealed that the exchange rate of Indian rupee against select foreign currencies is influenced by the macroeconomic determinants, namely, foreign exchange reserves, crude oil prices, gold prices and Index of Industrial Production. They are the major predictors and determinants of the exchange rate. Hence, the general assumption that the macroeconomic determinants do not influence the exchange rate has been disproved. The study has concluded that exchange rate is a driving force in the trade balance. Exchange rate fluctuations have a positive impact on exports, imports and trade balance. Hence, the general assumption that exchange rate fluctuations do not influence the exports, imports and trade balance has been disproved. The positive impact of exchange rate fluctuation on trade balance has implied that the currency depreciation improves the level of exports and thereby affects the imports.

The economic events, demand and supply of currency from one country into other country have triggered the exchange rate volatility. Exchange rate is an essential phenomenon for the policy makers, investors, business personnel, common man and other players in the foreign exchange market. The instability of the exchange rate greatly affects the decision making of the players of the foreign exchange market and all the economic activities. Thus the findings and suggestions of the study would aid the economists, policymakers and the government to take effective monetary measures to curb the high exchange rate volatility in future, and to maintain macroeconomic stability and healthy environment in the economy.

8.4 SCOPE OF FURTHER RESEARCH

Further research can be covered in the following areas:

- The present study can be extended for the other multinational currencies in developing and developed economies.
- The study can be undertaken to know the perception of Investors, economists and policy makers for undertaking effective policy measures.
- The spillover effect of Exchange rate volatility with the different sectors of the economy can be studied.