

Impact of Foreign Exchange Reserve on Macroeconomic Factors in India

*Dr. M. Jegadeeshwaran, #Kaleeshwari.S

*Assistant Professor, #M.Phil. Research Scholar, Department of Commerce, Bharathiar University, India.

Abstract - Foreign exchange reserve is the most eminent economic factor in any country's development. A rise in the composition of foreign exchange reserves will definitely increase both the liquid and the total debt, shorting the debt maturity. As a result, it may lead to a decline in consumption but enhance investment and economic growth. As exchange rates directly affect international trade. Generally, it provides a level of confidence to markets that a country can meet its external obligations, demonstrate the backing of domestic currency for meeting foreign exchange needs and debt obligations. An increase in the forex reserve will gain comfort to the government and the central bank in handling financial issues and also help the rupee to strengthen against the dollars. This evidence that there is equal importance of foreign exchange reserve on a country's economic development. Focusing on this an attempt is made to study the impact of macroeconomic factors on foreign exchange reserve and analyze how these factors play a major role in the rise of forex reserve in the country. Using statistical tools like correlation, regression and it has been found that there is a high positive relationship found between foreign direct investment, import, and exchange rate along with the foreign exchange reserve. A combined linear impact of macroeconomic variables on forex reserve. And there is a significant impact of these factors on forex reserve at a 5 percent level of significance, concluding that macroeconomic variables play an important role in the increase or decrease of forex reserve in the economy.

Keywords: effects, foreign exchange reserve, macroeconomic factors, impact, relationship.

I. INTRODUCTION

Foreign exchange reserve refers to the supply of currency held by the central bank of a country. International Monetary Fund (IMF) defines the foreign exchange reserve as external stock of assets, which is available to the country's monetary authorities to handle the external shocks in the form of payment imbalances. generally, a country needs foreign exchange reserve mainly for two main purposes, 1) to synchronize receipts and payments with the rest of the world and 2) to withstand occasional speculative Ness. The foreign reserve plays an important role in the designing and evaluation of current and future macroeconomic policies aimed at achieving trade balances. The pattern of reserve holding has been increased at relative speed since the 1990s.

II. REVIEW OF LITERATURE

Ali and Medhekar (2010)¹ made a good study about multifold effects on real monetary external sector determinants by taking data from 1971 to 2010 in the context of Bangladesh. He found that foreign exchange reserve is directly related to GDP and depends on export, import, foreign aid, and remittance in the context of Bangladesh's economy. He also mentioned that

international commitment, commercial transportation, and transfer payment of the countries affect the reserves position and it cannot be fully predetermined.

Srivastava (2010)² examined the effect of Macroeconomic factors like Industrial Production Index, Whole Price Index, Interest Rate, Foreign Exchange Rate, and Morgon Stanley Capital International World Equity Index on the return and volatility of the Indian Stock Market by using Johnson's Cointegration analysis and Vector Error Correction mechanism. The results indicated that Industrial Production Index, WPI, and Interest Rate are the most affecting variables in the long run. The impact of global factors was lower than that of domestic variables on the performance of the stock market.

Hosseini (2011)⁴⁵ investigated the Nature of the causal relationships between the stock prices and the key macroeconomic variables of India and China for the period January 1999 to January 2009 using monthly data. The selected variables were the Bombay Stock Exchange (BSE) Stock prices, Shanghai Stock Exchange (SSE) Stock Prices, Crude oil price, Money supply (m2), and Industrial Production and Inflation rate. The results of the study revealed both long-run and short-run linkages between the

macroeconomic variables and stock market indices of both countries.

Walia (2012)⁵³ studied the impact of the Global Financial Crisis on the Indian economy. The scholar exposed the various reasons for initiation and its impact on various Indian sectors like agriculture, manufacturing, construction, finance, insurance, real estate, etc. The total nine sectors were taken to calculate the GDP, Growth rate of exports and imports, Balance of payment position, Foreign Investments, Income flow in India, and the cumulative change in equity indices were studied to find the results. The entire study is divided into two parts, i.e. pre-meltdown and post-meltdown periods. It was found that initially, India was not affected by this crisis, but later at the bankruptcy of Lehman Brothers and the occurrence of some other events shivered the Indian economy.

Chandar, Sumathi, and Sivanandam (2015)⁶⁷ examined the prediction of the foreign exchange rate of the Indian rupee with four (Pound Sterling, US Dollar, EURO, and Japanese Yen) major currencies of the world. Using the data on 1205 days data on five various algorithms of Artificial Neural Networks (ANN), working on Back Propagation Neural Network (BPNN) it was found that among the five models Levenberg-Marquardt model proved to be the best model.

Babu and Reddy (2015)⁶⁸ studied the three foreign exchange rate forecasting models on the Indian Rupee against the US dollar, British Pound, Euro, and Japanese Yen. Observing 47 exchange rate data from 2010 to 2015 and applying ARIMA, nonlinear autoregressive Neural Network, and nonlinear Fuzzy Neuron. They have concluded that the ARIMA model outperforms the other model and proved to be the best model for forecasting in the case of India, as against the literature, which says that Neural Network has better performance than ARIMA.

Poongothai.K and Kalaipriya.S (2017)⁸² The study is an attempt to analyze the impact of the Foreign Exchange Reserve holdings on Inflation (both consumer price index and wholesale price index) in India. The variables taken for analysis are based on earlier studies of various nations including IMF. Conclusion based on results shows the better influence posed by the Foreign Exchange Reserves on inflation.

Statement of the problem

Forex reserve is proven to be a most important and vital indicator in any country’s there is an excessive accumulation of fore reserve is been beyond the capacity, India is the fourth largest country of top ten nations having highest forex reserve balance as of 2021, it means that India has its own pace in accumulating the reserve amongst other nation towards the foreign reserve. Irrespective of the volatility in exchange rate the accumulation or the generation is steadily increasing. However there makes

sense that developing countries must hold a required amount of reserve in order to meet their financial obligations. This means that then rise in reserve will definitely impact the economy, it would influence the macroeconomic factors of an economy in developing the performance of the nation when there is a rise in the reserve volume. This makes sense to make an attempt in analyzing whether foreign reserve impacts the macroeconomic variable which in turn helps in the nation’s economic growth. whether foreign exchange reserve impacts the macroeconomic factors which help in nations’ development?

The Objective of the Study

To elucidate the growth of Macro Economic Factors in India and the Impact of Foreign Exchange Reserves on Macroeconomic Variables.

Hypotheses of the Study

There is no significant relationship between foreign exchange reserve and Macroeconomic variables.

There is no significant impact of foreign exchange reserve on Macroeconomic variables

III. RESEARCH METHODOLOGY

The study is analytical in nature

Source of the Data

The data are secondary source information collected from various websites, such as world bank reports, reserve bank data, and other annual and monthly publications of RBI, magazines, newspapers, etc.

Period of the study

The period the study is from 2009-2019

Tools used for the study

Statistical tools like descriptive statistics, correlation, and regression are used for the study.

IV. ANALYSIS AND INTERPRETATION

1.1 Descriptive Statistics and Growth Rate of Macro Economic Factors for the year 2009-2019

Table 1.1

Year	CM R	ER	Inf	EX	IM	GD P	FDI	FPI	
Growth rate of macro economic	09-10	6.09	46.6	11.58	2.02	2.03	5.005	731.9	178.0
	10-11	6.16	48.8	10.47	2.03	2.20	5.269	845.9	151.4
	11-12	6.22	51.1	9.47	2.05	2.38	5.545	977.6	128.7
	12-13	6.28	53.6	8.57	2.06	2.58	5.837	112.9	109.5
	13-14	6.34	56.1	7.75	2.08	2.80	6.143	130.5	931.5
	14-15	6.41	58.8	7.00	2.09	3.04	6.466	150.9	792.3

15-16	6.47	61.6	6.33	2.11	3.30	6.806	174.4	673.9
16-17	6.54	64.5	5.73	2.12	3.57	7.164	201.5	573.2
17-18	6.60	67.6	5.18	2.14	3.88	7.540	232.9	487.5
18-19	6.67	70.8	4.68	2.15	4.20	7.936	269.2	414.6
19-20	6.74	74.2	4.23	2.17	4.56	8.353	311.1	352.6
Mean	6.60	59.52	7.64	23.9	31.57	93.78	16.92	89.48
St. D	1.52	9.26	3.01	95.6	84.27	64.36	77.87	86.53
CV	2.31	85.92	9.06	91.5	71.02	41.42	60.64	74.87

Source: compiled and computed from secondary data through SPS

Table 4.1 highlights the descriptive statistics of yearly rates of Marco Economic Variables such as call money rate, exchange rate, inflation, export, import, gross domestic product, foreign direct investment, and foreign portfolio investment. Gross domestic product has a high mean value of 93.787 this means that GDP is the major indicator in deciding the economy’s performance. Followed by FPI with a mean value of 89.488 and exchange rate with a mean value of 59.527. The highest standard deviation of 95.659 is found in export which conforms to the rule of highly volatile. And the lowest standard deviation is found in the call money rate with 1.521 which means the volatility level is low compared to the other macro-economic indicators. The skewness of all the indicators is negative except GDP, FDI, and FPI. which indicates that a longer tail towards the left of mean and GDP, FDI, and FPI have a longer tail towards the right. It also validates that GDP, FDI, and FPI are highly contributing variables in a country’s economic development. The kurtosis statistics is below 3 which indicates that the normal distribution of variables is platykurtic.

1.2 Analysis of relationship between Macroeconomic Variables and Foreign Exchange reserve for the period 2009-2019

H0 = there is no significant relationship between Macroeconomic Variable and foreign exchange reserve

Table 1.2 Correlation Matrix for Macro-Economic Variable and Foreign Exchange Reserve

	FER	CMR	ER	INF	EXP	IMP	FDI	GDP	FPI
FER	1								
CMR	-.113	1							
ER	.913**	.051	1						
INF	-.692*	-.025	-.739**	1					
EXP	.393	.253	.353	-.226	1				
IMP	.885**	.229	.878**	-.669*	.242	1			
FDI	.933**	-.054	.934**	-.712*	.471	.779**	1		

GDP	.489	-.058	.361	-.155	.687	.310	.413	1
FPI	-.469	.015	-.513	.151	.008	-.430	-.484	.032

Source: compiled and computed from secondary data through SPSS

Table 1.2 depicts the relationship between Macro Economic Variable and Foreign Exchange Reserve. The strength of association between foreign exchange reserve and the exchange rate is a highly positive relationship with .913. secondly, foreign exchange reserve and import also have a high positive correlation with .885 and, followed by a high correlation between foreign exchange reserve and foreign direct investments also has a high positive correlation. Import, exchange rate, foreign direct investment has a direct relationship with foreign exchange reserve. Exchange rate and import have a high correlation of .878 and exchange rate and foreign direct investment have a high positive relationship with .934. a high negative relationship is found in foreign direct investment and inflation.

1.3 Regression Analysis of Macro Economic Variables on Foreign exchange reserve in India for the period 2009-2019

Table 1.3 Model summary of Macro-Economic Variable on Foreign Exchange Reserve

Model	R	R Square	Adjusted R Square	Std. The error of the Estimate	Durbin-Watson
1	.995 ^a	.990	.949	165660.04439	2.410
a. Predictors: (Constant), FPI, EXP, CMR, INF, GDP, IMP, FDI, ER					
b. Dependent Variable: FER					

Source: compiled and computed from secondary data through SPSS

Table 1.3 depicts the model summary for the impact of macroeconomic factors on foreign exchange. when foreign exchange reserve is the dependent variable, R=.995 which means that there is a very strong relationship. R-square is.990 indicating that 99.9 percent of performance variation is accounted for the combined linear impact of independent variables. The adjusted R square value is .949, implying that the model has accounted for 94.9 percent of the variance in the criterion variable. The value of Durbin -Watson statistics is 2.410 representing that the model is suffering from auto-correlation.

Ho = There is no significant effect of macro-economic factors on foreign exchange reserve

Table 1.4 ANOVA of Macro-Economic Factors on Foreign Exchange Reserve

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.287	8	6.609	24.085	.040 ^b
	Residual	5.488	2	2.744		
	Total	5.342	10			
a. Dependent Variable: FER						
b. Predictors: (Constant), FPI, EXP, CMR, INF, GDP, IMP, FDI, ER						

Source: compiled and computed from secondary data through SPSS

Table 1.4 explains the ANOVA for foreign exchange reserve for the period 2009-2019. The significant value for the above model is less than 0.05 which considers the Foreign Exchange Reserve as the dependent variable and eight factors of the Macroeconomic variable is considered as the independent variable. Hence, the null hypothesis is rejected. It is concluded that there is a significant effect of Macro economic factors on foreign exchange reserve

Table 1.5 Coefficient of Macro-Economic factors on foreign exchange reserve for the period 2009-2019

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.371	1.074		1.277	.330
CMR	-1.123	4.979	-.234	-2.257	.153
ER	-2.069	2.286	-.263	-.905	.461
INF	-9.185	3.048	-.038	-.301	.792
EXP	4.562	.000	.060	.422	.714
IMP	5.795	.000	.668	3.737	.065
GDP	1.184	.000	.104	.865	.478
FDI	4.854	2.465	.517	1.969	.188
FPI	-.513	.847	-.061	-.606	.606

a. Dependent Variable: FER

Source: compiled and computed from secondary data through SPSS

Table 1.5 shows the coefficient for the impact of Macroeconomic factors on foreign. It implies that macro-economic variable and foreign exchange reserve. The significant value is above 0.05, which concludes that there is a negative impact of foreign exchange reserve on Macroeconomic variable.

V. FINDINGS

- The exchange rate's trend and growth rate are found to be rising, the interest rate, inflation, and exchange rate are correlated.
- Inflation shows a decreasing trend and growth rate which is a positive sign it will increase rates of returns for savers, and improved confidence and boost long-term economic growth is an indication that boosts foreign fund inflow.
- Trend and growth rate for export is found increasing, which is a sign that boosts an increase in capital investments.
- Trend and growth rate for imports are rising, a rise in imports along with deficit will cause depreciation in the exchange rate.
- The gross domestic product shows an upward trend and growth rate, an overall increase in the size of the economy, productivity growth can raise per capita GDP.
- An increase in trend and growth rate of foreign direct investments, which will raise the exchange rate which is a sign of an increase in foreign exchange reserve.

- Foreign portfolio investment indicates a decrease, which means there is a shortfall in the inflow. Gross domestic product with high mean value decides the performance of the economy, followed by foreign portfolio investment and exchange rate.
- There is a high positive relationship between foreign exchange reserve and exchange rate. followed by foreign exchange reserve and import and foreign direct investment.
- Apart from that exchange rate, import has a high relationship, followed by the exchange rate and foreign direct investment.
- A negative relationship is found between foreign direct investment and inflation.
 - There is a very strong relationship between foreign exchange reserve and foreign Direct Investment, exchange rate, import.
 - The r square value is showing a combined linear impact of the macro-economic variable.
 - Foreign exchange reserve directly affects the macro-economic variable, which is evident from the significant value is below 0.05.

VI. SUGGESTIONS AND RECOMMENDATIONS

- Maintaining a high reserve as per precautionary, speculative, and transactional motive of the nations, the excess of reserves can be turned towards the capital formation projects and rural development projects which can boost unemployment and bring a balance between the poverty level.
- Nation's foreign exchange reserve can be increased export (to any country willing to trade in US dollars). Foreign investors investing in Indian business will help in the appreciation of Indian currency in the market.
- Inflationary and appreciative effect of capital inflow will affect the Indian currency which can be balanced by canceling the effect of appreciation by replacing through FDI/FPI with inflows through exports. And sterilization process is used to counter the effects due to inflation.

VII. CONCLUSION

The study concludes that foreign exchange reserve has a high positive relationship with foreign direct investment, import, and exchange rate. And it is evident that there is an impact of foreign exchange reserve on Macroeconomic variables, which means that there is a direct effect of a macroeconomic variable on foreign exchange reserve and vice versa. So, it is clear that even though foreign exchange reserve is reserved for future obligations and external shocks from trade balances, it affects the growth and movement of a macroeconomic variable.

So, the study shows that foreign exchange reserve is a significant factor of a macroeconomic variable to keep the foreign exchange rate stable, the macroeconomic environment must be conducive to maintaining relatively stable price levels. Fiscal and monetary discipline is an essential precondition for changes in the behavior of factors. we must be able to evaluate the effects of and actively respond to, changes in the exchange rates with respect to our consumption decisions, investment portfolios, business plans, government policies, and other life choices (both financial and otherwise).

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