Vol 5 Issue 8 Feb 2016 ISSN No :2231-5063

International Multidisciplinary Research Journal

Golden Research Thoughts

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RNI MAHMUL/2011/38595 **ISSN No.2231-5063**

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Golden Research Thoughts
International Recognition Multidisciplinary Research Journal

ISSN: 2231-5063 Impact Factor : 3.4052(UIF) Volume - 5 | Issue - 8 | Feb - 2016

FOREX RESERVES IN INDIA – DETERMINANTS AND SUFFICIENCY

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ABSTRACT

In today's world, large Foreign Exchange Reserves and its strengthened balance of payments symbolizes the country's strength and worth, as it indicates the strong backing the currency of the country has. There are many Macroeconomic variables attracting the Foreign Exchange Reserves for a nation. For India too, the Macroeconomic variables are the sole that attracts the holdings of Foreign Reserves. The study is an attempt in such nature of analysing the impact of Macroeconomic Variables impacting the Reserve holdings in India. The variables taken for analysis are on the basis of earlier studies of various nations including IMF. Conclusion based on results shows the better influence posed by the Macroeconomic variables on Foreign Exchange Reserves improvement.

KEYWORDS: *Foreign Exchange Reserves, Macro-economic Variables and IMF.*

JEL Classification Code: F31, F33, F41.

INTRODUCTION:

One major development in global financial system for the past two decades has seen the rapid growth of Foreign Exchange Reserves. The large accumulation of Foreign Exchange Reserves can certainly be used as the insurance against financial crisis and default risk. In India, the approach in holdings as well as management of Foreign Exchange Reserves has been directed towards the wealth maximisation of the nation, other than maintaining trade balances and others, irrespective of costs involved in it. India's approach to reserve management, until the balance of payments crisis of 1991 was essentially based on the traditional approach, i.e. to maintain an appropriate level of import cover defined in terms of number of months of imports equivalent to reserves. The approach to reserve management, as part of exchange rate management, and indeed external sector policy underwent a paradigm shift with the adoption of the recommendations of the High Level Committee on Balance of Payments (Chairman: Dr C. Rangarajan).

In today's world, large Foreign Exchange Reserves and its strengthened balance of payments symbolizes the country's strength and worth, as it indicates the strong backing the currency of the country has. Hence, it attracts the confidence of international community present inside the country, as well as in the globe towards the country while a low Foreign Exchange Reserves signals the opposite. It is then necessary for the emerging economy to hold large Foreign Exchange Reserves against disruptive effect of abrupt capital outflows.

Problem discussed

Since the collapse of the Bretton Wood system many nations especially low income and developing nations have made tremendous increase in their accumulation of external reserves. India is one amongst the eight Asian nations (as on January 2014) of the top ten Foreign Exchange Reserves (excluding currency swap and outstanding loans of IMF or others) holding nations in the globe. Indian reserve holding accumulation has seen an extreme increase in the past twenty years, which rose from US $ 5.8 million in 1990-1991 to US $ 2.9 billion in 2012-2013. India has its own place and pace amongst other nations in the globe towards foreign reserve accumulation. Foreign investment followed by external commercial borrowings of domestic firms has led to rise in accumulation of Foreign Exchange Reserves of the nation. Irrespective of volatility in accumulations, Indian reserves holdings is rising steadily. In such case, the Foreign Exchange Reserves have a significant impact on its inflation and economic growth of the nation. In order to intervene in the foreign exchange markets and reduce foreign exchange volatility and achieve price stability accumulation of external reserves is inherent with no alternative. Since 1950-1951, the Foreign Exchange Reserves accumulation has come across various compositions and has faced both upward and downward trend during several periods up to date. In spite of the accumulations, policies and measures to manage external reserves, volatility and inflationary pressures persist. There also a various factors contributed towards the growth Foreign Exchange Reserves during the past. With this setting, the current research work aspires to analyse the accumulation of Foreign Exchange Reserves of India and its determinants in India along with excess reserves available. Based on the above issues, the researcher has framed the following research questions.

- To analyse the relationship between select Macroeconomic Variables of Foreign Exchange Reserves of India.
- To analyse the impact of select Macroeconomic Variables on Foreign Exchange Reserves in India.
- To find out the amount of excess reserves in India during the study period.

Literature samples

• David Irefin and Baba N.Yaaba (2012)[1], *"Determinants of foreign exchange reserves in Nigeria: An application of autoregressive distributed lag",* defined that on a global level Central Banks' holdings of foreign exchange reserves has escalated in recent years. The study employed autoregressive distributed lag approach to run a slightly modified econometrics 'buffer stock model' to estimate the determinants of foreign reserves in Nigeria with focus on income, monetary policy, imports and exchange rate.

• Anne –Laure Delatte and Julien Fouquau (2009)[2] *"The determinants of international reserves in emerging countries: A non-linear approach",* adopted a non linear approach to examine dynamics of international reserves holdings by emerging economies. Their specification accounts for the acceleration of foreign exchange reserves accumulation that the linear specification fails to explain. In this paper, they investigated determinants of demand for international reserves with Panel Smooth Transition model that the great advantage to allow parameters to vary across countries and time.

• Shin-Khi Fukuda and Yoshifumi Kon (2008)[3], *"Macroeconomic impacts of foreign exchange reserves accumulation: A theory and some international reserve",* stated a dramatic accumulation of foreign exchange reserve has been widely observed among the developing countries. The paper's purpose is to explore what long-run impact accumulated foreign exchange reserves have on macro variables in developing countries. They suggested that accumulation of foreign exchange reserves is accompanied by social costs. It is important to reconsider what is the optimal accumulation of foreign reserves in developing countries.

Scope of the study

The analysis also includes the assessment of relation existing between Macroeconomic Variables of holding Foreign Exchange Reserves and identifying excess reserves in India since 2002-2003. The study does not cover cost benefit analysis or volatility or risk assessment of holding Foreign Exchange Reserves of India.

HYPOTHESES FOR THE STUDY

H_{01}: Select Macroeconomic Variables of Foreign Exchange Reserves have no significant relationship among themselves.

H_{02}: Select Macroeconomic Variables have no impact on Foreign Exchange Reserves

Methodology of the study

Sources of data

The study is based on secondary data and the data reliable for analysis are collected from various reports, publications and databases of Central Government of India, Reserve Bank of India, World Bank, Central Intelligence Agency and International Monetary Fund. The macroeconomic determinants are classified into two groups as two approaches that are based on earlier studies.

Period of the study

The study covers the period of 11 years from 2004-2005 to 2014-2015.

Tools used for analysis

The collected data have been used for analysis with the help of financial ratios, statistical tools and econometric tools. The financial ratios used are reserves to import ratio and reserves to short-term debt ratio. The various statistical tools used are Correlation and Multiple Regression Analysis.

Significance of the study

Foreign Exchange Reserves accumulation has gained significance both for the welfare of the nation internally and internationally. There are many reasons behind the accumulation of Foreign Exchange Reserves which may be political, financial, economical or otherwise. India, being a part of the globe also tries to extract a huge portion of Foreign Exchange Reserves from abroad since the enactment of first five-year plan. The study has its implications beneficial to policymakers, various officials of government, investors both from domestic and abroad as well as Non-resident Indians, academicians and future researchers. The study possesses academic relevance in new theoretical and practical knowledge undoubtedly.

Limitations of the study

The major limitations of the study are:

- The study is made only in consideration with India and not applicable to any part of the globe.
- The study fully depends on the secondary data, which has its own limitations.

Analysis

The various macroeconomic determinants of Foreign Exchange Reserve holdings are classified as two approaches based on various reviews as given below on analysis

Table 1

Approach I&II : List of Macroeconomic determinants for analysis

Approach I	Approach II
FER: F (GDP, OPEN, EXP, RATE) Where, **FER** = Foreign Exchange Reserves **GDP** = Log of Gross Domestic Product **OPEN** = Log of Percentage of Imports to GDP (Trade Openness) **EXP** = Log of Export **RATE** = Log of Exchange Rate	$L_nRes_t = a_0 + a_1L_nPop_t + a_2L_n Pci_t + a_3L_n Im_t + a_4 L_n Trade_t + a_5L_nCad_t + a_6L_n Cac_t + a_7L_nSted_t + a_8L_nM_t - a_9L_nEx_t - a_{10}L_n Ird_t + \mu_t$ Where, **RESERVE** = Foreign Exchange Reserves **POP** = Population **PCI** = Per Capita Income **IMPORT TO GDP** = Percentage Imports to GDP **CAD** = Real Current account deficit **CAP TO GDP** = Ratio of Capital account to GDP **DEBT TO GDP** = Ratio of external debt to GDP **MONEY** = Ratio of money & quasi money to GDP **SD RATE** = Standard deviation of exchange rate **IRD** = Interest rate differentials

Correlation analysis: Approach I.

H_{01} (a1): Macroeconomic Variables of Foreign Exchange Reserves have no significant relationship among themselves.

Table – 2

Correlation Analysis of Macroeconomic Variables of Foreign Exchange Reserves during the period from 2004-2005 to 2014-2015

		GDP	RATE	EXPORT	IMPORT TO GDP
GDP	Pearson Correlation	1			
RATE	Pearson Correlation	-.587	1		
EXPORT	Pearson Correlation	.219	.473	1	
IMPORT TO GDP	Pearson Correlation	.185	.497	.951**	1

**. Correlation is significant at the 0.01 level (2-tailed).
Source: Compiled and calculated from Statistical Handbook of Indian Economy 2014 and World Bank data.

The table 2 indicates the Correlation analysis of Macroeconomic Variables of Foreign Exchange Reserves during the period 2004-2005 to 2014-2015. The correlation between Export and Import to GDP and was highly significant at 1 per cent level. The correlation between other Macroeconomic Variables was positive except between Gross Domestic Product and Exchange Rate during the study period. Hence, the null hypothesis is rejected and found that there is a significant relationship between Macroeconomic Variables of Foreign Exchange Reserves.

Approach II

H_{01} (a2) :Macroeconomic Variables of Foreign Exchange Reserves have no significant relationship among themselves.

Table – 3

Correlation Analysis of Macroeconomic Variables of Foreign Exchange Reserves during the period from 2004-2005 to 2014-2015

		PCI	CAD	IMPORT TO GDP	CAP TO GDP	IRD	POP	MONEY	DEBT TO GDP	SDRATE
PCI	Pearson Correlation	1								
CAD	Pearson Correlation	-.681*	1							
IMPORT TO GDP	Pearson Correlation	.937**	-.820**	1						
CAP TO GDP	Pearson Correlation	.507	-.627*	.578	1					
IRD	Pearson Correlation	.060	.251	-.011	-.315	1				
POP	Pearson Correlation	.749**	-.283	.581	.000	.018	1			
MONEY	Pearson Correlation	.942**	-.634*	.901**	.461	.267	.585	1		
DEBT TO GDP	Pearson Correlation	-.890**	.422	-.763**	-.208	-.185	-.869**	-.811**	1	
SDRATE	Pearson Correlation	-.503	.089	-.427	.070	-.289	-.743**	-.360	.647*	1
*. Correlation is significant at the 0.05 level (2-tailed).										
**. Correlation is significant at the 0.01 level (2-tailed).										

Source: Compiled and calculated from Statistical Handbook of Indian Economy 2015 and World Bank.

The table 3 represents the Correlation analysis of Macroeconomic Variables of Foreign Exchange Reserves during the study period 2004-2005 to 2014-2015. The correlation was significant at 5 per cent level for Per capita income and Current account deficit, Money and Current account deficit and Standard deviation of exchange rate and Debt to GDP and significant at 1 per cent level for Per capita income and Import to GDP, Current account deficit and Import to GDP, Population and Per capita income, Population and Debt to GDP Population and Standard deviation of exchange rate, Money and Per capita income and Money and Debt to GDP. The correlation was also negative between Current account deficit and Population, Import to GDP and Interest rate differentials, Import to GDP and Standard deviation of exchange rate, Capital account to GDP and Interest rate differentials, Capital account to GDP and Debt to GDP, Interest rate differentials to Standard deviations of exchange rate and Money to Standard deviations of exchange rate. Hence, the null hypothesis is rejected and found that there is a significant relationship between Macroeconomic Variables of Foreign Exchange Reserves.

Multiple Regression

H_{02}: Macroeconomic Variables have no impact on Foreign Exchange Reserves

Table - 4
Multiple Regression analysis of Macroeconomic Variables on Foreign Exchange Reserves during the period from 2004-2005 to 2014-2015

	R	R Square	Adjusted R Square	Std. Error of the Estimate	F Value	Sig	Significant/ Non-significant
Approach I	.969[a]	.940	.899	.06593	23.358	.001	Significant
Approach II	.999[a]	.998	.983	.02699	65.83	.009	Significant

Predictors: (Constant), Macroeconomic Variables.
Dependent variable: RESERVES

Table 4 indicates the Multiple Regression analysis of Foreign Exchange Reserves and select Macroeconomic Variables during 2004-2005 to 2014-2015. The R2 value of 0.940 for Approach I and R2 value of 0.998 for Approach II states that the Macroeconomic Variables have contributed significantly for Foreign Exchange Reserves holdings in India during the study period. The calculated F value is more than the table value for both the approaches and hence, the null hypothesis is rejected and there is a significant impact by select Macroeconomic Variables on Foreign Exchange Reserves in India.

Table 4: Ratio Analysis

Year	RESERVES/SHORT-TERM DEBT (in per cent)	RESERVES / 10per cent GDP (in per cent)	RESERVES / 25 PER CENT IMPORTS (in per cent)	RESERVES / TOTAL EXTERNAL DEBT (in per cent)
2004-2005	1654.30	154.21	61.41	71.58
2005-2006	2402.12	186.65	78.10	99.55
2006-2007	1886.66	208.35	111.50	114.85
2007-2008	1722.72	199.49	149.14	126.12
2008-2009	793.22	219.62	185.66	125.61
2009-2010	857.89	270.17	251.63	152.63
2010-2011	573.80	242.07	303.59	111.50
2011-2012	598.71	206.20	288.31	111.73
2012-2013	468.92	187.28	369.74	99.93
2013-2014	377.30	180.30	489.01	85.30
2014-2015	304.74	171.16	361.22	75.79
Mean	1058.22	202.32	240.85	106.78
SD	722.78	32.83	136.33	23.87
C.V.	0.68	0.16	0.56	0.22
CAGR	-0.15	0.01	0.19	0.05

Source: Compiled and calculated from Statistical Handbook of Indian Economy 2015 and RBI Bulletin.

The table 4 represents the various ratios to show the reserves adequacy during the study period 2004-2005 to 2014-2015. The various ratios infer the various criteria of adequacy of foreign exchange reserves of the nation. The ratio Foreign exchange reserves to 10% GDP has the High growth rate during the study period and the ratio Foreign exchange reserves to Short Term Debt ratio is shown negative growth rate. The Mean value, standard deviation and Co-efficient of variation is high in Foreign exchange Reserves to Short Term Debt, followed by Foreign Exchange Reserves to 10% GDP, Foreign exchange Reserves to 25% imports and Foreign exchange Reserves to total external debts respectively.

Suggestions

The suggestions based on findings are:

• Apart from fulfilling the precautionary, speculative and transactional needs, there are excess reserves in India. It can be turned towards various projects of national importance, especially in rural development projects and can be used to have industrial undertakings in north eastern states and economically backward regions, where poverty and unemployment is high. It could build up the standard of living of the people of those regions.

• The various macroeconomic variables as discussed in the study can be paid attention by the authorities to improve the reserve buildings in near future.

• A seperate authority looking after the Foreign Reserve Mangement can be builded up for proper control of the reserves.

CONCLUSION

Globally, emerging economies are found competing with the developed economies in accumulating foreign reserves. The reserves accumulated were used as an insurance cover against various economic shocks and will be used for the same in future. The countries intended to hold foreign reserves because they think only about prestige of being among the top nations in the globe in reserves accumulation, regardless of exchange rate or inflationary considerations. The various macroeconomic variables induced the Foreign Reserves holdings during the past decade in India have much impact on various inter disciplinary aspects. The reserves' collision with inflation was drastic with financial crisis crossing in its way. Thus, the reserves holding can be prolific if given elegant notice.

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