

A STUDY ON INTERNATIONAL RESERVES AND SOVEREIGN RISK: AN EVIDENCE FROM INDIA

***Reny Thomas **Sarath Sajan**

(Guest Lecturers, PG Department of Commerce, St Gregorios College, Kottarakara)

ABSTARCT

International reserves are any reasonably reserve funds, that central banks will pass among themselves, internationally. International reserves stay an appropriate type of payment among these banks. Reserves themselves will either be gold or a particular currency, such as the dollar or euro. Foreign-exchange reserves ought to solely embody foreign banknotes, foreign bank deposits, foreign treasury bills, and short and long-term foreign government securities. However, the term in popular usage also adds gold reserves, special drawing rights (SDRs), and International Monetary Fund (IMF) reserve positions. This broader figure is additional without delay obtainable, but it is more accurately termed official international reserves or international reserves. International reserves at a country's "external assets"—including foreign currency deposits and bonds control by central banks and financial authorities, gold and SDRs. The top ten holders of international reserves account for nearly more than half of the world's total foreign currency reserves. The International fund (IMF) created SDRs in 1969 in response to issues concerning the constraints of gold and bucks because the solely suggests that of settling international accounts. SDRs will enhance international liquidity by supplementing normal reserve currencies. Member countries' governments back SDRs with their full faith and credit.

KEYWORDS: SDR, risk, IMF, reserve

INTRODUCTION

International reserves of a country include the external assets of the country which consist of gold, SDR, deposits and bonds held by monetary authorities and central banks. International

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reserves include foreign currency, gold reserves, Special Drawings Rights, other assets denominated in foreign currencies and IMF reserve position according to the IMF (International Monetary Fund). They are used for financing the international payment imbalances directly or regulating the magnitude of imbalances indirectly through intervention in the foreign exchange market so as to affect the exchange rate of country's currency. The assets held by the authorities of the country are mostly denominated in reserve currencies such as US dollar, Japanese yen, Euro and British pound. Sovereign risk is the chance that a central bank will implement foreign exchange rules that will significantly reduce or negate the worth of its forex contracts. It also includes the risk that a foreign nation will either fail to meet debt repayments or not honor sovereign debt payments. International reserves are any kind of reserve funds, which central banks can pass among themselves, internationally. International reserves remain an acceptable form of payment among these banks. Holding high level of reserves helps in reducing the cost of external borrowings but at the same time it also incurs some cost. This study aims in understanding the optimum level of reserve for India.

OBJECTIVES

1. To determine the optimum level of international reserves of India.
2. To evaluate the impact of FII and other investments in the GDP of the country
3. To evaluate the level of sovereign risk associated with default in external debt.

SCOPE OF THE STUDY

This study mainly focuses on the comparison of the actual reserve of India with the optimum level of reserve. It gives due importance on the external debt of the country and the FII and other risk factors affecting the level of international reserves. The data has been taken from the RBI website and other respective Government and institutions website. Thus, this project is useful in understanding the level of sovereign risk and the external borrowings of India. It also helps in knowing about the status of India's international reserve holding and can be used to

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identify the growth of the country. Least but not the last students and academicians get an overview of the country's development in the past few years.

STATEMENT OF THE PROBLEM

Although the issue of optimality of reserve holdings has been discussed among policy makers, few studies have been attempted to estimate the optimum level of reserves for India. This study is about estimating the optimum reserve and comparing the optimum reserve estimated with the actual reserve maintained by India. The main focus of this study is the estimation of optimum risk by incorporating sovereign risk.

REVIEW OF LITERATURE

- **Chandra Dalaya** (1970) analyzed the role of foreign capital in the industrial development of India and observed that the stream of foreign aid to India had not been obstructed by any political forces. While discussing the effective use of foreign aid in the process of economic development, the study, interestingly, questioned the applicability of Dragoslov Avromovic growth-cum-debt model to developing countries because of divergent political and economic characteristics. Although the dependence on foreign aid can be reduced by export promotion and import substitution measures, the study, pointed out that most of India's borrowed resources had gone to public sector undertakings, to build infrastructure facilities and social sector projects which incidentally have long gestation period and hence no returns or exportable surplus could be expected in the immediate future from these projects.
- . Frenkel (1981), stated that the marginal propensity to import (MPI) determines openness to external shocks of an economy and should be positively related to international reserves if the reserves were held as a precautionary motive. Frenkel measured a country's MPI as the ratio of imports over GDP. His study concluded that "optimal reserve holdings would increase as the volatility of reserves increased." His empirical study explained that volatility of reserves is really a robust factor that lays high impact on international reserves
- Aizenman and Marion (2003) focused on the demand for international reserves in the Far East

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compared to the demand in other developing countries. Their study found that reserve holdings for the 1980-1996 periods were the outcome of several factors such as: international transactions, international transaction's volatility, the exchange rate arrangement, and political considerations

- Our work is also related to papers that study the optimal maturity structure of government debt in the presence of distortionary taxation. Angeletos (2002) and Buera and Nicolini (2004) study a closed-economy model in which the government can issue non-state-contingent bonds of different maturities under perfect commitment. They present examples in which the government can replicate complete market allocations by issuing non defaultable long-term debt and accumulating short-term assets. In their model, changes in the term structure of interest rates, which contribute to offsetting shocks to the government budget constraint, arise as a result of fluctuations in the marginal rate of substitution of domestic consumers.
- Telyukova and Wright (2008) address the “credit card puzzle,” that is, the fact that households pay high interest rates on credit cards while earning low rates on bank accounts. In their models, the demand for liquid assets arises because of a transaction motive, since credit cards cannot be used to buy some goods. Although we also study savings decisions by an indebted agent, we offer a distinct mechanism for the demand of liquid assets based on rollover risk.

ANALYSIS AND INTERPRETATION

ESTIMATION OF COST OF DEFAULT(C_0)

H-P filter model is used to find the potential GDP growth. The Hodrick-Prescott (HP) Filter is a data-smoothing technique. The Hodrick-Prescott Filter is commonly applied during analysis to remove short-term fluctuations that are associated with the business cycle. This method is used to find the potential GDP growth at current prices and constant prices. After finding the potential GDP the deviation of potential GDP growth and actual GDP growth is calculated at both current prices and constant prices.

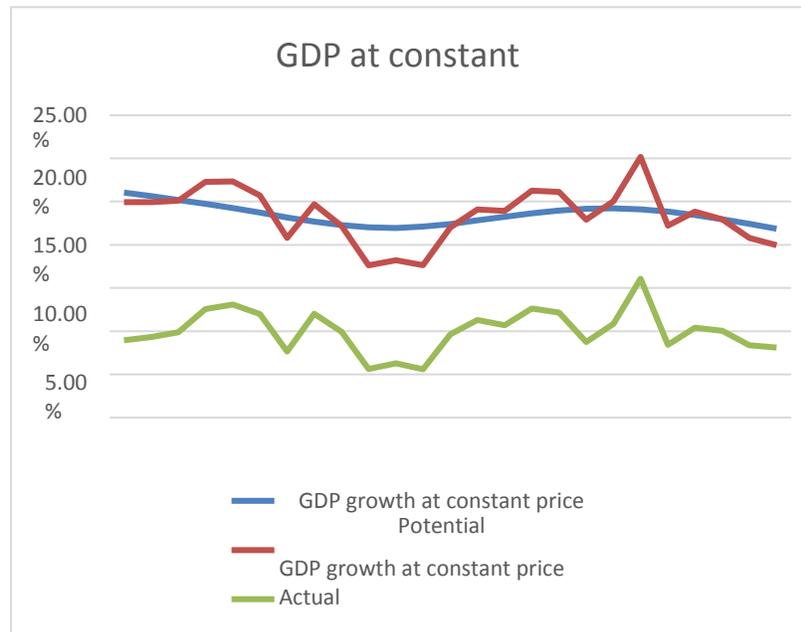
Table No.1

Deviation of potential and actual GDP

Year	GDP growth at constant price			GDP growth at market price		
	Potential	Actual	Deviation	Potential	Actual	Deviation
1991-92	16.04%	14.95%	-1.08%	3.93%	1.06%	-2.87%
1992-93	15.62%	14.94%	-0.68%	4.34%	5.48%	1.14%
1993-94	15.20%	15.08%	-0.12%	4.72%	4.75%	0.03%
1994-95	14.75%	17.30%	2.56%	5.06%	6.66%	1.60%
1995-96	14.25%	17.32%	3.08%	5.33%	7.57%	2.24%
1996-97	13.71%	15.70%	1.99%	5.54%	7.55%	2.01%
1997-98	13.16%	10.79%	-2.37%	5.71%	4.05%	-1.66%
1998-99	12.67%	14.69%	2.02%	5.88%	6.18%	0.31%
1999-2000	12.27%	12.19%	-0.09%	6.07%	8.85%	2.78%
2000-01	12.01%	7.63%	-4.39%	6.31%	3.84%	-2.47%
2001-02	11.95%	8.19%	-3.75%	6.66%	4.82%	-1.84%
2002-03	12.08%	7.66%	-4.42%	7.16%	3.80%	-3.35%
2003-04	12.40%	12.03%	-0.37%	7.80%	7.86%	0.06%
2004-05	12.81%	14.10%	1.29%	8.57%	7.92%	-0.65%
2005-06	13.25%	13.92%	0.66%	9.46%	9.28%	-0.17%
2006-07	13.66%	16.28%	2.62%	10.42%	9.26%	-1.16%
2007-08	13.97%	16.12%	2.15%	11.45%	9.80%	-1.65%
2008-09	14.16%	12.89%	-1.26%	12.49%	3.89%	-8.59%
2009-10	14.21%	15.06%	0.85%	13.48%	8.48%	-5.00%
2010-11	14.10%	20.17%	6.06%	14.30%	10.26%	-4.04%
2011-12	13.83%	12.23%	-1.60%	14.74%	65.39%	50.65%
2012-13	13.44%	13.82%	0.39%	14.57%	5.46%	-9.11%
2013-14	12.95%	12.97%	0.02%	14.06%	6.39%	-7.67%
2014-15	12.41%	10.79%	-1.63%	13.40%	7.51%	-5.90%
2015-16	11.86%	9.94%	-1.92%	12.70%	8.01%	-4.69%

The cost of default is measured by calculating the extent of output contraction during the financial crisis in 2008. Potential GDP is estimated by applying the H-P filter method. The table above shows the GDP growth at constant prices and current prices and the deviations of actual GDP from potential GDP. The table shows that during 2008 the constant and current GDP

contracted by 1.26% and 8.59% respectively. The contraction during 2012-13 was 9.11% and hence the optimum level of reserves is calculated by considering the two maximum ranges of contraction, i.e., 8.59 and 9.11%.



MARGINAL DEFAULT PROBABILITY

The marginal default probability is also required to find the optimum reserve. It is the unconditional probability of default in a year. It can be calculated by deducting the previous year default rate from the current year default rate. The default rate is obtained by using the following equation,

$$\text{Default Rate} = \frac{x}{1+x}$$

Where x is,

$$\frac{\text{risky interest rate} - \text{risk-free rate}}{1 + \text{risky interest rate}}$$

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Risky interest rate has been taken as the average of interest rate offered to NRI deposits and interest rate paid on India's external commercial borrowings. 3-month LIBOR rate was proxied for the risk-free rate.

TABLE NO 2

MARGINAL DEFAULT RATE

Year	Risky Interest Rate	Risk-free rate	x	Default rate		Marginal default rate
FY 2016	0.986517996	0.63	0.179469	0.1521608		-0.1301052
FY 2015	1.093204354	0.27	0.393275	0.282266		-0.0083767
FY 2014	1.083782253	0.23	0.409727	0.2906427	1	-0.027104845
FY 2013	1.395806257	0.28	0.465733	0.317747545		0.066561581
FY 2012	1.212006711	0.47	0.335445	0.251185965		-0.031231674
FY 2011	1.143687256	0.3	0.393568	0.282417639		-0.015990608
FY 2010	1.244767821	0.29	0.42533	0.298408247		0.231464077
FY 2009	1.359271168	1.19	0.071747	0.06694417		0.563320463
FY 2008	1.770855027	2.69	-0.33172	-0.496376294		-5.138782904
FY 2007	1.791768669	5.35	-1.27454	4.64240661		11.54390174
FY 2006	2.202661756	5	-0.87344	-6.901495128		-3.961551115
FY 2005	1.359423478	3.12	-0.74619	-2.939944013		-3.205729633
FY 2004	2.307210133	1.11	0.362	0.26578562		0.15368112
FY 2003	1.609467938	1.28	0.126259	0.1121045		0.014264914
FY 2002	2.398576738	2.03	0.10845	0.097839586		1.354899722
FY 2001	2.776624752	4.88	-0.55695	-1.257060136		0.204855115
FY 2000	3.573939209	6.29	-0.59381	-1.46191525		-1.071298692
FY 1999	3.68422649	5	-0.28089	-0.390616558		-0.017041173
FY 1998	4.275269308	5.71	-0.27197	-0.373575385		-0.025743957
FY 1997	4.381269475	5.77	-0.25807	-0.347831428		0.037176472
FY 1996	4.062667301	5.47	-0.27798	-0.3850079		0.368332672
FY 1995	4.071135264	6.25	-0.42966	-0.753340573		-0.695176054
FY 1994	3.682609293	3.94	-0.05497	-0.058164518		-0.154389315
FY 1993	3.756414686	3.25	0.10647	0.096224797		0.045927505
FY 1992	4.670305571	4.37	0.052961	0.050297292		-0.121615457
FY 1991	8.313504102	6.38	0.207602	0.171912749		0.171912749

The table above shows the marginal default rate for the corresponding years. The probability of default decreases when the reserve increases.

OPTIMUM RESERVE(R)

Optimum reserve is that portion of a nation's wealth that is kept apart as reserve for future uses. The optimum reserve is measured on the assumption that there is an existence of perfect market capital in the economy. It can be calculated as

$$R = \frac{(1 - \pi)r}{r} + C_o$$

where , r= is the opportunity cost

C_o- is the cost of default

πr- is the marginal default probability R is the optimum reserve

Opportunity cost, r is the 91-day T-bill rate and marginal probability of default is the difference between current year probability and previous year probability. The cost of default is 8.59 which is the output contraction on GDP during the financial crisis 2008 and 9.11 which is the highest during the period.

TABLE NO 5
OPTIMUM RESERVE

Year	Default rate	Marginal default rate	r	opportunity cost	OPTIMUM RESERVE	OPTIMUM RESERVE
FY 2016	0.1521608	-0.1301052	0.0859	0.072743153	-5.335699432	5.335699432
FY 2015	0.2822266	-0.0083767	0.0859	0.083475098	-84.65314047	84.65314047
FY 2014	0.2906427	-0.027104845	0.0859	0.08857689	-25.2010879	25.2010879
FY 2013	0.31774755	0.066561581	0.0859	0.081435285	11.304769	11.304769
FY 2012	0.25118596	-0.031231674	0.0859	0.084379701	-22.95809203	22.95809203
FY 2011	0.28241764	-0.015990608	0.0859	0.058466043	-43.4060108	43.4060108
FY 2010	0.29840825	0.231464077	0.0859	0.034004388	5.557248882	5.557248882
FY 2009	0.06694417	0.563320463	0.0859	0.0688615	2.903781404	2.903781404
FY 2008	-0.4963763	-5.138782904	0.0859	0.068672083	0.959679457	0.959679457
FY 2007	4.64240661	11.54390174	0.0859	0.065386417	0.99820204	0.99820204
FY 2006	-6.9014951	-3.961551115	0.0859	0.056505417	-0.474337558	0.474337558
FY 2005	-2.939944	-3.205729633	0.0859	0.047948364	0.562478655	0.562478655
FY 2004	0.26578562	0.15368112	0.0859	0.045182167	6.678710997	6.678710997
FY 2003	0.1121045	0.014264914	0.0859	0.05723525	63.74413604	63.74413604
FY 2002	0.09783959	1.354899722	0.0859	0.067933182	1.930328116	1.930328116
FY 2001	-1.2570601	0.204855115	0.0859	0.091642833	11.955171	11.955171
FY 2000	-1.4619153	-1.071298692	0.0859	0.089116417	-1.334158443	1.334158443
FY 1999	-0.3906166	-0.017041173	0.0859	0.088411667	-80.63174237	80.63174237
FY 1998	-0.3735754	-0.025743957	0.0859	0.0744955	-52.20216563	52.20216563
FY 1997	-0.3478314	0.037176472	0.0859	0.093518	37.17349784	37.17349784
FY 1996	-0.3850079	0.368332672	0.0859	0.2775	4.06975874	4.06975874
FY 1995	-0.7533406	-0.695176054	0.0859	0.244	-2.17010411	2.17010411
FY 1994	-0.0581645	-0.154389315	0.0859	0.2613	-6.525130546	6.525130546
FY 1993	0.0962248	0.045927505	0.0859	0.2546	20.01569173	20.01569173
FY 1992	0.05029729	-0.121615457	0.0859	0.2362	-7.44538765	7.44538765
FY 1991	0.17191275	0.171912749	0.0859	0.244	5.168953418	5.168953418

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In the above table the values obtained for optimum reserves are converted to absolute values. After getting the R value, GDP at market or current price is taken and 8.59% and 9.11% of actual GDP (market price) is deducted from the actual GDP. The values obtained are then multiplied with R. The result obtained is the optimum reserve at 8.59% and 9.11%.

TABLE NO.6

OPTIMUM, ACTUAL AND ADEQUATE RESERVE

Year	Adequate Reserve	Optimum reserve at 8.59%	Optimum reserve at 9.11%	Actual Reserve
2015-16	7470.89424	6713.220405	6675.031207	23787.4
2014-15	8211.25974	96478.85904	95930.02404	21376.4
2013-14	8146.3017	25877.89363	25730.6832	18283.8
2012-13	8007.48585	10275.83423	10217.37854	15884.2
2011-12	7036.38972	18334.05238	18229.75627	15061.3
2010-11	5050.40085	30885.37128	30709.67505	13610.13
2009-10	4091.20662	3290.659161	3271.939735	12596.65
2008-09	4123.30665	1494.413848	1485.912642	12838.65
2007-08	3036.9351	437.488975	435.000251	12379.65
2006-07	2521.51893	391.873234	389.6440022	8682.22
2005-06	1981.2267	160.141511	159.2305211	6763.87
2004-05	1503.19362	166.7019815	165.7536714	6191.16
2003-04	1077.32295	1734.740344	1724.872004	4901.29
2002-03	891.61761	14778.80072	14694.72922	3614.7
2001-02	735.59913	415.6918965	413.3271685	2640.36
2000-01	684.91992	2379.525223	2365.988924	1972.04
1999-00	646.58559	246.7316755	245.328104	1659.13
1998-99	534.996	13291.88334	13216.27039	1380.05
1997-98	462.528	7503.149626	7460.466793	1159.05
1996-97	416.76	4822.745026	4795.310091	949.32
1995-96	368.034	456.3621206	453.7660337	743.84
1994-95	269.913	207.4128692	206.2329689	797.8
1993-94	219.303	531.6595493	528.6351213	604.2
1992-93	190.125	1417.134161	1409.072573	307.44
1991-92	143.553	458.6277917	456.0188162	238.5
1990-91	129.594	276.9816715	275.4060182	114.16

The above table shows the optimum reserve at 8.59% and 9.11% and the actual as well as adequate reserve for the past 25 years. It can be seen that there are significant differences in the

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level of actual, adequate and optimum reserves of India.

FINDINGS

The optimum level of reserve has been calculated for the past 25 years. For estimating the optimum reserve, the cost of default and the marginal probability of default are calculated by using H-P filter model and the ARCH model and ARDL cointegration respectively. The values determined from the models have been applied to obtain the optimum reserve. From the analysis and interpretation of the data it is clear that the Indian banks and financial institutions largely escaped the heat of the global contagion because of the strong fundamentals and no direct exposure to the troubled assets and stressed institutions in the advanced countries. The Reserve Bank's swift and necessary responses ensured orderly functioning of the markets.

CONCLUSION

Optimum level of reserve is a pre-cautionary or self-insurance against a sudden stop in the capital inflows and a sudden loss of access to the international capital market. This study aims at estimating the optimum reserve by incorporating the sovereign risk associated with it. The optimum reserve of India for the period 1991-2016 has been estimated using the various econometric models. ARCH method was used to find the volatility of FII and the ARDL cointegration was used to find the risk premium. H-P filter method was used to find the cost of default by incorporating the GDP growth at constant and current prices. The probability of default was obtained by taking the risky interest rate and the risk-free rate. The risky interest rate is the average of the interest rate offered to NRI deposits and the interest rate paid on external commercial borrowings. The 3-month LIBOR rate was proxied for risk-free rate. After applying all the variables, optimum reserve was estimated at two ranges i.e., at 8.59% and 9.11%. It is found that the actual reserve is much higher than the optimum level of reserve which indicates that the country is less exposed to contagious effect of the crisis. A high of reserves helps to lower the costs of external borrowing and improves credit ratings on

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sovereign foreign currency debt. But these benefits come at a cost. Reserves are mainly invested in US treasuries which yield a low rate of return which is lower than the country's cost of borrowing either in local or foreign currencies. These reserves should be invested in productive sectors and infrastructure which yields a better return for the emerging economies. It is also observed that the cost of holding is small compared to the economic contraction of a financial crisis. The real challenge for the central banks of emerging economies is to maintain reserves at the level at which the benefits are at least equal to the cost of holdings. The Indian financial sector was resilient to the global financial crisis, thus reflecting the soundness of the Reserve Bank's regulatory and supervisory policies. The present study concludes that the international reserves in India are higher than the estimated optimum level of reserves, even after considering the sovereign risk associated with the financial crisis. It also suggests that prudent reserve.

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