

**FINANCIAL SECTOR LIBERALIZATION AND HOUSEHOLD SAVINGS IN
INDIA**

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ABSTRACT

This paper examines the impact of financial sector liberalization measures on household sector saving rate in India by constructing a continuous time series financial sector liberalization index. The impact of the index, along with the other determinants of household sector savings in India are estimated using a general model. The results suggest a significant negative impact of the index on household saving rate, which gives an indication of the increased credit availability due to financial sector liberalization leading to increased consumption rather than savings. Among the other determinants, absolute income is the major significant and positive determinant of household sector saving rate in India in the period of study.

1.INTRODUCTION

The development strategies of many developing countries, including India, in the mid twentieth century were framed such that all allocation decisions were to be made by government or its agencies. The state dominated development paradigm has shifted sharply towards a more market-determined strategy of development in the recent years due to the relatively low growth rate of incomes, industrial output and recurring balance of payments crises in the state dominated paradigm and also influenced by the astonishing success of Japan and East Asian countries in accelerating growth through the market-determined strategy of development. The change in development paradigm has also led to a change in the perception of the role of financial system in development. The financial liberalization literature developed in the 1970s and the 1980s stressed the costs of 'financial repression', particularly interest rate and exchange rate controls which restricted the growth of financial intermediaries and the real rate of economic growth. These findings were buttressed by the emergence of endogenous growth literature, which emphasized the importance of financial market development as a source of realizing higher economic growth by increasing the productivity of capital or lowering of intermediation costs or by enhancing saving rate. Since saving is viewed as one of the basic channels through which financial sector

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Grateful thanks are to my supervisors Dr: N. Shanta, Dr: N. Vijaya Mohanan Pillai and Dr: K. Pushpangadan for their useful comments and suggestions. However, the usual disclaimers apply.

liberalization spurs growth, understanding the links between financial sector liberalization and savings will provide some insight into long run economic growth. Although financial liberalization can enhance the efficiency with which saved resources are channeled into productive use, the suspicion that it may have contributed to sharp decline in the saving ratios in many industrial as well as non take-off developing countries have brought financial sector policies into the forefront of discussion of saving.

The financial system in India, evolving from a constricted and an undersized one to a more, open, deregulated and market oriented one had undergone a number of policy changes. In 1991, Indian government initiated a comprehensive market-oriented program, at the core of which was a phased deregulation of financial sector, along with reforms of trade and industrial policies. The broad indicators of financial development showed an upward trend in the 1990s, after the implementation of the financial sector liberalization programs. However there is no clear empirical evidence on the impact of financial sector liberalization measures on household sector savings. In India, most of the studies (Muhleisen, 1997; Loayza and Shankar, 1998; Athukorala and Sen, 2001, 2003) have taken proxy variables like bank branch expansion and total institutional lending to the private sector to represent financial sector liberalization in order to examine their impact on private savings. These studies are subject to the problems of sectoral consolidation and omitted variable bias. Hence the conclusions may be misleading.

This paper examines the impact of financial sector liberalization measures on household sector savings¹ in India, using a general model, which includes other determinants of household sector savings identified in the literature also, for the period 1970-71² to 1999-2000. A continuous time series policy index that captures both the deregulatory and institution building components of the financial sector reform process in India is constructed following the methodology adapted by Bandiera, Caprio and Schiandarelli (2000) to examine the links between financial sector liberalization and household savings. Further some sub indices are also constructed. To cross check the results, certain proxy variables for financial sector liberalization process are also used instead of the liberalization index.

This paper is organized as follows. Section 2 reviews the theoretical and empirical literature on financial sector liberalization and household savings, section 3 explains the major financial sector policy changes and the method of construction of financial sector liberalization index, section 4 describes the estimation procedure and results, and section 5 concludes.

2. REVIEW OF LITERATURE

2.1. Theoretical Review

Financial sector liberalization can be viewed as a set of operational reforms and policy measures designed to deregulate and transform the financial system and its structure with the view to achieving a liberalized market-oriented system within an appropriate regulatory framework (Johnston and Sundararajan, 1999). The original theoretical analysis which provided a rationale for financial sector liberalization as a means to promote financial development and hence growth was that given by Mc Kinnon (1973) and Shaw (1973). The new growth models (Romer, 1986; Lucas,

1988;Barro, 1990;Rebelo, 1991;Japelli and Pagano, 1994) trace the steady state growth rate in terms of three parameters, viz., the level of technology captured by social marginal productivity of capital, the proportion of savings channeled into investment and the saving rate. Financial sector liberalization can affect economic growth through either one of these three channels. Hence to examine the impact of financial sector liberalization on long run economic growth, it is necessary to study the links between financial sector liberalization and saving.

The models of McKinnon(1973) and Shaw(1973) focus specifically on financial repression in the form of ceilings on deposit and/or loan interest rates. However, more than a change in interest rate, financial liberalization consists of a much more ambitious set of reforms. Reform measures are introduced in a number of different dimensions; privatization of public financial institutions, removal of restrictions to entry into banking, measures aimed at spurring competition in financial markets, reduction of legal reserve requirements, elimination of directed lending, prudential regulation measures, measures aimed at securities markets development and openness of capital account etc along with interest rate liberalization (Bandiera, Caprio, Honohan and Schiantarelli, 1998). For analyzing the links between financial sector liberalization and saving, all these dimensions have to be captured.

Bayoumi (1993), using an overlapping generation model analyzes the impact of financial liberalization on household savings in the lifecycle framework. Prior to financial liberalization, the young are unable to finance their desired level of consumption in the face of borrowing constraints while they are able to use capital markets to smooth consumption over their middle to old age. Since consumption was lower than desired in the young age, normally the consumption will be higher in their middle and old age. Financial liberalization increases the competition between providers of financial intermediation and it reduces liquidity constraints of consumers. This has a temporary and a permanent effect. The initial temporary effect is the increase in aggregate consumption by the young consumers, which will wane over time. However, the consumption of old consumers is not immediately affected as they are still affected by their inability to borrow when they were young. The permanent effect of financial liberalization is that as young consumers are no longer credit constrained, they will smooth their consumption. As a result, the saving of a young consumer becomes sensitive to wealth, real income and other demographic and macroeconomic factors.

Financial liberalization has theoretically both long-term and short-term effects on saving. Long term effects include improved saving opportunities including higher deposit interest rates, a wider range of savings media with improved risk-return characteristics, more banks and other financial intermediaries and reduction in liquidity constraints. On the one hand, use of financial instruments offers the household sector wide and indirect access to the yield on the investment opportunities available in the economy (Mc Kinnon and Shaw, 1973; Romer, 1986; Lucas, 1988; Barro, 1991;Japelli and Pagano, 1994). On the other hand, reliable access to borrowed funds through the financial system can lower the saving rate as it may result in consumption rather than savings (Japelli and Pagano, 1994) or reduce the level of precautionary saving also, turning some households into dissavers (Townsend, 1994; Honohan, 1999).

First, though financial liberalization leads to an increase in the real interest rates paid to households, its effect on saving is ambiguous due to the presence of offsetting income and substitution effects³. Second, financial institutions, by pooling a large number of independent default risks can reduce the risk per unit of money deployed. However, the theoretical effects of a change in risk on the saving rate are also ambiguous⁴. Whether savings increases or decreases with change in risk depends critically on the coefficient of relative risk aversion and empirical studies (Litzenberger and Ronn, 1986; Alonso, Rubio and Tusell, 1990) give a wide range of estimates for this coefficient. Third, increased financial intermediation as a result of financial sector liberalization will reduce transaction costs between savers and investors and help to channelize savings into more productive areas. However, financial sector liberalization will not rescue all low income households in developing countries from liquidity constraints and such households will also tend to rely more on nonfinancial mechanisms such as coinsurance through village or extended family networks, for precautionary saving (Townsend, 1990; Honohan, 1999). Fourth, if financial liberalization has a favorable effect on the allocation of resources, this will generate increase in income that will in turn increase saving (Bandiera, Caprio, Honohan and Schiantarelli, 1998).

There are short-term effects of financial liberalization in addition to the long-term effects on saving. These include capital inflows due to financial liberalization, which in turn if not sterilized will lead to a credit boom, leading to real income surges, and this has a transitory effect on the volume of saving. Financial liberalization has been accompanied by real estate booms in some countries; the resulting increase in real wealth may have a temporarily negative impact on saving (Bandiera, Caprio, Honohan, Schiantarelli, 1998).

The above review shows that the overall effect of financial sector liberalization on savings is theoretically ambiguous.

2.2. Empirical Review

Fry (1988), obtained the effects of real interest rates on national saving as significant and positive using a pooled cross-section time series sample of fourteen Asian developing countries over the period 1961-83 whereas Giovannini (1985), Schmidt-Hebbel et al (1992) have failed to detect a statistically significant positive real interest rate effects. Warman and Thirlwall (1992), using data from Mexico for 1960-1990 obtained a strong positive effect of interest rate on financial savings whereas its effect on total savings and private savings is insignificant. Masson, Bayoumi and Samiei (1998) have obtained a positive and significant effect of real interest rate on private savings in industrial countries and a negative insignificant coefficient for developing countries whereas Loayza, Schmidt-Hebbel and Serven (2000) got insignificant and negative coefficients for real interest rate changes on private savings and the results were not robust across samples also. In general, it can be concluded that the impact of real interest rates on savings is ambiguous in the theoretical as well as empirical literature.

A review of the empirical studies show that most of them have focussed on only the channel of interest rates and have ignored the other aspects of financial sector liberalization in order to analyze their impact on saving. In some studies, a very simple method of representing financial liberalization is to identify pre and post liberalisation

periods with a dummy variable (de Melo and Tybout, 1986) or to specify a linear trend reflecting gradual liberalization (Muellbaur and Murphy, 1993 for U.K). Some studies have employed proxy variables like the volume of consumer credit (Japelli and Pagano, 1994; Ostry and Levy, 1995) and financial depth measured by the ratio of money supply to Gross Domestic Product (Vaidyanathan, 1993) to represent financial sector reforms. The first group of studies obtained a negative relation between the volume of consumer credit and national savings whereas the second group obtained a positive association between financial depth and national savings. Some other studies (Levine and Zervos, 1996; Bonser-Neal and Dewenter, 1996) using stock market development indicators like market capitalization ratio, total value traded ratio and turn over ratio⁵ as proxies for financial sector development found some evidence for financial reforms stimulating savings in the emerging markets. However, as pointed out by the authors themselves, due to limited sample size and due to the inclusion of some outlier countries in the sample which can seriously bias the results, their conclusion remains tentative. In India, most of the studies (Muhleisen, 1997; Loayza and Shankar, 1998; Athukorala and Sen, 2001, 2003) have taken proxy variables like bank branch expansion and total institutional lending to the private sector to represent financial sector liberalization in order to examine their impact on private savings and obtained insignificant impact of these variables.

All the econometric studies mentioned above are subject to two major common problems namely sectoral consolidation and omitted variable bias. First, these studies have used aggregate measures of saving ranging from national to private saving rate. This consolidation becomes particularly problematic when the impact of financial sector reforms on saving is examined. The reason is that, this extreme consolidation hypothesis implicitly assumes a considerable degree of financial market efficiency, as the household is assumed to be able and capital markets are considered to be perfect (Honohan, 1998). These conditions prevail only in a few developing countries (Corbo and Schmidt-Hebbel, 1991). Hence implicitly assuming a certain amount of financial market efficiency, the impact of financial sector reforms on saving is examined in the above mentioned studies. Consequently, the results are likely to be misleading (Honohan, 1998).

Another problem is that the results in the above mentioned studies may suffer from omitted variable bias. Since one or two proxy variables are used to represent reforms in these studies, the omission of other variables of significance may bias the estimated coefficients of the included variables and hence they are not reliable for policy analysis. Instead, the measures of financial liberalization should have been added together to get a continuous financial liberalization index to avoid biasing the estimated coefficients (Gibson and Tsakalotos, 1994; Bandiera, Caprio, Honohan and Schiantarelli, 1998). Bandiera, Caprio, Honohan and Schiantarelli (1998), constructed continuous time series financial liberalisation index which included both deregulatory and the institution building components of the reform process, for a few developing countries. They have used principal component analysis to reduce the dimensionality of the matrix, which indicates the reforms. They concluded that the impact of financial liberalization on saving differs across countries. Hence country specific studies are demanded in this regard.

The next section describes the major financial sector policy changes in India in the period of study.

3.MAJOR FINANCIAL SECTOR POLICY CHANGES IN INDIA

The Indian financial system has undergone a remarkable transformation over the last four decades and now comprises an impressive network of financial institutions, financial markets and a wide range of financial instruments. The financial development in India can be divided into three phases: First two decades of 1950s and 1960s representing a foundation phase, a decade and a half after 1969 marked by rapid expansion and the period since the middle 1980s characterised by consolidation, diversification and liberalization. The foundation phase is characterized by the extensive powers for supervision and control of banks vested in RBI, particularly under the Banking Companies Act, 1949. The policies of financial repression began in India with the bank nationalization episode of 1969 in the second phase. As a result of financial repression policies, the markets were heavily segmented and the underdeveloped nature of secondary markets inhibited competitive pricing of assets (Rangarajan 1994); credit was inefficiently used by non-price allocation mechanism; bank profitability was negatively affected due to the restrictions on banks' use of funds and the imposition of branch licensing requirements; the restrictions on bank entry and the dominance of public sector banks greatly inhibited competition and efficiency in the banking sector (Sen and Vaidya, 1996). It was in response to these developments that in middle 1980s the system entered its latest phase of consolidation, diversification and liberalization.

The impetus to financial sector reforms came with the submission of three influential reports by the Chakravarty Committee in 1985, the Vaghul Committee in 1987 and Narasimham Committee in 1991. The first committee suggested ways of activating the treasury bills market so that open market operations could gradually become the dominant instrument of monetary policy. The second committee recommended a phased decontrol and development of money markets and the gradual integration of these markets with other key short-term markets such as the treasury bills market. The recommendations of Narasimham Committee provided the blueprint of the reforms that followed in the post 1991 period, especially with regard to banks and other financial institutions.

In 1991, Indian government initiated a comprehensive market oriented reform programme at the core of which was a phased deregulation of financial sector along with reforms of trade and industrial policies. Tables 1,2 and 3 give the trends in the major financial sector development indicators in India from 1970-71 to 1999-2000. The finance ratio, which is the ratio of total financial claims to national income, exhibited a steady increase over 1970-71 to 1999-2000 from 0.16 to 0.5. The financial inter-relations ratio, i.e., the ratio between total issues to net domestic capital formation, reflects the relation between financial asset and real asset structure has averaged around 2.4 since 1990-91 though it has exhibited year to year fluctuation. The new issue ratio, the ratio of primary issues to net domestic capital formation, which was at a high of 1.618 in 1991-92 declined to 1.161 in 1994-95, before increasing to 1.328 in 1995-96. A downward movement in the ratio (from 1992-93 to 1995-96) would reflect the continued role of financial intermediation in capital formation because this ratio is indicative of the extent of dependence of the non-

financial sector on its own funds in financing the capital formation. The intermediation ratio, the ratio between the financial instruments issued by the financial institutions and the financial instruments issued by non-financial units, touched a high of 0.913 in 1994-95, but declined to 0.702 in 1995-96. This ratio also reflects the importance of banks and other financial institutions in financing activities. The number of bank offices in India expanded nearly from 8262 in June 1969 to 67339 in March 2000. Per capita deposit expanded from a mere Rs.88 in 1969 to Rs 8247 in 1999-2000, per capita credit over the same period expanded from Rs 68 to Rs.4705; the increase in both these indicators was more pronounced since the latter half of the 1980s stock market development indicators provide another evidence for the extent of financial development in India. Table 3 discusses the trends in the major stock market development indicators in India, as reported by Bombay Stock Exchange. The market capitalization ratio in Indian Stock markets, which is an indicator of market size, remained at a level of only 4 percent up to the early 1980s, though Indian stock markets were found a century ago. However, it increased tremendously to 46.8 percent at the end of March 2000. Turnover ratio in Indian stock markets, which is an indicator of liquidity, has increased from a low of 6.7 percent at the beginning of the nineties reached 35.1 percent at the end of March 2000.

Table 1:
Flow of funds based indicators of financial development in India

Period	Finance Ratio	Financial Inter Relations ratio	New Issue Ratio	Intermediation Ratio
1970-71 to 74-75	0.168	1.379	0.788	0.770
1975-76 to 79-80	0.274	1.818	1.042	0.743
1980-81 to 84-85	0.344	2.421	1.429	0.690
1985-86 to 89-90	0.400	2.402	1.401	0.721
1990-91	0.401	1.745	1.005	0.736
1991-92	0.497	2.922	1.618	0.806
1992-93	0.384	2.183	1.186	0.84
1993-94	0.473	2.825	1.489	0.898
1994-95	0.524	2.433	1.161	0.913
1995-96	0.493	2.260	1.328	0.702

Source: Flow of funds accounts of the Indian Economy, RBI, 2000.

Table 2
Progress of commercial banking in India

Indicators	June 1969	June 1975	June 1980	June 1985	March 1990	March 1995	March 2000
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Number of bank offices	826 2	1873 0	3241 9	5138 5	5975 2	6236 7	6733 9
Population per Office (thousands)	64	32	21	15	14	15	15
Per capita deposits (Rupees)	88	208	494	1026	2098	4242	8247
Per capita credit (Rupees)	68	148	327	678	1275	2320	4705

Source: RBI, 1999- 2000 PIII-6.

Table 3
Stock Market Development Indicators in India
(Percentage of GDP at Current Market Prices)

As at end of	Market Capitalization Ratio	Turnover Ratio
December 1970	3.8	0.0
December 1975	2.6	0.0
December 1980	3.8	1.5
December 1985	7.4	2.2
March 1990	13.4	6.0
March 1991	16.0	6.3
March 1992	49.5	11.0
March 1993	28.2	6.1
March 1994	42.8	9.8
March 1995	43.1	6.7
March 1996	44.5	4.2
March 1997	34.1	9.1
March 1998	37.0	13.7
March 1999	30.9	17.7
March 2000	46.8	35.1

Source: RBI, 1999-2000, P III-13.

Thus the broad indicators of financial development showed an upward trend in the 1990s, after the implementation of the financial sector liberalization programs.

In India, Gross Domestic Saving (GDS) rate is seen to show a stagnating trend in the 1990s, in spite of the financial sector liberalization measures, which is disturbing (EPWRF, 2003). Since the bulk of the GDS rate comes from the household sector saving rate, it may be considered as the major contributor to this stagnating trend (Table 4)

Table 4
Exponential Growth Rates of HSR in
India from 1970-71 to 1999-2000

Period	Growth Rate (percentage)	t probability
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Overall	2.8*	0.00
1970s	4.4**	0.00
1980s	3.8**	0.00
1990s	0.2	0.74

DW=1.82 and $R^2 = 0.89$ for the equation fitted to estimate the total growth rate, and that to estimate the decade wise growth rates, DW=2.04 and $R^2 = 0.93$.

(ii) ** Means significant at 1percent level.

Source: Calculations based on RBI,2000

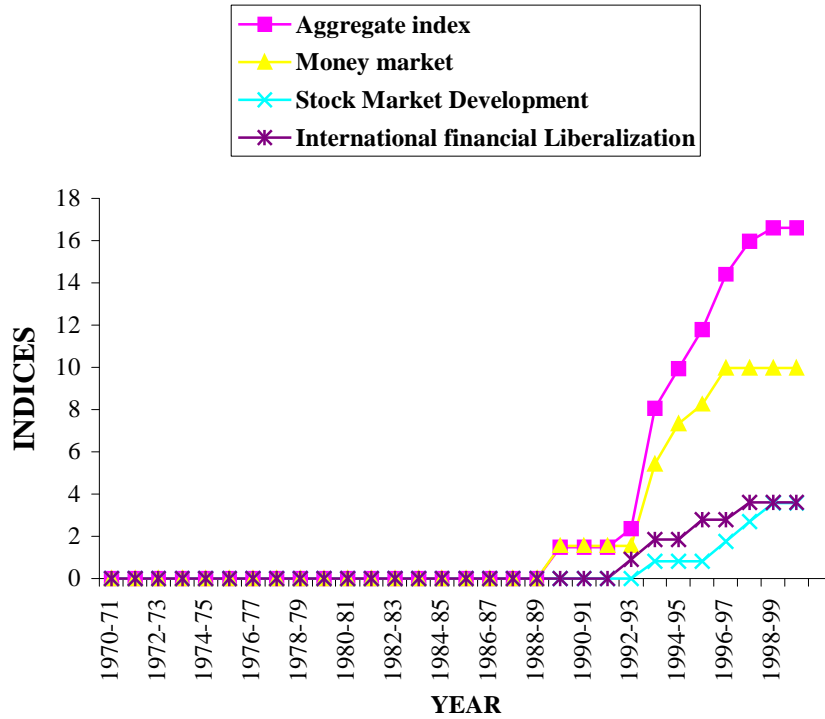
To examine the effect of financial sector liberalization measures on household sector savings in India, the measures of financial sector liberalization is added together in our study to get a continuous financial liberalization index following the methodology of Bandiera et al (2000).

3.2. Financial Sector Liberalization Index

Following the methodology of Bandiera et al. (2000), six different aspects of the financial sector reform process, which can affect household sector saving in India, are used to construct an aggregate financial sector liberalization policy index in our model. These six aspects are interest rate liberalization, reduction in reserve requirements, prudential regulation measures, pro competition measures, securities market development and international financial liberalization using principal component analysis. The links between these variables and household sector savings are explained in appendix 1. The data for these variables in India are collected and compiled from various issues of Economic Survey. The resultant one obtained is a matrix of 19 dummies and its dimensionality is reduced by principal component analysis. The aggregate index is constructed using the first principal component.

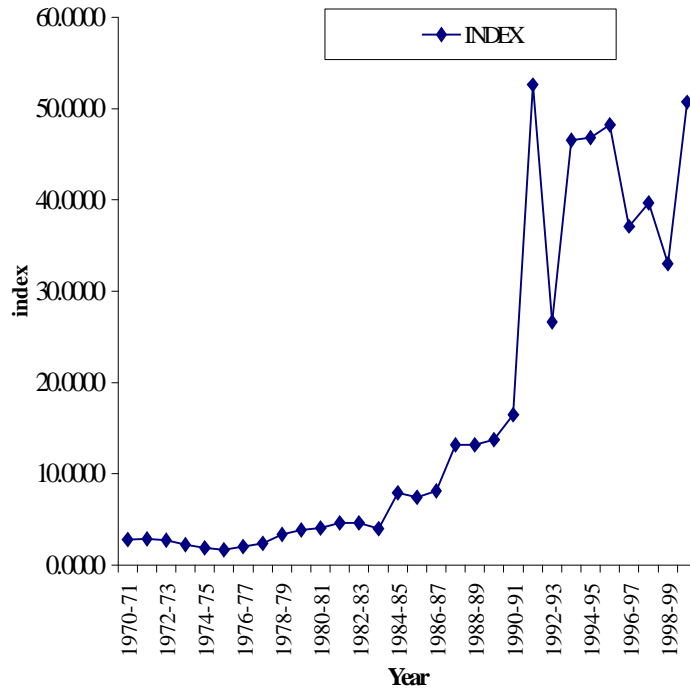
In addition to this aggregate one, some sub indices like money market liberalization index, securities market development index and international financial liberalization index are also constructed using the same methodology. Further, certain proxy variables for financial liberalization process like total advances to household sector by banks and other financial institutions, market capitalization and net foreign investment have been used instead of FLI.

Figure 1: Financial liberalization indices for India



Instead of this index, some proxy variables like total credit to household sector by banks and other financial institutions, foreign investment, market capitalization ratio and real effective exchange rate are used to represent financial sector liberalization and are added together to construct an aggregate financial sector development index (figure2).

Figure2: Aggregate Financial Sector Development Index for India



The next section describes the estimation procedure, results and their interpretations.

4. ESTIMATION PROCEDURE AND RESULTS

4.1. Model Estimation

The general model used in our study is $H S R_t = a + b X_t + \xi_t$, where $H S R_t$ is household saving rate, a is the constant term, X_t is the set of potential explanatory variables that can affect household saving rate, b is the coefficient vector of the set of explanatory variables and ξ_t is the error term while the subscript t denotes the time period.

The major variables that may affect household saving rate as identified in the literature like real percapita gross personal disposable income, its growth rate (proxy for long run income), real deposit rate, inflation, young and old dependency ratios in addition to the financial liberalization index constructed are considered here. On the basis of Granger non-causality tests (Granger, 1969), the explanatory variables to be included in the final model are decided. Further, there may be reverse causality from household sector saving rate to each of the explanatory variables also, which may affect the results considerably. This is also examined using the above tests. Here the null hypothesis is that there is no causality from one variable to another variable.

In table 5, both the causality from explanatory variables to dependent as well as that from dependent variable to explanatory to is tested. The result shows that in the first case the null hypothesis of Granger non-causality is rejected, whereas in the second case it is not rejected at the conventional significance levels of 1 and 5 per cent. However, in the case of GY, the null hypothesis is not rejected in the first case, and rejected in the second case. Hence there is no reverse causality from the dependent variable to the explanatory variables whereas there is causality from all the explanatory variables to the dependent variable, except in the case of GY. Hence the

variable GY is excluded from our analysis on the basis of table5. However, the results of Granger non-causality tests are sensitive to the number of lags used. The optimum number of lags used in the above analysis is selected on the basis of Akaike Information Criteria (see Appendix 4).

Table5: Results of Granger Non causality Tests

Non causality from explanatory variables to HSR			Non causality from HSR to Explanatory variables		
Variables	Optimum Lags	F Probability Value	Variables	Optimum Lags	F Probability Value
LY	3	0.009**	LY	3	0.84
GY	5	0.6815	GY	1	0.02*
LRID	1	0.05*	LRID	1	0.3
LINF	1	0.05*	LINF	1	0.8
YDR	6	0.0194**	YDR	6	0.13
ODR	1	0.0280**	ODR	1	0.24
FLI	1	0.024**	FLI	1	0.06

Note (i): HSR = Household Saving Rate; LY = Natural Logarithm of real Percapita Personal Disposable Income; GY= Growth rate of real percapita personal disposable income; RID = Real Deposit Rate; INF = Inflation Rate; YDR = Young Dependency Ratio; ODR = Old Dependency Ratio; PSR = Public Saving Rate; FLI = Financial Liberalization Index. All the variables except LY are expressed as fraction.

(ii)* and ** denotes significance at 5 per cent and 1 per cent levels respectively

Prior to the estimation procedure, we first examine the time series properties of the annual data. The stationarity problem⁵ of all the variables is examined by testing for unit roots using the standard Augmented Dickey Fuller (ADF) test statistic. The methodology is explained in detail in Appendix 4. Table 6 indicates that all the variables except inflation rate are non-stationary and integrated of order 1.

Results from regressions with non-stationary variables can sometimes be spurious⁶ and hence very much misleading (Granger and New bold, 1974;Plosser and Schwert, 1978). The usual procedure adopted to solve the above problem is to take the first differences of these level variables in order to make them stationary and then use them in the regression model. However, a major problem in using the differenced variables instead of the original ones (i.e., at level) is that it can lead to serious loss of long-run information. Most of the economic relationships are given in theory as long term relationships between variables in levels and not in their differences. Hence it is essential that the long-run information on the variables has to be utilized. At the same time, the possibility for spurious regression of non-stationary variables has also to be avoided. Both the problems can be solved simultaneously by checking for possible cointegration⁷ between the variables. Since our general model contains a number of variables, we carry out our co integration test in the framework of an unconstrained Vector Auto Regression (VAR) model. The test procedure is that of Johansen and Juselius (1990) co-integration tests.

Table 6: Results of unit root tests

Variable	Level				First Difference			
	With constant	With constant and trend	Without constant and trend	Inference	With constant	With constant and trend	Without constant	Inference
HSR	-0.95(0)	-3.17(5)	0.97(0)	I(1)	-4.62(0)**	-4.52(0)**	-4.66(0)**	I(0)
LY	2.92(5)	-0.78(5)	4.55(1)	I(1)	-6.03(0)**	-4.52(5)**	-3.6(0)**	I(0)
RID	-2.99(3)	-3.42(4)	0.93(6)	I(1)	-5.14(5)**	-5.32(5)**	-5.01(5)	I(0)
INF	-4.93(0)**	-3.84(3)**	-0.21(6)	I(0)	-5.1(0)**	-4.2(3)**	-2.20(6)*	I(0)
YDR	-0.87(5)	-1.56(5)	-1.61(0)	I(1)	-3.04(3)	-3.76(1)*	-4.57(0)**	I(0)
ODR	-0.94(5)	-1.71(5)	-0.15(0)	I(1)	-3.18(1)*	-4.75(0)**	-4.69(0)**	I(0)
FLI	-2.82(6)	-1.27(5)	-0.56(3)	I(1)	-4.08(8)**	-3.66(8)*	-4.33(8)**	I(0)

Note (i): The abbreviations are the same as in table 5

(ii): * and ** denotes significance at 5 per cent and 1 per cent levels respectively.

(iii): Figures in brackets denote the optimum number of lags used in the tests.

Johansen (1988) and Johansen and Juselius (1990) suggest two likelihood ratio tests for examining the co-integration relationships when there are more than two variables. One is the trace test, which tests the null hypothesis that there are at most r ($0 \leq r \leq n$, where n is the number of variables) co-integrating vectors. The second is the maximum Eigen value test, which tests the null hypothesis that there is r co-integrating vectors against the alternative of $r+1$ co-integrating vectors. In both the cases, if the statistic is greater than critical value, the null hypothesis is rejected. Thus the first row tests $H_0: r = 0$ against $H_1: r = 1$, if this H_0 is rejected only, then the next row is considered and so on. Reimers (1992) argues that these test statistics be corrected for the number of estimated parameters to obtain satisfactory size properties in small samples. The correction is by replacing T by $T-np$ in the test statistic, where T is the number of observations, n is the number of variables and p is the lag length of the VAR. Our interpretation of the results below is based on the test statistics with small sample correction.

Table 7: Co integration Test Results with Small Sample Correction

(a) Variables: HSR, LY, RID, INF, YDR, ODR and FLI.

Null Hypothesis	Maximum Eigenvalue test			Trace test		
	Alternative	Statistic	95 per cent Critical Value	Alternative	Statistic	95 per cent Critical Value
$r = 0$	$R = 1$	155.3*	57.1	$r \geq 1$	263.4*	192.9
$r \leq 1$	$R = 2$	36.47	51.4	$r \geq 2$	108.1	156

Note: (1) ** Denote statistical significance at 1- per cent level.

(2) The abbreviations for the variables are the same as in Table 5

Table 7 gives the results of the JJ co integration tests after small sample correction obtained using the package Pc Fiml 9.0 version, when aggregate financial liberalization index is used as an explanatory variable along with the other ones. It shows that both the tests suggest the rejection of null hypothesis of no co-integrating vector and the presence of one co-integrating vector.

Table 8. (a): Modeling Household Saving Rate by Ordinary Least Squares

Variable	Coefficient	t- value	t- probability	Partial R ²
Constant	-1.65**	-3.23	0.004	0.332
LY	0.22**	4.18	0.0008	0.408
RID	-0.58	-1.74	0.10	0.16
INF	-0.54	-1.58	0.13	0.13
YDR	-0.19	-1.72	0.099	0.12
ODR	0.48**	3.09	0.005	0.30
FLI	-0.003**	-2.5	0.02	0.224
(2) Results Using Sub indices Instead of Aggregate Index				
MMLI	-0.0007	-0.19	0.85	0.002
SMDI	-0.0077	0.99	0.34	0.05
IFLI	-0.015	-1.3	0.214	0.076
(3) Results Using Outcome Variables Of Liberalization Process Instead of FLI				
CR/GDP	-0.019	2.50	0.11	0.25
MC/GDP	-0.014	-0.42	0.68	0.01
FI/GDP	-0.35	-0.721	0.480	0.027
REER	-0.06	-1.57	0.134	0.1204
(4) Results Using Financial Sector Development Index				
Index	-0.0004	-2.01	0.05*	0.13

$R^2 = 0.897$, $F(6,22) = 32.09(0.000)$, Durbin Watson Statistic = 1.56

Note: (1)** and *denotes significance at 1 and 5 per cent levels respectively; Abbreviations are the same as in Table 5.

(2) MMLI= Money Market Liberalization Index; SMDI= Securities Market Development Index; IFLI= International Financial Liberalization Index; CR/GDP= real advances to household sector by banks and other financial institutions as a percentage of GDP; MC/GDP= Market Capitalization as a percentage of GDP; FI/GDP= Foreign investment as a percentage of GDP; REER=Real Effective Exchange Rate.

Table 8. (b): Model Adequacy Tests

TESTS	Statistic for Specifications				P Value for Specifications			
	1	2	3	4	1	2	3	4
Auto Regression(F)	0.96	2.17	3.6	1.1	0.39	0.14	0.05*	0.3
ARCH (F)	1.25	1.09	0.5	0.02	0.27	0.31	0.5	0.9
Normality (χ^2)	4.93	1.07	0.8	3.3	0.09	0.58	0.67	0.2
Reset (F)	1.19	0.63	0.92	0.12	0.29	0.44	0.35	0.9

Note: *denotes significance at 5 percent level.

The model used explains about 94 percentage of the variation in household saving rate, as shown by R^2 value (Table 4a). It is statistically significant also at one percentage significance level, as shown by the F Statistic. It is found that the residuals are not serially correlated over time, which is indicated by the Durbin Watson statistic and the Auto Regression F statistic (Table 4b). Again, the ARCH results suggest that the residuals have constant variance, Normality assumption is not violated as given by Normality results and RESET results show that there is no functional form mis specification and omitted variable bias in the model (Table 8b). The detailed discussion of the OLS results obtained will be discussed in the section 4.2.

Since, in the JJ method, all the variables are treated as endogenous, it is difficult to determine which relationship is represented through the obtained co integration vector. To test whether the direction of the obtained co integrating vector is the intended one, that is, if it represents our saving rate function residual analysis method is used. If the direction of the co integrating vector is the intended one, then the residuals obtained from its Ordinary Least Square estimates will not contain any explainable non-randomness left from the model. Hence it is assumed that the residuals be stationary. The results of the residual analysis using the standard Dickey Fuller unit root procedure⁸ are given in Table 5. It shows that the residuals obtained from the model used are stationary⁹. Hence it can be concluded that the obtained co integrating vectors are the intended ones.

Table 9: Results of unit root tests on residuals

ADF Test Statistics		
Without constant and trend	With Constant	With Constant and Trend
-4.3(1)**	-4.39(1)**	-4.5(3)**
-4.62(3)**	-4.82(3)**	-5.17(3)**
-4.34(1)**	-3.25(3)**	-4.87(1)**

Note: * and ** denotes significance at 5 per cent and 1 per cent levels respectively.

Further, a Chow test based on recursive estimation technique is used to test for possible structural instability of the empirical model¹⁰. It shows that there is no parameter instability at 1 per cent significance level in the model used. Now we turn to discuss the OLS results obtained for our general household savings rate function (Table 8(a)).

4.2. The Results:

A one-unit increase in the financial liberalization index leads to a significant decline of about 0.002 unit in the household sector saving rate in the long run. Further, excluding inflation or real interest rates has not caused much change in the estimated coefficient and its sign (Appendix 2 and Appendix 3). When the sub indices are used instead of the aggregate index, all of them have negative and insignificant effects on household saving rate. When the proxy variables are used also, all are showing insignificant impacts on household saving rate. Since the estimated coefficients of other variables and their significance remained the same, when these variables are used instead of FLI, they are not reported here. The insignificant impact using sub indices and the proxy variables to represent financial sector liberalization may be due to omitted variable bias. The aggregate financial sector development index constructed using the proxy variables show a significant negative impact on household saving rate. A one unit increase in the financial sector development index leads to a significant decline of about 0.0004 unit in the household sector saving rate in the long run.

One major reason for the negative impact of financial sector liberalization index may be that increased credit availability to households as a result of measures aimed at reducing liquidity constraints may result in consumption rather than in savings. Another major reason may be that it may reduce the precautionary motive for savings also. This result is supported by the estimated significant negative impact of the financial sector development index also constructed using the outcome variables of financial sector liberalization. In other words, how the increase in credit has been used will determine whether financial liberalization stimulates household sector savings or not. As far as the credit components are concerned, the surges in private capital flows in the nineties got reflected in accretion to Net Foreign Exchange Assets in the banking sector (RBI, 2000). However, the estimated negative impact of foreign investment and international financial liberalization index shows that this surge may have resulted in real estate booms that might have adversely affected HSR. However,

the use of one or two proxy variables to represent financial sector liberalization process may give misleading results as the omission of the other dimensions like pro competition measures, prudential regulation measures etc may significantly bias the results (Gibson, 1994; Bandiera et al, 2000). Further, the variables used may not be the outcome of financial liberalization process alone and they are likely to be the result of macroeconomic, fiscal, monetary and exchange rate policies.

Our finding agrees with most of the recent empirical studies on financial sector liberalization and saving (Bandiera et al, 2000 etc), contrary to the earlier theoretical literature suggesting a positive impact of financial sector liberalization on savings (McKinnon and Shaw, 1973 etc). Our analysis suggests that in India, though financial sector liberalization resulted in improved saving opportunities and more banks and other financial intermediaries, the immediate effect of financial sector liberalization process on HSR emanates from the increased credit availability, which might have resulted in consumption rather than savings. In particular, the surge in private capital flows following the international financial sector liberalization process also might have adversely affected HSR. However, the negligible magnitude of the estimated coefficient indicates the possibility of liquidity constraints still existing in India, the point which is further strengthened by the estimated positive and significant impact of current income on HSR. As one of the main channels through which financial sector liberalization affects economic growth is considered to be saving, the significant negative impact of financial sector liberalization measures on household savings in India deserves special mention.

Among the other determinants, our analysis shows that household sector saving depends, *ceteris paribus*, on absolute personal disposable income with a significant coefficient of 0.22 units, which agrees with most other existing studies. Both the real interest rates and the inflation rate show a negative, but insignificant impact on the household sector saving rate. This might be due to the strong correlation between them. Such correlation results in the problem of inseparability of the effects of the real interest rate and the inflation rate. We deal with this problem by formulating two additional separate models, one excluding the inflation rate and the other excluding the real interest rate. These results are reported in Appendices 2 and 3 respectively.

Excluding inflation, however, has not caused much difference in the magnitude and sign of the estimated coefficient of real interest rate. The insignificant impact of the real interest rates may be due to two reasons. One may be that income and substitution effects of the real interest rate on the household sector saving rate may cancel each other. Consequently, the aggregate impact becomes insignificant. Another possible reason may be the presence of liquidity constraints, which weakens the effects of intertemporal relative prices on intertemporal consumption choices. The importance of liquidity constraints in India is further strengthened by the significance of current income in our result. Besides as many studies emphasize (EPWRF, 2003) real interest rates will have greater influence on the portfolio composition of household financial savings rather than on aggregate household savings. The interesting point is that excluding real deposit rate, made the sign of inflation rate positive (Appendix 3), though statistically insignificant. This shows that the estimated negative sign of inflation rate may be due to the strong correlation between it and real interest rate.

Both the young and old dependency ratios are insignificant determinants of household saving rate.

5. SUMMING UP

The major findings of the study are the following:

- Financial-sector liberalization measures are seen to have a statistically significant negative impact on the household sector savings in India. The effect is found to be emanated mainly from the increased credit availability that might have resulted in consumption rather than savings. However, the negligible magnitude of the index indicates the possibility of liquidity constraints still existing in India.
- Among the other determinants, absolute income is a positive and significant determinant of household sector saving rate in India in the period under consideration.
- Real interest rates and inflation rate are insignificant determinants of household saving rate in India.
- Young and old-dependency ratios are insignificant in determining household saving rate.

NOTES

¹While the separation of aggregate household sector saving into physical and financial saving may be a sometimes convenient factor for estimation, an explanation of how households arrive at their chosen allocation between the two types of assets as yet remains to be provided.

²1970-71 is taken as the starting year for our analysis since the process of financial development in India was given impetus with the adoption of the policy of social control over banks in 1967, which was reinforced in 1969 by the nationalization of 14 major commercial banks. Since then only banking system has formed the core of Indian financial system and bank deposits have become a major part of the saving portfolio of household sector.

³Higher real interest rate increases the present price of consumption in relation to the future price of consumption, thus providing an incentive to increase current saving (substitution effect). If the household is a net lender, then higher real interest rate increases lifetime income, and thus tends to increase consumption and decrease saving (income effect). Hence higher real interest rate will promote savings only if the substitution effect is greater than the income effect.

⁴ Studies (Rothschild and Stiglitz, 1971) show that risk and savings are positively related if the coefficient of relative risk aversion is non-increasing and greater than one, that is the precautionary motive for savings. This means that savings rate will be lower in economies with less risky sources of income. If the coefficient of relative risk aversion is non-decreasing and less than one, risk and savings will be inversely related.

⁵This is explained in detail in Appendix 4.

⁶This means that even though there is no relationship between the corresponding variables, R^2 might appear very high. Granger and Newbold (1974) and Plosser and

Schwert (1978) proved that the regression coefficient estimated from two difference stationary series was statistically significant with very high R^2 , but very low DW statistic, whereas by taking their differences obtained R^2 close to zero, but DW statistic close to 2.. This shows that there was no relationship between the variables and the original result obtained was spurious. Plosser and Schwert (1978) added further empirical evidences to it.

⁷The concept of co integration is explained in detail in Appendix 5.

⁸In this respect, this residuals based test is known as Augmented Engle Granger test for co integration (Engle and Granger, 1987).

⁹The residuals obtained by taking variables other than household saving rate as the dependent variable and regressing each one of them on the remaining variables as the explanatory ones are obtained to be non stationary, which supports our assumption that the obtained co integrating vector is the intended one. The results of these regressions are not reported here.

¹⁰The graph obtained is not reported here.

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APPENDIX 1

CONSTRUCTION OF FINANCIAL LIBERALIZATION INDEX

The financial liberalization index for India has been constructed using the methodology followed by Bandiera, Caprio and Schiantarelli (2000) who used it in their analysis for each of the eight developing countries (Chile, Ghana, Malaysia, Indonesia, Korea, Mexico, Turkey and Zimbabwe). An ideal index of financial sector reform process should include both deregulatory and institutional building components of the process. For the construction of the index, the different dimensions of these two components which can affect saving in a developing country are classified as following,

- 1. Interest rate liberalization:** On its own, it is intended to increase real interest rates, which will encourage saving (if substitution effect dominates income effect).
- 2. Reduction in reserve requirements:** This increases the resources available for lending by the formal financial sector, and also reduces the break-even intermediation spread, thereby increasing deposit rates for a given level of lending rates.
- 3. Pro-competition measures:** A more competitive environment may lead to an increased risk-taking in lending, as the return on low-risk lending narrows. Due to this increased risk-lending opportunities offered to the households, they could reduce the net household saving also.
- 4. Increased prudential regulation:** This may increase net household saving by offsetting the risk-taking discussed above. Further a new perception that banks are sound may encourage growth in financial intermediation. Increased financial intermediation can reduce transaction costs between savers and investors through economies of scale and risk diversification, thereby creating a tendency to increase the household sector saving rate.
- 5. Stock market development:** Liberalization and expansion of the securities market would allow individuals to reallocate resources into more efficient uses, which leads to a higher rate of return on savings. This increase in the rate of return may either increase savings due to substitution effect or decrease savings due to income effect. Further, securities market development reduces the riskiness of income, by allowing individuals to diversify their risk. The impact of change in risk on savings is theoretically ambiguous, depending on the coefficient of relative risk aversion (assumptions regarding preferences), which is a widely debated theme in the literature (Neal and Dewenter, 1996).
- 6. International financial liberalization:** Even if foreign funds flow in, following liberalization, the net effect will be an increase in the rates of return, as the barriers to

capital outflow are removed. However, the net effect of this on saving is not clear as banks can use funds borrowed from abroad to support lending to households. been used respectively.

The data used for the construction of the index is available from the author on request.

APPENDIX 2

Table A 2 (a). Regression Results Excluding Inflation

Variable	Coefficient	t -value	t- probability	Partial :R ²
Constant	-1.3*	-2.63	0.02	0.22
LY	0.17**	3.5	0.002	0.35
RID	-0.07	-0.985	0.35	0.04
YDR	-0.15	-1.26	0.22	0.065
ODR	0.49**	3.05	0.006	0.29
PSR	0.55	2.01	0.06	0.15
FLI	-0.003	-2.19	0.04	0.173

$R^2 = 0.92$, $F(6,23) = 37.71 [0.0000]$, Durbin Watson Statistic = 1.53.

Table A 2(b). Model Adequacy Tests

TESTS	Statistic	Probability Value
Auto Regression(F)	1.93	0.17
ARCH(F)	0.15	0.70
Normality(χ^2)	1.91	0.39
Reset (F)	2.36	0.14

APPENDIX 3

Table A 3(a): Regression Results Excluding Real Interest Rate

Variable	Coefficient	t -value	t -probability	Partial :R ²
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Constant	-1.19**	-2.47	0.022	0.22
LY	0.16**	3.5	0.002	0.34
INF	0.04	0.63	0.53	0.02
YDR	-0.15	-1.36	0.188	0.078
ODR	0.55**	3.03	0.006	0.29
PSR	0.48	1.9	0.08	0.13
FLI	-0.002*	-2.07	0.05	0.16

$R^2 = 0.91$, $F(7,22) = 33.62$ (0.0000), Durbin Watson Statistic = 1.52.

Table A 3 (b): Model Adequacy Tests

TESTS	Statistic	Probability Value
Auto Regression(F)	1.93	0.17
ARCH(F)	0.15	0.7
Normality(χ^2)	1.9	0.39
Reset (F)	2.36	0.14

APPENDIX 4

UNIT ROOT PROBLEM

Time series data can be of two types (1) stationary and (2) non-stationary. A series is stationary if its mean, variance and covariance are invariant over time and otherwise it is said to be non-stationary. If the process is stationary, it can be represented by a simple algebraic model, whereas if it is non-stationary, it is not possible to model the process in terms of an equation with fixed coefficients, estimated from past data. Non-stationarity can be due to the presence of unit root or due to the presence of a trend component. If it is the first case, then the process is said to be difference stationary and if it is the second case, then the process is said to be trend stationary. To test for stationarity, the unit roots for each of the series are examined using the Augmented Dickey Fuller (ADF) unit root tests developed by Dickey (1976); Fuller (1976); Dickey and Fuller (1979). Here the null hypothesis that the time series belongs to the difference stationary process against the alternative that it belongs to the trend stationary process has been tested using two models, one with constant and the other with constant and trend. The optimum number of lags used is determined using two-model selection criteria (1) Akaike Information Criteria (AIC) and (2) Swartz Bayesian criteria. The model giving the least value of these two criteria is considered as the best model.

APPENDIX 5

CO INTEGRATION

The concept of co-integration, introduced by Granger (1981) and Engle and Granger (1987) is used as a statistical property to describe the long-run equilibrium behavior of economic time series. The statistical concept of equilibrium centers on that of *stationary process*. In a regression relationship between two variables, say y_t and x_t if both are stationary, then the results are valid whereas if both are non stationary, there is possibility of spurious regression unless they are co integrated.

A non-stationary variable is said to be integrated of order 'd' (I (d)) if it requires 'd' times differencing to make it stationary. If both variables y_t and x_t are integrated of order 1, then an important property of these I (1) variables is that some linear combinations of them can be stationary since the trends in y_t and x_t may cancel out to produce stationary (I (0)) variables. If this is the case, the two variables are said to be co integrated. The regression of these two cointegrated non-stationary variables will not be spurious as they move together over time, which implies that there is a long run

equilibrium relationship between them. Hence in a regression relationship between two (or more) variables, integrated of order 1, the possibility of spurious regression can be avoided if they are cointegrated. Therefore, two or more variables integrated of the same order, if they are cointegrated, can be used in their level forms themselves instead of taking their first differences in the regression equation.