Chapter Five

AN EMPIRICAL ESTIMATE OF THE PARAMETERS OF THE MODEL AND THEIR IMPLICATION

1. Introduction :

The model has nine equations and each equation has nine independent variables, consisting of disposable income expected rate of inflation and expected real rates of returns on various assets. The parameters of the model are estimated with ordinary least square method.

First we shall analyse the empirical estimates of each of the equations of model A, consisting of various components of household saving. Then we will go over to analyse the empirical estimate of the parameter of model B and then analyse the effect on model C. Finally we shall discuss in the light of empirical estimate, the analysis that emerges for the whole model.

2. Empirical Estimates of the Parameters of Model A :

A) Estimates of the Parameters of Equation:

Saving of Household in Liquid Asset

$$\frac{S_{L\cdot A}}{Y_d} = -0.705 + \underset{(0.00005)}{0.00003}\, Y_d + \underset{(0.174)}{0.229}\, \rho^e + \underset{(0.096)}{0.040}\, r_{BB} + \underset{(0.204)}{0.435}\, r_{iyr}^{*}$$

$$+ \underset{(0.026)}{0.016}\, r_{e\cdot D} + \underset{(0.033)}{0.051}\, r_{DI} + \underset{(0.086)}{0.227}\, r_{PA}^{*} - \underset{(0.032)}{0.025}\, r_{G} - \underset{(0.151)}{0.299}\, r_{SB}^{**}$$

$\bar{R}^2 = 0.755$ F = 12.36 D.W. = 2.59

Figures in brackets are standard errors

* Significant at 0.025 level

** Significant at 0.05 level

The coefficient of disposable income (Y_d) is positive as expected but insignificant. It is an important variable in the simple correlation matrix.

The next variable is expected rate of inflation(P^e). Its coefficient is positive but insignificant. It suggests that inspite of households' awareness that inflation will reduce the real value of each unit of liquid asset, yet they continue to have a higher ratio of these, because these assets yield a certain real service which they are not ready to for-go.The indian households have got used to money transactions and prefer to have the convenience of these rather than divert these assets towards higher income earning assets. The positive coefficient indicates the predominance of the following effects: monetisation,black money, wealth and uncertainty.

The coefficient of expected real rate of interest ($\frac{\text{market}}{}$) is,as expected,positive but is insignificant.

The coefficient of real rate of return on one year deposit(r_{1yr}) is positive and significant indicating that both the asset components,liquid assets and illiquid assets, are complementary in households' portfolio. It is generally observed that when interest rates on deposits increase, there is simultaneous increase in the interest on saving deposit. As

a large proportion of saving deposits is treated as demand deposits (87% approximately) therefore a rise in one year deposit could be treated as a rise in saving deposit rate and therefore an increase in liquid asset ratio.

The coefficient of expected rate of return on consumer durable ( ) is positive but insignificant. It implies that as expected rate of return on consumer durables increases the desire to have them in the household saving portfolio increases; therefore households' liquid asset accumulation increases to finance these lumpsum expenditure. Most of the households first save and then invest in these goods. The savings are expected to be either in liquid or illiquid assets which finance expenditure on consumer durables.

The coefficient of expected return on direct investment (h_{D1}) is positive and insignificant. The coefficient of expected return on physical assets(h_{PA}) is positive and significant implying that when the expected return on physical assets increases, households first accumulate liquid assets and later on liquidate these assets to make bulk commitments towards physical assets. We notice from our simple correlation table that expected return on physical assets is negatively related to saving in physical assets, implying that when, its own rate increases, the desirability of physical assets increases, but actual increases takes some time as these are lumpsum purchases. So one of the intermediary assets held to facilitate these

transactions is liquid asset.

The coefficient of expected rate of return on gold (r_G) is negative and insignificant. The negative sign implies that as households expect returns on gold to increase, they divert their liquid assets' savings towards accumulation of gold. Therefore there is "real gold effect" but it is insignificant.".

The coefficient of real rate of interest on borrowing ($r_{s\cdot B}$) is negative and significant at 10% level. It indicates that as real cost of borrowing increases, borrowings essentially from banks fall. The producer segment of the household sector economises on the holding of currency and demand deposit and invests as much of his own resources as is possible in his farm or business.

Thus the important variables affecting liquid asset ratio are expected rate of return on physical assets, rates of interest on one year deposit and on borrowing. The $R^2 = 0.755$ is fairly high and so is the F ratio, which implies that the variables considered are significantly affecting the function. The Durbin Watson Statistic suggest no auto correlation.

B) Estimates of the Parameters of Equation :

Saving of Household in Illiquid Asset

$$\frac{S_{H.L.A}}{Yd} = -1.726 + \underset{(0.00003)}{0.00001}\, Yd + \underset{(0.114)}{0.367}\, p^{e*} + \underset{(0.063)}{0.136}\, r^{*}_{BB} + \underset{(0.134)}{0.103}\, r_{1yr.} - \underset{(0.017)}{0.008}\, r_{L.D.} - \underset{(0.021)}{0.027}\, r_{D\cdot I} + \underset{(0.056)}{0.086}\, r_{P.A} + \underset{(0.021)}{0.114}\, r^{*}_{G} + \underset{(0.899)}{0.149}\, r_{s\cdot B}$$

R^2 = 0.971, F = 129.85, D.W. = 2.02

Figures in brackets are standard errors

* Significant at 0.025 level.

The coefficient of (Disposable Income) is positive but insignificant. The positive coefficient suggests that these assets increase with income, apart from other reasons to save income tax, which is progressive in nature.

The coefficient of expected rate of inflation(ρ^e) is positive and significant. The positive coefficient suggests that under inflationary conditions, the nominal income of households increases, so that provident fund which is deducted as a fixed percentage of nominal income would increase. Similarly income tax (rates) are progressive therefore with nominal income increasing the tax burden increases; hence to save on income tax, households' saving in the form of time deposits, P.F. and LIF also increases. This component also increases, because of the generation of more and more of black money and a strong bias for these assets because of tax benefits that accrue on this.

The coefficient of expected real (market rate of interest) (η_{66}) is positive and significant. It indicates that Indian households prefer less risky assets and exhibit the behaviour of being safe with their investment.

The coefficient of real rate of interest on one year deposit(η_{67}) is positive and insignificant. The coefficient

could be insignificant because we have in this category assets like provident fund, Life Insurance Fund and compulsory deposit which are not likely to be responsive to this rate.

The coefficient of expected real rate of return on consumer durables (h_{cD}) is negative and insignificant while it has a positive coefficient in liquid asset ratio though again insignificant. This implies that to acquire consumer durables households in the intermediate period save in liquid assets, while increase in desirability of having consumer durables reduces saving in illiquid asset. This is natural as illiquid assets have long maturity period and cannot be easily used to purchase consumer durables except on maturity.

The coefficient of expected real rate of return on direct investment (h_{DI}) is negative and insignificant whereas its coefficient in liquid asset ratio is positive though insignificant. It suggests that direct investment assets are complementary assets to liquid assets while they are substitutes to illiquid assets.

The coefficient of expected real rate of return on physical asset (h_{PA}) is positive and insignificant. When expectation about real rate of return on physical asset increases the households' desire to have these assets increases, but this desire cannot be fulfilled in our accounting period of one year; it takes more time. For this, resources have to be raised

particularly for the components machinery and equipment and residential dwellings. As a result households save both in the liquid and illiquid assets to purchase these physical assets. When households actually acquire these assets then they reduce the actual saving in liquid and illiquid assets. The absolute value of coefficient is greater in liquid asset equation as compared to illiquid asset.

The coefficient of expected real rate of return on gold(η_9) is positive and significant. It implies that probably the demand for gold is not to make speculative gains but to meet certain social obligations. It also suggests that those households who initially inherited gold and had made capital gains when the returns increased, have not further increased their saving in the form of gold. The households have preferred to diversify their saving not only with the view to minimise the losses, but also because of government regulations regarding ownership of gold, and other convenient assets being available.On the other hand this variable has a negative and insignificant effect on liquid assets because liquid asset is held by all sections of households, while both gold and illiquid assets are held by generally well to do house holds.

The coefficient of real rate of interest on borrowing (η_{56}) is positive as expected and insignificant. With the cost of borrowing increasing household will first prefer to save

and then invest rather than borrow and invest.

Thus the important variables affecting this asset ratio are expected rate of inflation, real/market rate of interest and expected return on gold.

The $\bar{R}^2$ = 0.972, suggests that large part of variation in saving in illiquid asset ratio is explained by our variables and the F ratio suggests that the relationship postulated is significant. The D.W. Statistics suggest no auto correlation.

C) Estimates of The Parameters of Equation:

Saving of Household in Consumer Durables

$$\frac{S_{c.d}}{Y_d} = \underset{}{0.591} + \underset{(0.00002)}{0.00001}\, Y_d + \underset{(0.077)}{0.133}\, \rho^{e**} + \underset{(0.042)}{0.158}\, r_{B.B}^{*} +$$

$$\underset{(0.090)}{0.171}\, r_{i.yr}^{**} + \underset{(0.011)}{0.004}\, r_{c.d} - \underset{(0.014)}{0.013}\, r_{oI} - \underset{(0.03)}{0.007}\, r_{P.A} +$$

$$\underset{(0.014)}{0.022}\, r_{o_1} - \underset{(0.067)}{0.164}\, r_{s.B}^{*}$$

$\bar{R}^2$ = 0.945 , F = 64.38, D.W. = 1.27

Figures in brackets are standard errors

* Significant at .025 level

** Significant at .05 level

The coefficient of disposable income (Y_d) is positive and insignificant. The positive coefficient implies that it is not an inferior asset in household saving portfolio.

The coefficient of expected rate of inflation(ρ^e) is as postulated positive and this variable has a significant

effect on consumer durable ratio. A one percent increase in expected rate of inflation leads to an increase in this asset ratio of 0.133%, while it leads to an increase of .362% in illiquid asset ratio. Therefore numerically the effect is greater on illiquid asset.

The coefficient of real market rate of interest (h_{66}) is positive and significant. The lenders feel optimistic about the rate of interest and therefore expect their income to increase; this might increase their expenditure on consumer durable. On the other hand household who borrow funds for purchasing consumer durables would prefer to borrow now as the cost of borrowing is lower now as compared to what they expect it to be in future. Therefore these households increase their expenditure on consumer durables, when h_{66} increases. Further h_{66} has positive effect on liquid assets and all the other variables' effect like real rate of interest on one year deposit and expected real rate of return on consumer durables, indicate that both liquid assets and consumer durables are complementary assets in household portfolio; therefore there could be some spill over effect from liquid asset also.

The coefficient of real rate of interest on one year deposit (h_{19}) is positive and significant at 10%. This would indicate that both consumer durables and illiquid assets may be complementary goods in household saving behaviour. We

alsoknow that η_{iy} positively affects liquid assets. Therefore liquid assets and consumer durables are definitely complementary assets. Also this positive relationship can then be seen as a spill over effect from liquid assets rather than its having complementary relationship with illiquid asset.

The coefficient of expected real rate of return on consumer durables ($\eta_{e\cdot D}$) is as expected positive but insignificant probably because of the lags; similarly the coefficient of expected real rate of return on direct investment (η_{DI}) is negative and insignificant. The coefficient of expected real rate of return on physical assets ($\eta_{P\cdot A}$) is as postulated negative but is insignificant. It implies that as $\eta_{P\cdot A}$ increases household will prefer to invest their savings in physical assets rather than commit a lumpsum expenditure on consumer durables. This indicates that these too assets are substitutes in house saving portfolio.

The coefficient of expected real rate of return on gold (η_G) is positive and insignificant. The positive effect of this variable consumer durable ratio can be interpreted as: with theincrease in rate of return on gold the households that owned considerable amount of gold must have made capital gain - this is the 'Wealth Effect'. With this increase in income a part of it gets diverted in expenditure on consumer durables and illiquid assets; with the latter having a greater numerical coefficient.

The coefficient of real rate of interest on borrowing (η_{SB}) is as postulated negative and significant. It indicates that Indian households do resort to borrowing from institutions, to acquire consumer durables, and do not necessarily have the tendency first to save and then invest provided they have the opportunity for borrowing. But they are rational in their behaviour - when the cost of borrowing increases they reduce borrowing even for consumer durables.

The $\bar{R}^2$ = .945, is high and the F ratiosuggests that the variables considered are important in explaining the movements in our dependent variable. The important variables that are significantly affecting this ratio are: η_{BB}, η_{SB}, η_{iyr} and P^e. The Durbin Watson statistic is 1.27, which is in the inconclusive range.

D) Estimates of the Parameters of Equation :

Saving of Household in Direct Investment

$$= -0.047 + \underset{(0.00004)}{0.0001}\, Y_d^{*} - \underset{(0.152)}{0.317}\, P^{e*} - \underset{(0.086)}{0.158}\, \eta_{BB}^{**} -$$

$$\underset{(0.198)}{0.295}\, \eta_{iyr} - \underset{(0.025)}{0.021}\, \eta_{CD} + \underset{(0.003)}{0.001}\, \eta_{DI} - \underset{(0.082)}{0.084}\, \eta_{PA} -$$

$$\underset{(0.030)}{0.006}\, \eta_{G} + \underset{(0.147)}{0.211}\, \eta_{SB}$$

$\bar{R}^2$ = 0.459, F= 4.82, D.W. = 1.90

Figures in brackets are standard errors

* Significant at .025 level.

** Significant at .05 level.

The coefficient of disposable income (Y_d) is positive as postulated and significant as well. It is expected that with all round growth in the economy, the capital market is likely to develop and with it, this asset share in household saving is likely to increase.

The coefficient of expected rate of inflation(ρ^e) is negative and significant also suggesting that during inflationary conditions households are likely to reduce their share in this asset as uncertainties increase regarding the returns and as earlier noted Indian households generally prefer safe investment.

The coefficient of real market rate of interest (γ_{bb}) is negative as expected and significant. It suggests that as household expect the market rate of interest to increase to avoid capital losses on this asset too, they shift their saving from these to more convenient assets like liquid and term deposits, so that they can avail of the opportunity of capital gain. Further those households (especially the money lenders) who feel optimistic when γ_{bb} is expected to increase, generally invest their savings for lending to other households or in consumer durables, but not in direct investment. Therefore it have a negative coefficient.

The coefficient of real rate of interest on one year deposit (γ_{iyr}) is as postulated negative and insignificant

suggesting that in the households' portfolio these two assets i.e. illiquid assets and direct investment are substitutes. The same conclusion can be derived when we look at the coefficient of $\gamma_{D\cdot I}$ on $S_{D\cdot L\cdot A}/\gamma_d$ which is negative.

The coefficient of expected real rate of return on consumer durables ($\gamma_{c\cdot D}$) is negative and insignificant. It indicates that these two assets are also substitutes. This relationship is also noticed in the estimation of consumer durable equation.

The coefficient of expected real rate of return on direct investment ($\gamma_{D\,I}$) is positive as expected but insignificant. This could be because this group consists of heterogeneous assets all of which are not likely to be affected by return on variable dividend security.

The coefficient of expected real rate of return on physical assets (γ_{PA}) is negative and insignificant which again indicates that the two assets are substitutes in household saving portfolio.

The coefficient of expected real rate of return on gold (γ_G) is negative but insignificant indicating the two assets to be substitutes.

The coefficient of real rate of interest on borrowing (γ_{sB}) has come with a wrong sign and is insignificant.

Thus the significant variables affecting this ratio are disposable income, expected rate of inflation and market

rate of interest. The $\bar{R}^2$ = .459 is not high, the F ratio is significant and Durbin Watson Statistic is in the inconclusive range. Probably $\bar{R}^2$ is low because proper continuous time series data which is comparable over this time span is not available.

E) Estimates of the Parameters of Equation:

Saving of Household in Physical Assets:

$$\frac{S_{PA}}{Y_d} = 1.924 - \underset{(0.00009)}{0.0001}\, Y_d + \underset{(0.314)}{0.306}\, \rho^e + \underset{(0.179)}{0.464}\, h_{SB}^{*} - \underset{(0.379)}{0.110}\, h_{IYR} -$$

$$\underset{(0.048)}{0.161}\, h_{CD}^{*} - \underset{(0.059)}{0.227}\, h_{DI}^{*} - \underset{(0.141)}{0.020}\, h_{PA} + \underset{(0.280)}{0.175}\, h_{SB}$$

$\bar{R}^2$ = 0.726 , F = 12.62, D.W. = 2.41

Figures in brackets are standard errors

* Significant at .025 level.

** Significant at .05 level.

The coefficient of disposable income (Y_d) is negative and insignificant. It rightly indicates that as a country becomes more and more prosperous its household will save proportionately less in physical assets first because these are lumpy assets which are not easily convertible and secondly many other financial assets suitable to the needs of households are available.

The coefficient of expected rate of inflation(ρ^e) is as postulated positive but insignificant. In the simple correlation coefficient matrix it was second in importance; its

insignificance can therefore be because of presence of other explanatory variables which effect household decision to save in physical assets relatively more.

The coefficient of real market rate of interest is positive and significant. The positive coefficient of h_{BB} suggests that when households expect market rate of interest to increase then to avoid payment of higher interest households purchase physical assets which they would have otherwise delayed; this is particularly true of stock holdings. Also those households who are lending at market rate of interest are optimistic about future earnings and therefore increase their asset accumulation of physical assets the same way they do of consumer durables.

The coefficient of real rate of interest on one year deposit (h_{iy}) is negative and insignificant. The negative coefficient implies that a rise in the interest rates on term deposit increases the ratio of term deposits in household income and probably it is at the cost of the traditional assets, the physical assets; in this sense they are substitutes in household saving portfolio. On the other hand we had noticed that when expected rate of return on physical assets increases, both liquid assets and illiquid assets ratio increased suggesting lags in household behaviour in acquisition of physical

assets. Now as there are no lags in acquiring illiquid assets an increase in its own rate increases this ratio and reduces physical asset ratio immediately.

The coefficient of expected real rate of return on consumer durables (h_{cD}) is negative as postulated and is significant also. A 1% increase in h_{cD} reduces this asset ratio by 0.16%. Similarly the coefficient of expected real rate of return on direct investment(h_{DI}) is negative as postulated and is significant also. Herewith a 1% increase in h_{DI}, the fall in this asset ratio is of 0.22%. Thus the effect of expected rate of return on direct investment, is numerically larger than the effect of expected rate of return on consumer durables. Thus both these assets can be thought of as a significant substitute of physical asset in household saving behaviour.

The coefficient of expected real rate of return on physical assets (h_{PA}) is negative and insignificant. This could probably be because of lags involved in the accumulation of physical assets; when the expected rate of return on physical assets increases, the desirability of having more of these assets increases, but accumulation of this asset does not take place immediately; rather temporarily other assets like liquid assets and illiquid assets increase to finance, in the end, purchases of physical assets; this probably takes more than one

accounting period and therefore we get a negative coefficient.

The coefficient of expected real rate of return on gold (h_{6}) is negative and insignificant. The reduction in physical assets in response to increase in expected real rate of return on gold indicates that the wealthier households (who initially owned gold) in response to increase in wealth and income (on account of huge capital gains made because of increase in price of gold), like to diversify their portfolio and so instead of investing in old assets like physical assets, they divert their savings towards illiquid assets and gold, precious stones etc. Also the households who derive their income from sumggling of gold, gain when h_{6} increases. This should increase saving in physical assets, but the former effect is likely to be more and therefore the insignificance of the net effect.

The coefficient of real rate of interest on borrowing (h_{sb}) is positive and insignificant. It has come with a wrong sign positive as against negative postulated by us. Probably this is again due to lags.

The $\bar{R}^2$ = 0.726 is high, the F ratio is significant and Durbin Watson Statistic indicates no auto correlation.

F) Estimates of The Parameters of Equation :

Saving of Household in Negative Form (Net Borrowing from other Sectors)

$$\frac{S_B}{Y_d} = \underset{}{0.068} + \underset{(0.00004)}{0.0001}\,Y_d^{*} - \underset{(0.158)}{0.236}\,\rho^{e} - \underset{(0.088)}{0.055}\,h_{BB} - \underset{(0.186)}{0.055}\,h_{HH} - \underset{(0.024)}{0.008}\,h_{CD} - \underset{(0.030)}{0.058}\,h_{DI}^{**} + \underset{(0.078)}{0.122}\,h_{PA} + \underset{(0.029)}{0.012}\,h_{GI} - \underset{(0.137)}{0.116}\,h_{SB}$$

$\bar{R}^2 = 0.707$, $F = 9.89$, D.W. = 1.99

Figures in brackets are standard errors

* Significant at .025 level

** Significant at .05 level

The coefficient of disposable income (Y_d) is as anticipated positive and significant. It implies that as households' disposable income increases their ability to repay back increases. As these borrowings are from credit institutions, with increase in disposable income, the credit worthiness of these households increases; as a result they further borrow to invest in their own business or in farms.

The coefficient of expected rate of inflation (ρ^{e}) is negative and insignificant. The negative sign of the coefficient indicates that the households especially the self employed and farm households are pessimistic about the investment and therefore reduce borrowing. Also as most borrowing is not

done for increasing expenditure on consumer durables and direct investment, therefore this ratio falls.

The coefficient of real market rate of interest (h_{bb}) is negative and insignificant. The coefficient has come with a wrong sign. The coefficient of real rate of interest on one year deposit (h_{iyr}) is negative and insignificant. This indicates that as real rates of interest on term deposits increase, the borrowing ratio falls; this could be because both real rate of interest on one year deposit and borrowing rates are positively correlated implying that a rise in real rate of interest on one year deposit simultaneously leads to rise in borrowing rates; this then reduces borrowing ratio. As this is secondaryeffect, we notice that its effect is not significant.

The coefficient of real rate of return on consumer durables ($h_{c\cdot D}$) is negative and insignificant. A rise in the expected rate of return on consumer durable leads to a fall in borrowing ratio both as shown in the simple correlation table and in this regression. It implies that generally households do not still borrow for purposes of purchasing consumer durables; rather they finance it by first saving in other assets.

The coefficient of expected real rate of return on direct investment ($h_{D\cdot r}$) is negative but significant at 10%.

It has come with a wrong sign; we had postulated a positive relationship.

The coefficient of expected real rate of return on physical assets ($h_{P\cdot A}$) is as anticipated with a positive coefficient and is significant. It indicates that as return on physical assets increases the profitability of investing in these assets increases; therefore borrowing ratio increases. We notice that one % increase in the expected real rate of return on physical assets leads to an increase in borrowing ratio of 0.12%.

The coefficient of expected real rate of return on gold (h_{G}) is as expected positive but insignificant. It suggests that most Indian households do not borrow to invest in gold. Rather gold is purchased for social functions and generally it is purchased from past savings and not by incurring debt. As most of the gold is purchased on occasions like marriage, the demand for these is not related to the return on gold.

The coefficient of real rate of interest on borrowing ($h_{S\cdot\theta}$) is as anticipated negative, but insignificant suggesting that cost is not a consideration, when households are borrowing, but what is important is whether conditions favourable to profitable investment in physical assets exist. If they do exist they do borrow no matter what interest rates are.

The $\bar{R}^2$ = 0.70 is high, the F ratio is significant and D.W. indicates no auto correlation.

G) Estimates of the Parameters of Equation:

Saving of Household Sector:

$$\frac{S_{H\cdot H}}{Y_d} = -0.127 - \underset{(0.0001)}{0.00004}\, Y_d + \underset{(0.436)}{0.965}\, \rho^{e\,*} + \underset{(0.242)}{0.698}\, h_{B\cdot B}^{\,*} + \underset{(0.49)}{0.359}\, h_{1yr} - \underset{(0.066)}{0.160}\, h_{CD}^{\,*} - \underset{(0.083)}{0.153}\, h_{DI}^{\,**} + \underset{(0.216)}{0.085}\, h_{PA} + \underset{(0.082)}{0.087}\, h_G + \underset{(0.379)}{0.189}\, h_{S\cdot B}$$

$\bar{R}^2$ = 0.923, F = 45.14, D.W. = 2.01

Figures in brackets are standard errors

* Significant at .025 level

** Significant at .05 level

The coefficient of disposable income (Y_d) is negative and insignificant. The negative coefficient indicates (though one has to study in greater details for full impact) that (1) either with increase in income, the distribution of income has favoured the lower income groups, who save less therefore there is a fall in saving ratio[1] or (2) the increases in income has benefitted those households who have made speculative gains and also earned black money. This black money & income is used either towards consumption of smuggled goods or foreign made goods, which might not be easy to report in our category of consumer

1. It is difficult to conclude from the different estimates available that distribution of income has become more equal over the years in the post-independence period.

durables. Also these households savings' which are not reported might be kept illegally in Indian banks or foreign countries' banks. Thus when disposable income increases, alongwith inflationary expectations and when black money is also increasing then under such circumstances the saving ratio might fall because of the unreported savings.

The coefficient of expected rate of inflation (ρ^e) is positive and significant. A one percentage increase in expected rate of inflation leads to an increase of 0.965% in saving ratio. The positive coefficient implies that like the advanced countries, inspite of so many structural differences, monetary and financial market differences, expected prices are having similar effect in under developed countries also. So that in India households in response to a moderate rate of inflation, increase their saving ratio. When we look at the portfolio effects of Inflation we find that for (1) liquid assets category the effect is positive and insignificant (2) illiquid assets it is positive and significant (3) consumer durables it is postive and significant (4) Direct investment it is negative and significant (5) Physical Assets it is postive and insignificant and (6) Borrowing ratio it is negative & insignificant.

Therefore regarding the composition of saving it can be said that inflation raises the illiquid asset and consumer

durables ratios and reduces direct investment ratio significantly. Therefore inflation induces household to have monetary and financial intermediaries assets' in their portfolio, alongwith consumer durables but reduces direct investment assets[2].

Regarding physical assets its ratio is likely to fall with development but prices seem to have negligible effect on this ratio, and it does not suggest that there is flight from financial assets towards physical assets. Rather a rise in household saving is accompanied by not only a rise in physical assets and consumer durables but by more important assets like illiquid asset and liquid asset. This reflects that the dominant effect is of increase in monetisation, uncertainty and black money.

The coefficient of real market rate of interest ($h_{s.6}$) is positive and significant. As the household expect market rate of interest to increase they save more to earn a higher rate of return. This is in correspondence with the theory of interest.

The coefficient of real rate of return on one year deposit (h_{1yr}) is positive and insignificant. This insignificance is probably because of conflicting effects it has on

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2. As a source forfinancing investment we know direct investment is qualitatively better than intermediate financial asset for in the former the borrower has full control over the funds borrowed while in the latter the institutions interfere with thefunds lent.

the components which get cancelled in the process of aggregation. It positively and significantly affects liquid assets and negatively and significantly affects direct investment, ratio. It insignificantly affects the other asset ratio as: illiquid assets, consumer durables, physical assets and borrowing.

The coefficient of expected real rate of return on consumer durables ($\gamma_{c.D}$) is negative as postulated and significant. A one percentage increase in the expected rate of return on consumer durables reduces household saving ratio by 0.16%, which is very small. An increase in this rate of return leads to a rise in complementary expenditure on current consumption which over time is expected to reduce the saving ratio. This rate insignificantly affects all the ratios except physical assets, yet it significantly affects household saving because physical assets are a large proportion of household saving.

The coefficient of expected real rate of return on direct investment ($\gamma_{o.I}$) is negative as postulated and significant. It insignificantly affects liquid assets, illiquid assets, consumer durables, and direc-t investment, but only like expected real rate of return on consumer durables, affects physical assets negatively and significantly. As the share of physical asset in household saving is high, therefore the

effect of λ_{bw} is significant and negative on household saving ratio.

The coefficient of expected real rate of return on physical assets (λ_{PA}) is positive and insignificant. The individual assets that it significantly affects are liquid assets and borrowing and both the coefficient are positive; this implies that in one case i.e. liquid asset the expected real rate of return on physical assets positively increases liquid asset ratio& thereby increases, household saving, while on the other hand a rise in this rate also increases borrowing ratio which inturn reduces household saving. But because of this conflicting effect ; on aggregation this rate of return loses significance. The positive sign indicates that when this rate of return increases household saving alongwith some of its components increase. Its own asset ratio i.e. saving in physical asset is not encouraged immediately. The results suggest that in this case probably lags are involved between desirability and actual acquisition of this asset; therefore results in our framework are not clear cut.

The coefficient of expected real rate of return on gold (λ_G) is positive and insignificant. A positive sign indicates that households do increase their savings when this rate of return increases to make speculative gains. On the other hand the wealth effect is strong i.e. on realising speculative gains (of which some are in the form of black money

transaction) from gold asset, household put a large proportion of these gains in term deposits; therefore household savings rise. The asset ratios that it significantly and positively affects are illiquid assets and consumer durables. These assets are also held by households who are engaged in smuggling gold.

The coefficient of real rate of interest on borrowing ($\beta_{s\cdot B}$) is positive but insignificant. This insignificance is because amongst the assets also, that it significantly affects, some are negatively affected and others like illiquid asset and direct investment are positively affected and therefore on aggregation they effset each other.

Thus the variables significantly affecting household saving are expected rate of inflation, real market rate of interest, expected real rate of return on consumer durables and expected real rate of return on direct investment. $\bar{R}^2$ = .923 is very high and indicates that the variables considered explain the behaviour of household saving to a large extent. The F ratio is highly significant and D.W. statistics suggest that there is no autocorrelation.

H) Estimates of the Parameters of Equations

Domestic Saving Ratio

$$\frac{D\cdot S}{Y} = 1.482 - \underset{(0.0001)}{0.0001}\,Y_d + \underset{(0.480)}{1.022}\,\rho^{e*} + \underset{(0.266)}{0.905}\,\beta_{BB}^{*} - \underset{(0.563)}{0.387}\,\beta_{1yr}$$

$$- \underset{(0.072)}{0.238}\,\beta_{c\cdot\$}^{*} - \underset{(0.091)}{0.101}\,\beta_{DI} + \underset{(0.238)}{0.076}\,\beta_{PA} + \underset{(0.090)}{0.300}\,\beta_{G}^{*} + \underset{(0.417)}{0.506}\,\beta_{s\cdot B}$$

R^2 = 0.938, F=57.26, D.W. = 1.98

Figures in brackets are standard errors

* Significant at .025 level.

** Significant at .05 level.

The coefficient of disposable income (Y_d) is negative It was also negative for the household saving function. Here the F ratio is much higher than in household saving function but is still insignificant at 5% level. This negative coefficient as explained in the section-G, is either because distribution of income has favoured those sections who save less or and black money transaction increases with disposable income and inflation, the consumption ratio and unaccountable savings increase, so that our saving ratio are negatively related to disposable income.

The coefficient of expected rate of inflation(P^e) is positive and significant. Even in the household saving function the coefficient of this variable is positive and significant. But the β coefficient is numerically higher for domestic saving, i.e. 1.022. A one percentage increase in the expected rate of inflation, increases domestic saving ratio by 1.022%, while household saving ratio increases by 0.965%. On the whole we can say that the inflation we have witnessed - is very moderate for a growing economy. It has induced generation of higher household saving and domestic saving.

The coefficient of real market rate of interest ($h_{B.B}$) is

positive and significant. The coefficient of this variable in the household saving function is also positive and significant though the β coefficient is numerically higher for domestic saving. A one percentage increase in the real ba-zar bill rate, increases the domestic saving ratio by 0.90%, while it increases household saving ratio by 0.69%.

The coefficient of real rate of interest on one year deposit (γ_{iyr}) is negative and insignificant as the rate of interest on deposits increases, borrowing rates increase, which is cost for corporate sector & therefore reduce their potential saving. The coefficient of this variable in household saving function is positive, but insignificant.

The coefficient of expected real rate of return on consumer durables (γ_{cd}) is negative and significant. For the household saving function, the coefficient of this variable is also negative and significant, but the β coefficient is numerically higher for domestic saving. A 1% increase in the expected rate of return on consumer durables reduces the domestic saving ratio by 0.23%, while it reduces household saving by 9.16%. This implies that not only households reduce their saving ratio, but also the coporate sector and the government sector reduce their saving ratio and thereby reinforce this effect by further reducing the domestic saving ratio.

The coefficient of expected real rate of return on

direct investment (β_{DI}) is negative and insignificant. The coefficient of this variable in household saving function was also negative but significant.

The coefficient of expected real rate of return on physical assets (β_{DA}) is positive and insignificant. Similarly in the household saving function the coefficient of this variable is positive and insignificant. Probably as noted before this insignificance is because of lags involved between the desirability of owning these assets & actually purchasing these assets.

The coefficient of expected real rate of return on gold (β_{G}) is positive and significant also; while in the household saving function it is positive but insignificant. Probably the increase in significance of this variable in domestic saving function is because with increase in expected real rate of return on gold both the government and the corporate sector gain. The government owns gold as one of its assets and the registered firms who are transacting in gold business are part of the corporate sector. When return on this asset increases, the corporate sector particularly gains and thereby their savings are expected to increase, which pushes the domestic saving ratio.

The coefficient of real rate of interest on borrowing (β_{SB}) is positive but insignificant. In the household saving

function too it is positive but insignificant.

Thus the significant variables affecting this function are expected rate of inflation, real rate on bazar bill, expected real rate of return on consumer durables and gold. The $\bar{R}^2$ = 0.938, is high and F ratio is high indicating that the relationship postulated is significant; the D.W. ratio 1.98 is in the inconclusive range.

3. Empirical Estimates of the Parameters of Model B Equation: Incremental Capital Output Ratio:

$$\frac{\Delta C}{\Delta O} = -7.395 - \underset{(0.0007)}{0.001}\, Y_d + \underset{(2.791)}{5.290}\, \rho^{e**} + \underset{(1.591)}{0.440}\, r_{BB} + \underset{(3.365)}{2.026}\, r_{1yr} + \underset{(0.432)}{0.167}\, r_{C\cdot D} + \underset{(0.525)}{0.309}\, r_{DI} + \underset{(1.254)}{1.429}\, r_{P\cdot A} + \underset{(2.488)}{0.657}\, r_{S\cdot B}$$

$\bar{R}^2$ = 0.033, F=1.32, D.W. 3.17

Figures in bracket are standard errors.

** Significant at .05 level.

The coefficient of disposable income(Y_d) is as expected negative, but significant at 10% level only. It is natural that as an economy progresses it becomes more and more efficient and therefore to produce a unit of output it requires less and less of capital input.

The coefficient of expected rate of inflation(ρ^e)is positive as postulated and is significant also. It indicates

that during the inflation period considered there has been a tendency among the producers to install more of capital rather than utilise efficiently the capital that is already installed. It could be that inflationary tendencies are due to structural bottlenecks which also inhibit the efficient use of capital. Further the demand for products which require more capital may rise during inflation so that the production structure is more capital intensive. Also inflationary tendencies breed corruption; as a result inefficient projects and people are given the job which results in less effective use of scarce factor capital. Thus expected rate of inflationpositively affects the incremental capital output ratio.

The coefficient of real market rate of interest is positive, but insignificant. This rate is positively affecting consumer durable, physical asset and illiquid asset ratios and negatively direct investment ratio. Consumer durable and physical asset positively affect $\Delta c/\Delta o$, while direct investment and illiquid asset ratiosnegatively affect this ratio. A overall positive effect implies that the effect on consumer durables, physical asset and direct investment outweighs the effect on illiquid asset ratio.

The coefficient of real rate on one year deposit($\%_{1yr}$) is positive and insignificant. This positive effect is because

of its significant effect on consumer durable. The coefficient of expected rate of return on consumer durables ($\gamma_{e \cdot D}$)is as postulated positive but insignificant. Similarly the coefficient of expected ate of return on direct investment(γ_{DI}) is positive but insignificant. Thes postive effect indicates that higher return on securities are mainly due to speculative activity rather than substantial gain. The coefficient of expected rate of return on physical assets (γ_{PA}) is positive but insignificant. Similarly the coefficient of expected rate of return on gold and real rate of interest on borrowing is positive but insignificant.

The $\bar{R}^2$=.033)is very low and F ratio clearly point out that the relationship postulated is not significant and these variables areunable to explain the behaviour of our dependent function. The only variable significantly affecting this function is the expected rate of inflation (P^e). Probably with the inclusion of other variables like: the break up of investment into inventory and capital stock; kind of technologies imported, government policy regarding taxes and incentives and certain demand factors, the function could have been better estimated. But our intention was to study the effects of only those variables which were also included in the saving ratio function & none other on the incremental capital output ratio. Further it is clear that even in this function that we have

estimated, our main variable, expected rate of inflation is significantly and positively affecting the ratio as postulated.

4. An Empirical Analysis of Model C :

Growth Equation:

The growth rate in the economy is affected by both saving ratio and incremental capital output ratio. Both these ratios when estimated in reduced form are affected by expected rate of inflation and other variables. The empirical results suggest that both saving ratio function and incremental capital output ratio function are positively affected by expected rate of inflation i.e. the inflationary conditions tend to raise household saving, which in turn increases domestic saving ratio. This has positive effect on growth as both household saving and domestic saving are positively related to growth.

On the other hand incremental capital output ratio is also positively affected by expected rate of inflation. But a rise in incremental capital output ratio implies a fall in growth rate. Thus expected rate of inflation on the one hand raises growth rate by increasing saving ratio, while at the same time reduces growth rate by raising incremental capital output ratio. The actual effect of expected rate of inflation on growth will depend upon the strength of the two effects i.e. the β coefficient of this variable.

The estimated results are : a one percentage increase in the expected rate of inflation in our framework leads to an increase in saving ratio of 0.677%, while it increases the incremental capital output ratio by 2.282%. Obviously the numerical estimate of β coefficient in the incremental capital output ratio equation is higher leading us to conclude that expected rate of inflation has negative effect on the growth of Indian Economy inspite of its having positive effect on domestic saving ratio:

5. Conclusion :

The empirical results suggest that the important variables positively affecting household saving are expected rate of inflation and the market rate of interest, while those negatively affecting the ratio are expected rates of return ons consumer durables and those on direct investment.

Both consumer durables and direct investment's expected rates of return have a negative effect on physical asset, and via this effect, negatively affects households saving. The repurcussions of expected rate of return on consumer durables are more serious because, it raises the ratio of consumer durables in saving portfolio which is not desirable at this stage of our development, and secondly it is significantly affecting domestic saving ratio function negatively, while expected return on direct investment is not significant in domestic saving ratio function.

The expected rate of inflation significantly affects the component illiquid asset, direct investment and consumer durables; of these it positively affects illiquid asset ratio (at .025 significance level) and consumer durable asset ratio (at .05 significance level), and the numerical coefficient of illiquid asset ratio is higher. A 1% increase in the expected rate of inflation leads to increase in illiquid asset ratio by 0.36%. This coefficient is high, especially as the ratio of this asset in household saving is also high. As mentioned earlier[1], this asset category is particularly important for generating growth, as these are the genuine longterm savings of the household which can be used to augment capital stock in the economy. Another very important asset category which is important as far as financing growth is concerned is direct investment. But this is being negatively affected by expected rate of inflation. The share of this asset is not only low in household saving, but has been volatile as well, therefore, probably it might not have had such a negative impact directly on the growth of the economy, But if expected rate of inflation continues to have a negative effect then it will hamper proper development of capital market and this will result in loss both to the government and to the corporate sector. The numerical coefficient of the effect of the expected rate of inflation on direct investment ratio of household is very close to that of illiquid asset ratio. As the share of direct invest-

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1 Refer to Chapter 3, Section 6

ment in household saving is low, this might not worry us in the present, but the negative impact of expected rate of inflation on an important asset, (which is likely to be an important asset in future) cannot be belittled also.

The positive effect of expected rate of inflation on consumer durables ratio is of a small magnitude, but because its ratio is continuously increasing and is further expected to increase, therefore this is not desired, especially when viewed in the light of a 'Socialistic Society' that our planners envisaged. With an increase in the share of consumer durables, the production structure would be geared more and more towards production of these goods, or the goods may be smuggled which is worst.

With the high ratio of population under the poverty line, it is questionable whether it is desirable to have food shortage and unemployment increasing on the one hand, and sophisticated goods mainly to be used by high income groups increasing on the other.

Thus the empirical results suggest that though household saving increases significantly with expected rate of inflation, yet only one of its component : saving in illiquid assets, is favourably affected by expected rate of inflation, which will help in promoting growth, while direct investment, another long term asset, is negatively affected.

As expected rate of inflation has a negative effect on direct investment ratiotherefore government should come up, with comprehensive policy to stimulate capital market and provide incentive to household to invest in these assets.

On the other hand the market rate of interest significantly affects the saving ratio implying that monetary factors do influence the real factors even in the short run. It significantly and positively affects illiquid asset, consumer durablesphysical assets, while negatively, saving indirect investment ratio. Statistically it has maximum effect on physical asset ratio.

Certain other observations from the empirical results suggest:

1) Increase in illiquid asset ratio is generally not at the cost of other assets, which implies that financial intermediaries have been successful in raising the saving ratio of the economy. Part of this increase is because of the increase in black money in the economy.

2) McKinnon's arguments that real money and physical capital are complementary in the long run, holds true even in the short run, but in the latter case inflation in India has encouraged real money ratio holdings and physical asset ratio, (though not significantly in any case); this is primarily because inflation in India has been accompanied by increases in black money.

3) In both the equations : saving in illiquid assets and saving in direct investment, we notice that an increase in $h_{D\cdot I}$ reduces $S_{I\cdot L\cdot A}$ ratio, and increase in $h_{I/P}$ reduces $S_{D\cdot I}$ ratio(though both effects are insignificant statistically). This indicates that the two assets are substitutes and therefore the corporate sector can get funds by raising its rate of return and thus diverting household saving from illiquid assets to direct investment.

On the composition of saving front it can therefore be tentatively concluded that households do not strictly have a preferred portfolio mix and they do change the final destination of their saving according to different set of circumstances. Thus the behaviour of the household depicts that there are certain substitute assets in the household wealth portfolio like: the consumer durables and physical assets; illiquid assets and direct investment, illiquid assets and consumer durables, and certain complementary assets like liquid asset and consumer durables; and liquid assets and physical assets. All this implies that there are bound to be substantial portfolio effects. If this istrue, then there will not be a direct relation between supply of money and prices, rather thestate of disequilibrium might continue for long. Thus the empirical results suggest that inflationary tendencies in India have promoted saving ratio on one hand and increased incremental capital output ratio on the other. Thus growth is negatively affected by this mild inflation too.