

OPTIMAL CASH RESERVE RATIO IN INDIA'S* LIBERALISED MONETARY SYSTEM

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1. Introduction

Reserve requirements are an effective tax on bank deposits intended to "stabilise" the money creation process.¹ The cash reserve ratio (CRR) is a tax on bank deposit liabilities because similar deposit liabilities of non-bank financial institutions are not subject to reserve requirements. And to the extent the rate of return on bank reserves, measured either explicitly or implicitly, lies below the market rate due to the reserve requirements, it constitutes a discriminatory tax also. While the monetary "control" rationale is no doubt a convincing argument, no consensus prevails, among economists and policy makers as well, as to the optimal level of reserve requirements. Nor there exist any criteria by which to set the requirements in order to stabilise the money creation process. Friedman (1959) advocates 100 percent reserves, whereas, Carson (1973) and Fama (1980), to mention a few, argue for abolishing reserve requirements altogether on all deposits.

2. The Model

The purpose of this study is to formulate a compact macro-asset equilibrium model with a well built-in role for the CRR with a view to deriving a computable optimal CRR in the liberalised Indian monetary system. Given that price stability, can be most effectively pursued by monetary policy, Reserve Bank of India had set for itself the difficult task of minimising the expansionary impact of budget deficits on the liquidity of the banking sector. Since achieving price stability through stabilising money creation is given overriding importance, from the model detailed below the optimal level of CRR is derived as that ratio which minimises the log-price-level variability determined basically from the covariance structure of stochastic disturbance influencing the demand for financial assets.

The following describe a one good economy with demand for four financial assets: currency (C) with the non-bank public, the reserves (R) of the banks, household sector deposits (D) and equity of bonds held by households (B) and by banks $((1-r) D)$. On the

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1. Though there need not exist a one-to-one correspondence between the CRR level and the money multiplier value, (Courakis, 1987), this is not to deny that the CRR comprises a tax on bank deposit liabilities.

production side capital is the only constraining primary input.

$$C + rD = H/P \quad [1]$$

$$B + (1-r) D = K \quad [2]$$

$$C + D + B = W = K + (H/P) \quad [3]$$

Here $(H/P) = C + R (=rd)$ is the real high-powered money. P is output price level. ' r ' is the cash reserve ratio whose optimal level we intend to derive and compute. Total real wealth (W) consists of real capital ' K ' plus the real value of high powered money (H/P) . The variables C, B, D, R, W and K are all defined in real terms. Since P is measured in nominal H , the system (1) - (3) incorporated (H/P) on the RHS of the equations.

We assume, all four assets are gross substitutes. Of the two implicit interest rates of our model, the nominal rate on deposits ' id ' is further assumed to bear a certain correspondence with the equidity rate ' ie '. Also assuming ' ie ' to be exogenous, as it is determined by the marginal product of K , we are left with equation (1) to determine ' P '. Rewrite equation (1) as:

$$P = H/(C + rD) \quad [4]$$

This new equation tells us that in equilibrium the price level is determined by the ratio of supply of and demand for the nominal high-powered money.²

For deriving the optimal CRR from the covariance structure of stochastic disturbances the demands for currency and deposits, are subject to proportional real disturbances ec and ed with zero mean and finite constant variances s^2c and s^2d respectively. Supply of H is assumed deterministic in anticipation of our empirical results. Taking logarithms of (4) after incorporating error terms, yields

$$p = \log H - \log [C(1 + ec) + rD(1 + ed)] \quad [5]$$

which when linearised around the equilibrium E ($ec = E(ed) = 0$), gives the following expression

$$-p = \frac{C ec}{C + rD} + \frac{rD ed}{C + rD} \quad [6]$$

Here ' p ' indicates deviations around the equilibrium. The two terms on the RHS of (6) are fractions of the stochastic shock due to variations in currency demand and deposit demand

2. The real balance effect is assumed to be insignificant so that changes in real balances will have negligible effect on monetary demands.

respectively. The variance expression for (6), then, is given by

$$S^2p = \frac{C^2 S^2c + r^2 D^2 S^2d + 2rCD Scd}{(C + rD)^2} \quad [7]$$

Earlier, we have posited that the optimal CRR is that ratio which minimises the variability of the price level. Accordingly, the optimal CRR which minimises S^2p with respect to r is derived to be³.

$$r^* = C (S^2c - Scd) / (S^2d - Scd) \quad [8]$$

Relation (8), of course, is not generally meaningful if either $Scd > S^2c$ or $Scd > S^2d$ but meaningful when both hold simultaneously.⁴ The covariance term exceeding either variance term describes the condition of instability inherent in the system⁵.

Expression (8) states that the optimal CRR varies positively with the ratio of currency to deposits and the variance of the stochastic disturbance term of currency but inversely with the variance of the stochastic disturbance term of deposits and the covariance term Scd provided $S^2c < S^2d$. From (8) some special cases are noteworthy. One is, $r^* = 0$ when $s^2_c = s^2_d$, a special case as argued by Carson (1973) and Fama (1980). Another interesting special case is one where $r^* = 1$. This result follows when the stochastic disturbances of currency and deposits are negatively correlated with each other such that $Cec = -Ded$. In other words the demand for money defined as currency plus deposits is perfectly stable. This implies another important result of absence of stochastic shocks in the equity market because

$$Cec + Ded + B eb = 0 \quad [9]$$

where 'eb' is the stochastic disturbance in the equity demand. Since our interest is in computing the empirically optimal CRR in view of its immediate policy importance, we now turn to the econometric estimation of the currency and deposit demand functions for the Indian economy with a view to estimating S^2c , S^2d and Scd .

3. 'r' is assumed to be independent of the stochastic disturbance structure of the model.

4. A negative 'r' implies that banks hold no reserves but issue currency as a fraction of deposits.

5. When $r < -(C/D)$ then the result in (8) becomes unstable.

3. Econometric Results

The variance-covariance matrix of the stochastic residual terms in the currency and deposit equations needs to be estimated for calculating the optimal reserve ratio. For this purpose the currency and deposit demand regression equations have to be specified and the scope of time-series data along with the sample period requires to be decided. First, the sample period is confined to 1970/71 (2) - 1991/92 (4) and it is quarterly data. Second, the demand functions were specified in the most popular log-linear form so that the errors and their variance-covariance structure were consistent with our theoretical model. Third, in each equation one scale variable and one interest rate variable were arguments as in the standard case. Fourth, since data are quarterly, to minimise all specification problems and errors, three quarterly dummies were also introduced into each equation. Finally, with a lagged endogenous variable in each equation, the system was estimated by the Zellner's (1962) seemingly unrelated regressions for consistent and asymptotically efficient parameter estimates as follows:

$$\begin{aligned} \log C_t = & -0.4102 + 0.1117 \log RGNP_t - 0.0521 \log i_t \\ & (-2.076) \quad (2.751) \quad (-1.408) \\ & + 0.9482 \log C_{t-1} - 0.0388 Q_1 \\ & (33.78) \quad (-2.426) \\ & - 0.1212 Q_2 - 0.0423 Q_3 \\ & (-16.03) \quad (-3.177) \end{aligned}$$

$$\bar{R}^2 = 0.9926 \quad F = 1573.64 \quad h = 1.212$$

$$\begin{aligned} \log D_t = & -0.8201 + 0.1379 \log RGNP_t + 0.0401 \log i_t \\ & (-2.856) \quad (2.882) \quad (1.245) \\ & + 0.9441 \log D_{t-1} - 0.0662 Q_1 \\ & (54.53) \quad (-2.883) \\ & - 0.0392 Q_2 - 0.0165 Q_3 \\ & (-4.021) \quad (-1.319) \end{aligned}$$

$$\bar{R}^2 = 0.9989 \quad F = 6220.60 \quad h = 1.687$$

Residual Covariance Matrix

S^2_c	S_{cd}	S^2_d
0.000471	0.000375	0.000603

All symbols denote as follows: C = real currency with the nonbank public; RGNP = real gross national product, i = rate of interest on 1-3 years time deposits; and Q1, Q2, Q3 are quarterly dummies. For the deposits variable D we have considered both demand plus time and other deposits with banks since all three are subject to uniform reserve requirements. All the parameter estimates in the currency equation excepting that of the interest variable are statistically significant at better than conventional levels of confidence. The interest variable becomes significant at 20 per cent. In the deposits equation, barring the interest variable and the third quarterly dummy, all other variables are significant once again at better than conventional levels of confidence. The interest variable bears the appropriate sign in both equations though not statistically significant. The h - statistics indicate that autocorrelation is not a serious problem.

Substitute in (8) the estimated residual covariance matrix values reported above and the currency-deposit ratio (C/D) of 0.2385 for the fourth quarter of 1991-92 to compute the optimal CRR value to equal $r^* = 0.1004$ or 10.04 per cent which was far below the statutory ratio of 25 per cent as at end March 1992. In fact for the C-D ratios of 0.2329 and 0.2379 of the fourth quarters of 1992-93 and 1993-94, the optimal CRR magnitudes become 0.0982 and 0.1003 respectively or approximately 9.82 and 10.03 per cent respectively.⁶ These computed values are also far below the statutory ratios of 15.0 and 14.0 per cent.⁷ Thus there appears to exist a clear cut case for further lowering of the present statutory cash reserve ratio. The case for further reduction in the ratio positively depends on how fast the C-D ratio is brought down by the nonbank public's preferences for the two assets. Further, if the CRR is set at the optimal level, it is likely to reduce the standard deviation of $\log P$ to approximately two per cent or variance to about 0.4 percentage point according to relation (7). This is on the assumption that the supply of high-powered money were deterministic which may come closer to ground reality in the 90s.

6. The C-D ratio for 1993-94 is computed with data referring to March 4, 1994 from the *Weekly Statistical Supplement*, Reserve Bank of India Bulletin.

7. The statutory CRR at end March 1993 was 15.0 per cent until it was reduced to 14.50 and 14.0 per cent on 17-4-1993 and 15-5-1993 respectively. In addition, incremental CRR of 10 per cent on the net incremental DTL of 17-4-1992 over that of 3-5-1991 was also applicable. However, the effective CRR would be slightly lower if one adjusts the actuals for the interest received at 10.5 per cent on CRR balances maintained on the basis of net DTL as on 23-3-1990 minus the minimum interest free 3 per cent CRR.

Summary

The crucial aspect to focus upon in evaluating Africa's experience in financial sector development is its savings effort, the level and quality of financial intermediation and the efficiency in resource use. On all these scores, the African financial sector has performed very badly. Upon acceding to political independence, African governments decided to remodel their financial infrastructure by the establishment of a diversified set of financial institutions - viz - commercial banks, development banks, savings banks, co-operative banks, housing finance and postal savings banks, etc. Unfortunately, the ensuing benefits have not been commensurate with the enormous costs incurred. A great deal of effort was geared towards the provision of credit rather than the mobilization of resources. The official attitude to resource mobilization has been extremely lax partly due to foreign resource inflows and partly due to the inexpensive rediscounting terms and facilities provided by the central bank.

Commercial bank branches have not yet been sufficiently diffused in the rural hinterland with the result that Africa's resource potential in the rural areas still remains untapped. Development and Co-operative banks have literally become mere retailers of foreign loans and government funds even though many were empowered to mobilize resources in their statutes of establishment. The operations of specialised financial institutions are generally insulated from competition by various legislations, and are even provided with generous subsidies. Instead of undertaking much wider and more demanding tasks, (eg. bringing in financial innovation, developing money and capital markets, broadening the monetized sector of the economy, improving the unorganized segment), central banks

in developing Africa are confined to the narrow contours of a regulator, and are circumventing financial deepening through the provision of generous accommodation to the commercial banks and the government.

Bank credit still remains a financial appendage of certain enclaves: large-scale mineral exporters, highly protected manufacturing, foreign owned undertakings, and the parastatal sector. In contrast, small farmers and indigenous small-scale enterprises remain financially repressed although they possess quite a large share of the deposit resources on which bank credit is based. These repressive influences of the formal banking system are perpetuating the enlargement of the informal sector.

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Summary

Rural women have been one of the most consistently neglected groups in development planning and programming, and, paradoxically, one of the groups with the greatest unrealized potential. Direct access to credit, accompanied by savings, can become a catalyst for change that brings benefits to rural women, as well as to their families and communities. The book will address this issue as follows:

— In the introductory chapter, the reasons for direct, lending to rural women in developing countries are highlighted and women's creditworthiness is reviewed.

— A review of women's informal practices of borrowing and saving, their advantages and disadvantages is given in Chapter 2.

— This is followed by an overview of women's limited use of formal financial markets for borrowing and savings, and existing constraints on the supply of credit to women in Chapter 3.

— Chapter 4 discusses women's demand for credit, its assessment and promotion, with reference to both institutional credit and to savings.

— Chapter 5 provides an overview of institutional strategies for providing financial services to rural women, either separately or together with men, with extensive case illustrations; the variety of operational linkages that are being tried between credit and savings.

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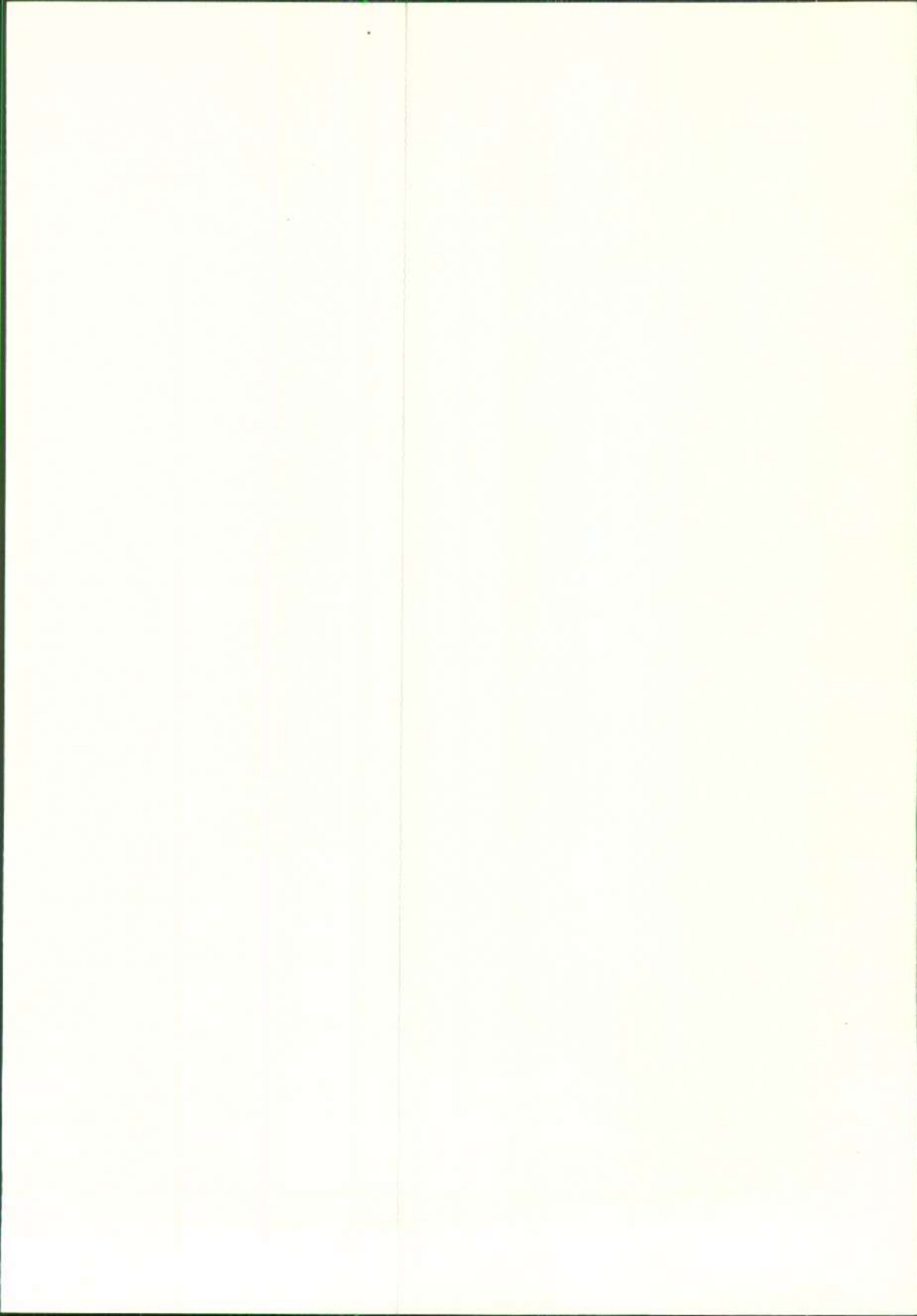
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