Determination of Money Supply in India: The Great Debate

Das, Rituparna

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Rituparna Das

Introduction

Researchers reported that - there were two approaches to money supply determination in India: balance sheet or structural approach and money multiplier approach; the former focused on individual items in the balance sheet of the consolidated monetary sector in order to explain changes in money supply and the latter focused on the relationship between money stock and reserve money; the money multiplier approach emerged strongly as a critic to the balance sheet approach; between January 1976 and January 1978 there was a hot and rich debate between two groups of researchers, one group led by Gupta who believed in the money multiplier theory, the other group of RBI economists, who were not accepting this theory; the debate gave rise to a number of research papers where mostly regression techniques were used to estimate and forecast money supply function; Bhattacharya (1972), Gupta (1972) and Marwah (1972) used regression techniques to estimate money multiplier in India four years before the debate took place. The above debate is narrated below in an analytical style.

The Balance Sheet Approach

The First Working Group on Money Supply (FWG) introduced this approach. This approach comprised the following points: (a) money supply was a liability of the banking system and government; (b) inter-bank assets and liabilities did not affect money supply;

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(c) banks' borrowings from RBI increased money supply and (d) variation in banking systems financial assets minus the variation in its net non-monetary liabilities represented the change in money supply, (e) division of the economy into (i) government sector comprising central and state governments and (ii) private sector (comprising the rest of the domestic sector and the foreign sector) was necessary in order to know which sectors caused how much changes in financial assets and net monetary liabilities of the banking system; (f) the government sector's domestic budget deficit on money supply could cause an increase in money supply through variations in the financial assets and net non-monetary liabilities of the banking sector; hence (g) the impact of government sector's deficit in its foreign accounts on money supply was nil; (h) the government sector's total impact on money supply equalled its total budget deficit minus its net purchases of foreign exchange from RBI; (i) deficit financing was defined as the total impact on money supply of the government sector and to include the changes in RBI's holdings of government securities and treasury bills, banks' holding of government securities, RBI's foreign exchange assets as a result of the government sector's net purchase/sale from/to RBI, and the banking system's net non-monetary liabilities as a result of the transactions between the government sector and the government's currency liability to the public; (j) an increase/decrease in the banking sectors' loans and advances to the private sector and/or its holdings of private sector's shares and securities would result in an equivalent increase/decrease in money supply and (k) government sector's direct impact on money supply. The government sector's ability affect money supply directly through changes in the treasury balances was also mentioned by academicians like Bhole (1987).

Gupta (1976a)

Gupta (1976a) sharply critiqued the FWG Analysis. He opined that mere balance sheet counterparts or accounting equivalents such as those enumerated in Factors Affecting Money Supply in Analysis II should not be called the determinants of Money Supply (M). Gupta was suspected to get the H theory of M determination from Brunner and Meltzer (1964) or Cagan (1965) while the Indian academicians like Gupta (1972) and Marwah (1972) were suspected to inspire him.

Mujumdar (1976)

Mujumdar (1976) was reported to criticize Gupta (1976a) on the following grounds: (a) the so called high powered money (h) could be powerless and could lose it's importance in bringing about variations in M had the central bank imposed quantitative credit ceiling thereby restricting the power of the banks to expand credit despite their having adequate reserves; (b) the multiplier analysis could not explain fully the variations in the secondary money whereas the RBI analysis did it; (c) since in the Indian context credit planning was an integrated part of development planning over the years RBI should opt for planning both of primary money and secondary money than for planning primary money only and leave the secondary expansion to work itself out on the basis of multiplier; (d) while RBI analysis sought to provide a total explanation of variations in both primary and secondary money, the multiplier analysis seemed to ignore the demand side of secondary money.

Khatkhate (1976)

Khatkhate, a member of the FWG was reported to come down on both of Gupta (1976a) and Mujumdar (1976). Though he appreciated Gupta's stress on the behavioural relations like currency ratio and reserve ratio, but in Khatkhate's opinion they were not linked up with RBI presentation of monetary data. At the same time he differed with Mujumdar on the following points: (a) the multiplier analysis was unsatisfactory and mechanistic vis-à-vis RBI analysis; (b) raising reserve ratio and imposing credit ceiling were different in terms of their effects on the multiplier; (c) depending on reserve ratio alone the multiplier fluctuates. Khatkhate's opinion on the above points was as follows: (i) the multiplier analysis was not merely a substitute, rather an intrinsic part of RBI presentation; and, (ii) raising reserve ratio and imposing credit ceiling were analogous in terms of their effects on the multiplier. Khatkhate commented that when reserve ratio was raised or credit ceiling was imposed, it was necessary to examine how other components like excess reserves ratio, currency ratio etc behaved; there were evidences that even when reserve ratio was unchanged or credit ceiling was not imposed or raised, the multiplier changed.

SAM (1976)

SAM (1976) was reported to support and supplement Mujumdar (1976) and attack Gupta (1976a). SAM critiqued Gupta against his using the RBI data on M and H and at the same time claiming that RBI did not know the distinction between the two. SAM did not accept the following: (a) the multiplier theory was a universally acceptable theory of M determination; (b) there could be a mechanistic relationship between monetary base and M such as H theory, the determinants of M lied in real and monetary sectors as also in institutional structures and development, not only in monetary sector; (c) deposit

increases when M increases, deposit was dependent on overall level and growth of national income, level of interest rate, quantum of deficit financing etc; (d) forces, which increase M, also increase time deposits. There were following two loopholes in the trio: (a) they expressed their views, supported Mujumdar and attacked Gupta, but did not substantiate all these with evidences and thus the quality of their paper was not at par with either Swami (1978) or Chona (1976); (b) perhaps, they did not make comparative static analysis of the H model, any change in the real and other sectors could be accommodated in this theory; for example extension of banking facilities in the hitherto untapped areas would increase deposit collection and hence disposable H and thus would raise M. SAM emphasized on stability test of the coefficients in money multiplier and accurate forecasts of exogenous variables. This was the first time ever the stability test is mentioned. In their view multiplier might be useful for long run projection of M, but not for short run because in short run its coefficients could deviate from the long run trend.

Madhur (1976)

Madhur (1976) was reported to criticize all of Gupta (1976a), Mujumdar (1976) and SAM (1976); he criticized Gupta (1976a) because Gupta (1976a) did not address the problem of adjusting H though Gupta did it in one of his Delhi School of Economics Working Papers; he criticized Mujumdar's summarizing of the multiplier theory by terming M as a highly stable function of H after H was adjusted against changes in the reserve ratio; he took to task SAM and Mujumdar when all of them took H to be RBI policy controlled; as per Madhur the fiscal policy determined H and RBI had very little to do there, RBI could at most change the reserve ratio and thus affect the adjusted H only

when banks did not fail to meet the RBI stipulated reserve ratio; finally he criticized SAM (1976) because (a) SAM declared on the one hand that derived data, not the primary data of RBI had analytical significance, whereas on the other hand supported Mujumdar, who always referred to primary data; (b) SAM misunderstood the multiplier theory because they could not realize that behavioural ratios like currency to deposit ratio in monetary economics were functions of real, monetary and structural variables; (c) SAM believed that the money multiplier was highly unstable in India, but Madhur proved the contrary empirically; and (d) in analyzing the effect of compulsory deposit scheme on bank money, SAM (1976) assumed m to be unity, but in Mujumdar's (1976) article it is 2.485 though unadjusted, as per SAM, RBI would already know the differences between H and bank money in terms of RBI credit to government and commercial bank credit to government respectively but in RBI's so called total explanation of variations in M, H and ordinary bank money were mixed up and gave an indication of one to one correspondence between bank money and M.

Gupta (1976b)

Gupta (1976b) was reported to reply to Mujumdar (1976), SAM (1976), Khatkhate (1976) and Madhur (1976); Gupta's complaint against Mujumdar was that the latter was not convinced that the RBI analysis was tautological and the latter's main contention was that M in India was directly determined by the RBI, which was further confirmed by SAM, who said that RBI was directly determining the M by virtue of regular undertaking of credit planning and credit rationing; this was a wrong contention as per Gupta; RBI could not determine currency or what Mujumdar called primary money, not to speak of

credit or what Mujumdar called secondary money; therefore RBI was very much in need of a theory with sufficient predictive power to explain the determination of components and totality of M, and money multiplier theory could fulfil all these needs; in any case RBI's accounting table was of tautological character and as such did not have any explanatory or predictive power; again the multiplier referred to by RBI analyses involving distinction between M and money multiplier did not permeate entire RBI thinking on the subject. Gupta tried to disprove assertions of SAM and Mujumdar that the money multiplier was mechanistic by deriving the demand deposit multiplier from asset demand functions and a market equilibrium condition. Thus Gupta asserted that the multiplier theory offered a convincing behavioural explanation of the money supply process and changes and identified well-defined channels through which the influence of myriad of forces – economic, institutional and policy generated – operating on money supply, could be systematically analyzed as well as predicted. Here Gupta referred to Gurushree Swami's unpublished research work, which explained (a) the link between currency ratio on the one hand and on the other holding of black money, spread of banking facilities in the rural areas, bazaar-bill rate, 9-month time deposit rate of banks etc; (b) the link between time deposit to demand deposit on the one hand and on the other two interest rate factors – the 12 month time deposit rate of banks and the rate on variable industrial securities, and (c) the link between reserve ratio on the one hand and on the other both interest rate factors and non-interest rate factors like shifts in deposits among scheduled non scheduled and state cooperative banks, structural changes within the scheduled banking sector in terms of redistribution of total deposits among banks of different sizes, stability in the banking system, liquidations and amalgamations of banks

etc. Gupta refuted Khatkhate and Mujumdar when they considered money multiplier to be influenced by changes in the value of statutorily required reserve ratio of banks because in his opinion changes in statutorily required reserve ratio changed disposable H, not mere H. Here he drew an analogy between the relationship between consumption expenditure and disposable income on the one hand and on the other the relationship between M and disposable H. In contrary to Mujumdar, Gupta asserted that RBI could not change money supply through changing statutory reserve ratio, therefore appropriate use of various control instruments like open market operations, changing the required reserve ratio and controlling RBI lending to central banks could alter the disposable H, not the money multiplier, whereas bank rate had very little effect on the money multiplier. Here again Gupta referred to Swamy's regression analysis of available H on M for two separate periods: (a) 1951-52 to 1961-62 and 1962-63 to 1971-72 with $\overline{R}^2 =$ 0.988 and $R^2 = 0.999$ respectively indicating highly significant regression coefficient of adjusted H in both the cases. Another point of Mujumdar and SAM against the multiplier theory that it attributed changes in money supply to monetary sector alone, was not true as per Gupta, but money supply was influenced by both real and monetary factors. Here Gupta reacted by identifying a channel present in the multiplier theory whereby autonomous changes in the demand for bank credit arising from autonomous changes in the real sector could be allowed to influence the multiplier and so money supply; here the importance of operation of the above channel was to deemed to be measured, which required developing a sufficiently complete and disaggregated model of determination of money supply and estimating money supply empirically. But Gupta thought that all these refinements would not add much to the explanatory and predictive power to the simple

multiplier theory. Gupta again opposed SAM, where SAM complained that Gupta denied the presence of any organic relationship between bank credit and money supply because presence of a third variable, the quantity of H, which was again subject to autonomous variations, caused an observed organic relationship between two variables volume of credit and volume of deposit; given a stable demand deposit multiplier, variations in H caused predictable changes in demand deposits as well as bank credit. SAM in their own illustration could not correctly establish the causal relationship between credit expansion and money supply expansion; here Gupta pointed out SAM's failure to see the difference in terms of addition to H between deposit accretion and borrowings from central bank and SAM's two contradictory statements, one where SAM made credit expansion dependent on deposit expansion and other where they made credit expansion a causal factor in money supply expansion. As per Gupta SAM's paper was full of imprecise and confused statements and lack any hypotheses in the truest sense of the term and SAM did not understand the modus operandi of the compulsory deposit imposition. Actually as per Gupta compulsory deposits impounded H, because banks paid it to RBI through transfer of H, only kind of money RBI accepted and also because government decided not to borrow from the RBI; here M contracted because of reduction in H, but not because of postponement of addition to currency and demand deposit as per whether payments to employees are made through cash or check as per Gupta. Gupta also tried to disprove SAM's (1976) immediate impact argument regarding the control of RBI credit to commercial banks and its effect on bank reserve. Gupta ended up with an expression of happiness with SAM and RBI for their agreement with Gupta (1976a) on qualitative difference between the effects of the RBI's lending to government and commercial bank

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lending to government on money supply because (i) SAM's quotation from a RBI publication to the above effect, (ii) a small section on money multiplier being included in RBI Report on Currency and Finance. (iii) RBI's Analysis of Money Supply II contained a simple discussion of the m theory. But still Gupta (1976b) was not fully happy, when he detected reluctance on part of some of the RBI economists to accept openly the m theory as the basis of official analysis of money supply. He advised them to master the multiplier theory or share their own theory with the academic community, but not to support RBI's empty analysis.

Chona (1976)

Chona (1976) was reported to be a supplement to Gupta's (1976b), except for the second paragraph in p 668, where Chona asserted the central bank's "absolute control over its monetary liabilities", which went against Gupta. Chona sought to examine the stability of the ratio of currency to M and the ratio of reserves to demand deposits. Chona (1976), following Ahrensdorf J. and S. Kanesa Thasan (1960), treated the changes in M caused by variations in monetary liabilities of the central bank (ΔM_L) and by fluctuations in money multiplier (ΔM_k). ΔM_L was further subdivided into changes due to net foreign assets of the central bank (ΔM_f), to net credit to the government (ΔMcg) and to the policies followed by the central bank (ΔMp). Chona's findings were as follows: (a) after identifying separately the components of changes in M attributable to ΔM_k and ΔM_L and expressing them as percentages of M in the previous period in order to bring out the relative impact of changes in L and k on percentage change in M, the average k effect was found to range between 0.5% and 2.9% and the average L effect was found to range

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between 5.6% and 11.6%; so there was a smaller impact of k on M compared to L[1]; the policy of monetary management in the inflationary situation should be to control L in order to check monetary expansion; (b) the effects of changes in currency ratio dominated the changes in M attributable to ΔM_k, the average effects of changes in the reserve ratio were rather insignificant, barring 1973, almost the entire variation in M attributable to ΔM_k was behavioural and not policy induced; (c) Amongst the non-behavioural factors determining M, i.e. the components of ΔM_L the most important was, by and large, ΔMcg; (d) in a large number of years the policy induced changes in L tended to impart contractionary impulses to M in the opposite direction of the expansionary impulse caused by ΔMcg, there emerged broadly, though not consistently, an inverse relationship between exogenous and policy induced changes in monetary liabilities of RBI.

Swamy (1978)

As per Swamy (1978), reportedly since 1975, when she had made the analysis of the sources of change in money supply, a considerable amount of discussion came up among some academicians and RBI staff on whether the H-M approach was appropriate or not for money supply analysis in India[2]. The RBI group appeared to feel that since supplies of both of reserve money and bank money and the behaviour of multiplier were fully controlled by RBI, there was no use of the multiplier approach, which paid importance to the behavioural aspect of public and commercial banks on the value of the multiplier and

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[1] There were contradictions between the last statement of the last paragraph of Part II and the last statement of the first paragraph of Part III of Chona's paper regarding the comparative strength of L effect and k effect on M.
[2] The same claim is made by Gupta 1976b.

so on the supply on money. Referring to Cagan (1965), Courchene and Kelly (1971) and Gupta (1973) Swamy criticized the above attitude of the RBI group. Cagan (1965) related the sources of changes in H in USA to various incidents like Gold Mechanism after 1914 and treasury operations. Courchene and Kelly (1966) related the supply of H in Canada to policy variables like full employment, price stability etc. Gupta (1976b) related the source of change in H to government borrowing in India. So Swamy argued that H-M approach could deal with the cases even where changes in H are not under the control of the central bank as it did in USA and Canada. For India Swamy empirically identified autonomous and passive sources of change in H. The autonomous sources were the results of autonomous decisions of the RBI and the passive sources were those not under the RBI control. Autonomous sources of change in H identified by Swamy were (i) changes in government securities held by the RBI due to open market operations, (ii) subscriptions to new loans of central government, (iii) purchase of securities from the public (i.e. the banks), and (iv) sale of securities to the public. Passive sources of change in H identified by Swamy were (i) decisions made by the public, i.e. net foreign exchange (forex in short) purchase from the RBI and borrowings of commercial and cooperative banks from the RBI; and (ii) decisions made by the government, i.e. changes in government securities held by the RBI due to the government borrowings from the RBI and government's net forex purchase from the RBI. Swamy concluded that the RBI and Government clubbed together for policy purposes explained on average 68% of the changes H.

Impact of Bank Credit on Money Supply

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Bank credit is reported to be a useful indicator of real sector activity that affected money supply. In India reportedly one of the objectives of monetary policy is ensuring adequate credit flow to the productive sectors of the economy. RBI is reported to extend credit to the government by way of loans and advances and investments in government securities and to a little extent to the financial sectors including banks. The depository corporations such as commercial and cooperative banks are again reported to invest in government papers and other market instruments and extended credit to the commercial sector including non-depository financial corporations. The non-depository financial corporations are also reported to invest in government securities and extend credit to the commercial sector and to a limited extent to the banking sector by way of refinance. The role of bank credit in making the money supply endogenous is discussed in Das (2009).

Rao, Venkatchalam and Vasudevan (1981)

Rao et al (1981) was reported to contend that equilibration of supply and demand was done by allowing for change in nominal income given an exogenous forecast of real income which in turn affected the estimates of demand for currency and deposits. The forecasts of money supply were reportedly derived by an iterative solution of the entire model, which meant that all the relationships specified in the model were to be simultaneously satisfied. The model was reportedly simulated for the sample period and the annual predictions generated by the model were compared with actual values of monetary aggregates and the national income deflators for those years. The results were reportedly presented in two alternative models: Model A - in this model the equilibrium took place around narrow money and demand deposits were derived as a residual by

deducting estimated time deposits from aggregate deposits; Model B - in this model the equilibrium took place around broad money and time deposits were derived as a residual by deducting estimated demand deposits from aggregate deposits.

Singh, Shetty and Venkatachalam (1982)

While discussing on the issues of monetary policy Singh et al (1982) was reported to find that reserve money caused logarithm of narrow money. They did not forecast money supply.

Rangarajan and Singh (1984)

Rangarajan et al (1984) reportedly dealt with the relevance and nature of adjustment of reserve money for the purpose of publication of series of data on reserve money and used the new adjusted series to examine the lags in the impact of reserve money H on M. As per Rangarajan et al in its unadjusted form, the impact of changes in cash reserve requirements (CRR) was captured in the multiplier; the impact of reserve money as an instrument of control could be understood easier if the effects of reserve requirement changes were included in the computation of the base; during the periods when legal cash reserve requirement was changed, the growth rate of a monetary base that incorporated the resultant impact would diverge compared with a series unadjusted for such changes. The results of this study indicated that in general changes in reserve money were useful and important guides to understand the behaviour of money supply.

Conclusion

Before submission of Swamy's PhD thesis in 1975, the multiplier approach to estimation and analysis of sources of high powered was not found in any of the monetary models developed in the context of India. The person to understand importance and applicability of the H-M Model in India after Swamy was S.B. Gupta, who admitted his sincere perusal of Swamy's thesis in Gupta (1976b). Gupta's work on Monetary Modelling before 1975, like Gupta (1973) did not speak of his awareness of the development of this model in monetary literature abroad. Again Gupta (1976a) had certain loopholes. He made contradictory statements – one in fourth paragraph of p125 and another in the first paragraph of p126. In the fourth paragraph of p125 he tells that banks' credit to government reallocates money supply in favor of government leaving total money supply unchanged, whereas in the first paragraph of p126 he told, if government securities comprised a major chunk of assets in the bank's asset portfolios then the reserve ratio would come down and money supply would go up since variations in reserve ratio influenced money multiplier adversely. Without rectifying the contradiction Gupta (1976a) reportedly took the Ministry of Finance, Government of India (GOI) to task when the latter declared government borrowing from banks and government borrowing from RBI substitutable in Economic Survey 1973-74. Gupta (1976a) repeated the first view that GOI's borrowing from RBI increased H and hence raised M, whereas GOI's borrowing from banks could not affect RBI and left total money supply unchanged. On the other hand Chona's (1976) paper might be considered as an extension of Thasan and Ahrensdorf, (1960) in the Indian context. Table 1, Table 2, Table 3 and Table 4 in Kanesathasan and Ahrensdorf (1960) in the context of Brazil, Canada, Ceylon, Egypt,

Federal Republic of Germany, Italy, Japan, New Zealand, Philippines and United States found their Indian counterparts in Chona (1976). For India, separately, Chona (1976) identified behavioural factors and policy induced changes influencing money supply and lists them in Table 5. On the basis of the data presented in Chona's (1976) paper, the stance of RBI's monetary policy was found in the appropriate direction.

After Gupta (1976b), the money multiplier was reported to be found in non-RBI monetary models explicitly in the works like Ahluwalia (1979), Madhur, Nayak and Roy (1982) and Chitre (1986), and implicitly in the works like Krishnamurty (1984), Pandit (1984), Chakravarty (1987), Nachane and Ray (1989), Jadhav and Singh (1990), Rangarajan and Ariff (1990), and in the RBI studies like Singh et al (1982) and Rangarajan and Singh (1984). There were, reportedly, attempts like Rao, Venkatchalam and Vasudevan (1981) to go beyond the multiplier approach. Still the concept and use of multiplier is found to have relevance today e.g. Rath 2003. Further, the technique of forecasting was not reported to find priority in the research works of 1970s conducted after 1972 except for Swamy's PhD thesis and Gupta (1973) involving the multiplier debate. A careful perusal of the papers on determination of money supply in India reportedly gives an understanding of the explanations regarding what are the sources of high-powered money, how the money multiplier works and what are the determinants of money supply, and reveals that money supply can reportedly be forecast either from the liability side, which is money multiplier approach or from the asset side, which is the balance sheet approach. It was advised by researchers that monetary forecasts are required for a variety of purposes. Decisions on monetary policies like cash reserve ratios and refinance of commercial banks by RBI must, by wisdom of researchers, be clearly

based on an analysis not only of monetary aggregates of the recent past but also future prospects. The same applies to measures concerning the structure of interest rates and the assessment of commercial banks credit budgets as per researchers. Forecasts of growth of bank deposits reportedly play an important role in estimation of resources available for financing investment and particularly of plan outlays in the public sector. The purpose of forecast is reported to have a bearing on the time horizon over which the forecast is to be made and hence on the methodology to be used, e.g., in the estimation of financial resources available for plan outlays one of the components is based of the growth of bank deposits. Here it is suggested by researchers to incorporate the following issues:

It is also reported that the concept of residency may emerge in near future as one of the determining factors of money supply in India. The Working Group under the Chairmanship of Y. V. Reddy on Analytics and Methodology of Compilation of Money Supply reportedly introduced the concept of residency and recommended changes in the reporting system of commercial banks; residency was supposed to relate to the country in which the holder had a centre of economic interest; currency and deposits held by the non residents in the rest of the world sector would presumably be related to balance of payments considerations such as international capital flows rather than to the domestic demand for monetary assets or to the use of money in domestic transactions and should therefore be regarded as external liabilities to be netted from foreign currency assets of the banking system. The Group was reported to propose that, though there was a need to categorize deposit liabilities by residency it might not be appropriate to exclude all categories of non-resident deposits from domestic monetary aggregates as non-resident rupee deposits were essentially integrated into the domestic financial system and only

non-resident repatriable foreign currency fixed deposits should be excluded from deposit liabilities and treated as external liabilities; accordingly from among various categories of non-resident deposits at present only FCNR (B) deposits might be classified as external liabilities and excluded from domestic money stock. As per another reported proposal of the Group time deposits of resident should not include Resurgent India Bonds (RIBs) and India Millennium Deposits (IMDs) based on the residency criterion and exclude banks' pension and provident funds because they were in the nature of other liabilities and were included under 'other demand and time liabilities'; the new monetary aggregates like NM2 and NM3 were therefore based on the residency concept and hence did not directly reckon non-resident foreign currency repatriable fixed deposits in the form of FCNR(B) deposits, RIBs and IMDs.

Finally, researchers suggested not to overlook the issue of stability of money multiplier. Rath (1999) is reported to find over the period 1980-98 instability in both of broad and narrow money multipliers; however over the part period 1980-90, Rath found M_3 multiplier stable; he argued that reasons for such stability might be financial liberalization witnessed in the economy since late 1980; the monthly data on Indian money multiplier showed that it was varying in the range of 2.17-3.72 with a mean value of 3.0; the volatility of the multiplier measured by its standard deviation, which declined during the 1980s from the 1970s, however increased in the 1990s mainly due to frequent changes in the CRR; the movement in the broad money multiplier made the stability of the multiplier a key issue because it could not explain the long run relationship between the broad money and the monetary base. A more recent study by Jha and Rath (2003) covering three time periods April 1980 to March 2000 (Period 1), April 1980 to March 1990

(period 2) and April 1990 to March (Period 3) since financial market deregulation came in India was reported to find all monetary variables in their log level form to be I(1) with lags chosen as SBC/AIC criteria; this study conducted Granger-Engel co-integration tests using ADF test statistics and found that neither M3 nor M1 were co integrated in period 1 indicating unstable multipliers; in period 2 however broad money and narrow money were cointegrated; in period 2 broad money and narrow money were found to be cointegrated with reserve money which was not the case in period 3 so much so that multipliers were stable in period 2 but not in period 3 because of financial liberalization in period 3.

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