An Outline of the Existing Literature on Monetary Economics in India

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2010

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Introduction

As per the researchers on monetary economics, a detailed account of the changing role of money from Walrasian and Non-Walrasian settings to the more recent theories on the dynamics of the relationships between money, inflation and growth with reference to their historical evolution are available in Friedman et al. ed. (1998) and such type of theoretical work did not happen in India. There is a tendency among the Indian researchers to apply the theories developed abroad to up to date empirical data in econometrics models and then, with the help of econometric techniques and compare the results. For example Dash and Goal (2001) applied the theory of Foster (1992) and Chona (1976) applied the theory of Ahrensdorf and Thasan (1960). This paper dealt with such applications, their lacunae and attempts to resolve the issues unaddressed till 2005.

Points to Be Noted

In the above context the following points are relevant:

Nachane (1985)

The money-income-price nexus has been a dominant preoccupation of economists, ever since Hume enunciated the Quantity Theory in 1752, as noted by Nachane (1985). Nachane detected a division between the protagonists of this debate into two groups – 'Monetarists' and 'Neo Keynesians'. He mentioned that Brunner (1968), credited with coining the term 'Monetarism' had described the core doctrine in terms of three propositions: (i). The actions of the central bank dominate the changes in reserve money. (ii). Changes in reserve money dominate changes in money supply over the business cycle. (iii). Rate of change in economic activity precedes the same of money supply. To Nachane interpreted propositions (i) and (ii) together meant that monetary authority could control money supply within fairly narrow limits. Nachane noted that one group of Keynesians led by Kaldor (1984) did not accept this and expresses serious doubts on the monetary authority's ability to control money supply while another group led by Tobin (1974), though accepted this, but contended that in real world monetary authorities rarely sought to control money supply, rather they opt to control conditions using market interest rate movements as barometer (Klein 1970 and Stewart 1972). Nachane took proposition (iii) to be the

prime bone of contention between monetarists and neo-Keynesians. Nachane noted that the results of the first group members like Anderson and Carlson (1970) showed a large and rapid influence of monetary factors on total expenditure and an ephemeral effect of fiscal policy on nominal GNP amount to reaffirmation of the short run Quantity Theory while the other group members recognized that the short run Quantity Theory would be valid only should LM curve be vertical and by rejecting the vertical LM curve as an empirical oddity, they automatically denied the Quantity Theory itself. Nachane reported that the long run Quantity Theory asserted that changes in quantity of money *per se* had negligible effect on real income growth. Nachane mentioned that Friedman considered real magnitudes to be in long-run equilibrium independent of the nominal quantity of money, so that nominal magnitudes were simply proportional to nominal quantity of money. Nachane found the antithesis of this view Tobin (1974), who argued that the impact of a money supply change on the price level crucially hinged on the mechanism of the money supply change. Nachane commented that much monetary theory had been developed from a model in which government debt and reserve money were identical, but in a model with various kinds of government liabilities it was easy to show that the real

equilibrium depends on the proportions in which these liabilities were supplied.

Thus, broadly, the main positions of Nachane regarding the impact of money on economic activity are as follows - monetarists regard money supply as a major short-term determinant of nominal income; the more orthodox monetarists deny any influence of money on real output in the short as well as long run; the less orthodox like Friedman admit that money may affect real output in the short run but in the long run the influence of money is assumed to be limited to prices only; neo Keynesians on the other hand do not assign any short-term casual role to money supply in determination of nominal income fluctuations; however, according to neo Keynesians in the long run, money tends to affect real output as well as prices, the latter effect being crucially dependent on the way in which money supply change are introduced.

Nachane reported further that empirical testing of monetarist/Keynesian propositions began with the monumental work of Friedman and Schwartz (1963) and continued with Cagan (1965), Stein (1976), Tobin and Buiter (1976), Modigliani and Ando (1976) and many others; Sims (1972) gave a new turn to the exercise by introducing the newly enunciated concept of Granger causality into the testing procedure; Barth and Benette (1974),

Williams, Goodhart and Gowland (1976), Feige and Pierce (1979), Hsaio (1981) and numerous others tested the money-income relation with various causality based methods for several different empirical contexts usually in the developed western economies; in the Indian context two studies deserved attention: (i) Bhattacharya (1972) tested the relative performance of reduced form versions of the basic Keynesian model and the Quantity Theory model and came to somewhat unexpected conclusion that the former predicts the monetized income a bit better than the other (ii) Brahmananda (1977) undertook a theoretical-cum-empirical investigation into the determinants of real national income and price level in India. To Nachnae, Brahmananda's approach is neo classical in spirit where using single equation econometric techniques a number of separate hypotheses were tested. Nachane observed ample evidence to bear out the hypothesis of the 'Money Side' of the Quantity Theory and also of the 'Physical Supply Side' for long period purposes and found that the Keynesian theory does not explain real income while the New Classical theory does it and the Quantity Theory explains the price level.

Brahmananda et al. (2003)

Brahmananda et al. (2003) noted that the Quantity Theory of money, its various versions, empirical evidence of these versions, controversies surrounding the same, the definitions of the variables included in the Quantity Theory, their empirical counterparts, the channels through which money affects the economy in static and dynamic periods etc., had been considered as the core of Monetary Economics. As per Brahmananda originally, the Quantity Theory in its classical versions was concerned with the explanation of price level changes, but later, money supply changes were related to the explanation of changes in nominal income. Here Brahmananda found the theory to be transformed into approaches to the demand for money with an assumption concerning a stable relation between money and nominal income. Brahmananda observed the notion of money as real balances with a given price level to be related to real income in the community and the stability properties of such a relation to be examined. Brahmananda found the hidden expectations underlying stability to come into discussion. Brahmananda also noted the demand for money concept to be expanded to include the demand for various assets and gradually, the empirical component of money itself to continue to expand. Brahmananda further noted that the Quantity Theory of money is concerned with the equilibrium relation between the quantity of money and changes therein with the level of

prices. To Brahmananda naturally it follows that the time period implied has to be such that the equilibrium relation gets established when the quantity of money changes; if they assume stationary state conditions, the given quantity of money and the given quantity of composite output both remain unchanged, and the price level is maintained period by period i.e. the levels of money prices of different commodities remain unchanged; now they can disturb the stationary state by either a one shot increase in the quantity of money or a one shot increase in the volume of composite output; the increased volume of the quantity of money would be maintained thereafter or the increased volume of output will be maintained thereafter. Brahmananda took note that the Quantity Theory stated that if other conditions were unchanged there would be increase in the level of prices proportionate to the increase in the quantity of money in the first case and in the second case the level of prices would be decreased inversely proportionately to the increase in real output and the different individual time lengths within which the different prices would be increased or decreased are abstracted from. Brahmananda found Ricardo to have introduced this abstraction and jumped from the initial disturbance to the final outcome, taken for granted the time process through which the final outcome is reached after the disturbance. This meant to Brahmananda that

forces, which would elongate or shorten the time period or temporarily distort the adjustment, were being abstracted from. In David Hume's analysis, Brahmananda noticed that the initial state had some general slack and an unanticipated increase in money had a 'once over' effect on increasing employment and real output as also the level of prices because of the initial slack and if this sort of a slack did not exist, or got used up, they reverted to the relationship between money and prices with no scope for the once over increase in employment and real output; the general slack would be in unused inventories and unused labour or its efforts; if there were no unused inventories, some reduction in real wages of workers became necessary during the once over process. Brahmananda detected the space for an explanation of how a general slack could have existed and/or why the wages were in excess of normal requirements for subsistence and efforts to be accounted for.

DP (1998)

DP (1998) noted Keynes to be a staunch advocate of constructing a monetary system, which responded rapidly to the needs of trade and gave birth to the concept of endogenous money supply; according to Keynes credit was the pavement along which production travels, and the bankers if

they knew their duty, would provide the transport facilities to just the extent, required for the purpose for full capacity employment of the productive powers of the community. DP also noted that the relationship between the changes in the money supply and income and interest rates depended in the first instance on the way changes in M come about. DP mentioned Keynes' two illustrations of how endogenous money supply increased as income rose where Keynes emphasized the importance of an endogenous overdraft system in permitting the expansion of economic activity. DP reported that following (i) the Radcliffe Report in 1956, (ii) the development of an anti-monetarist analysis by Kaldor in England and (iii) the beginnings of American post Keynesian monetary theory between 1958 and 1973, the idea of an endogenous component of monetary system became associated with post Keynesian theory and also became popular in England as well as US.

Rath (1999)

In the theoretical literature on endogenous money supply process, Rath (1999) noted the existence of three distinct and competing models: (a). pure portfolio approach, (b). pure loan demand approach and (c). mixed portfolio loan demand approach where the first corresponds to the multiplier approach in the monetarist framework and the latter two are accommodative and

structuralist views of money endogeneity of the post Keynesian monetary theory. Rath contrasted the former approach where money supply grew strictly through central bank initiative, i.e. through processes strictly exogenous to financial market pressures, with the post Keynesians, who held the view that pressures emerging endogenously within the financial markets were the basic determinants of both of money supply growth and credit availability. One similarity Rath found was that both of the endogenous money approaches sharing the view that banks sanctioned credit, created deposits in the process and looked for reserves later. Post Keynesians, Rath saw, were different in their view on how and wherefrom banks obtained the needed additional reserves once they extended credit and created deposits, and, one approach argued that when banks held insufficient reserves the central bank must necessarily accommodate their needs at the discount window since acting otherwise can threaten viability of the financial system. Rath noted that there was no justification for any effective quantity constraint in this context in the case of what was called accommodative endogeneity of money supply. As per the other approach, Rath noted, when RBI decided to restrict the growth of non-borrowed reserves, then additional reserves were generated within the financial structure itself through innovative liability management practices like borrowing in the CDs

(certificates of deposits) in the case of what was called structural endogeneity of money supply. The critical difference between two approaches related to the private initiatives of banks in accommodating increase in loan demand as per Rath. In the former approach, as noted by Rath, accommodation hinged exclusively on the stance of monetary authority and its willingness to meet reserve pressures created by higher lending, while in the latter accommodation depended on both of the stance of monetary authority and the private initiatives of banks. In terms of the form of the money supply function, in accordance with Rath, the former stipulated a more horizontal money supply function, whereas the latter believed in a positively sloped money supply function. In the pure portfolio approach, Rath reported, reserve money to be the sum of currencies and reserves flowing from RBI's balance sheet; the broad money were measured as an aggregate of different financial liabilities: currencies, time deposits and demand deposits on component side flowing from the overall banking system, the respective quantities of which were determined by choices of agents. In a fractional reserve banking system, Rath found the supply of base money to set an upper bound on money supply when actual money supply was determined within this bound by portfolio preferences embodied for the demands for the different liabilities. In pure loan demand approach, Rath

found, the level of bank lending to endogenously determine money supply; its model set up differed from the first approach in which it included demand for bank loans and the banking sector balance sheet constraint. This fact, Rath wrote, ensured that the market for bank lending cleared and enabled loan demand to affect money supply. Money supply grows, as found by Rath, strictly through the central bank's initiative by way of its functioning as the lender of the last resort. In mixed portfolio loan-demand approach, Rath reported, the banks' choices of composition of their assets and liabilities were modelled. Rath observed that when the central bank followed a tight monetary policy, banks managed their assets and liabilities in a way to cater to profitable lending while not being reserve constrained. In order to capture these phenomena the third approach, according to Rath, included not only demand for alternative instruments along with bank lending, but also captured the compositions of their assets and liabilities.

Dash et al. (2001)

Dash et al. (2001) noted that prior to 1990s high-powered money was being endogenized through automatic financing of government deficit, but monetary control was sought to be imposed by a direct regulation of credit generation by banks combined with measures such as a cut in public

investment to reduce demand. Dash et al. noted further that with financial reforms banks had greater freedom; capital inflows made it more difficult to control high powered money and money demand became unstable as close financial substituted developed. If deep structural aspects of bank behaviour were effectively modelled, as per Dash et al., it could aid in the design of policy even in the new era. Although loans create deposits, according to Dash et al. loans are determined by both of supply and demand; they depended on profit maximization by banks and on RBI's monetary policy that changed base money. Dash et al. further observed that bank credit responded to demand for speculative credit in India. Responses to food and non-food price and output are dissimilar, as found by Dash et al.. Monetary policy had succeeded in preventing explosive growth in money supply, reported by Dash et al., but it targeted non-food prices and it was more efficient to target agricultural prices for inflation control. The overall growth rate of the monetary base was adequate, reported by Dash et al., but its timing could be improved if a contraction of base money was completed earlier than it had been in the past and coincided with a rise in food prices. Details of such a targeting can easily be worked out, as felt by Dash et al., where information available in the systematic structural features of the Indian economy could be exploited in designing monetary policy. Whenever

incentives to expand bank credit were high enough, Dash et al. noticed banks to find ways around a variety of quantitative controls. Price bubbles in assets that lead to expansions in broad money, Dash et al. opined, could better be controlled through a combination of carrot and stick, working through the market, and carrots could be raising incentives for productive investment and sticks could be taxes and regulation. Credit turned out to be the endogenous outcome of incentives facing agents, as written by Dash et al., where a range of price variables carried these incentives. Dash et al. observed that there were also evidences that RBI's monetary control intensified shocks to real output, while being unable to prevent the expansion of credit in response to a speculative profit motive.

Krishnamurty (2002)

Krishnamurty (2002) suspected that India had perhaps been among the first few developing countries for which economy wide econometric models were estimated. Krishnamurty traced the earliest work back to the mid-fifties when macroeconomic modelling as a professional academic activity was still in its infancy. Krishnamurty found the earliest model for India was estimated by Narasimham (1956) under the guidance of Nobel laureate Jan Tinbergen. Krishnamurty also found that the hazards in attempting to model an

underdeveloped economy at that time were self evident and problems arising from the absence of comprehensive and empirically feasible theoretical framework relevant to developing countries, weak and inadequate data base, and lack of perspective as regards the role of such models in LDCs were quite evident from the early models. Since then there had been considerable progress as Krishnamurty felt. Krishnamurty distinguished between five generations of models for India. Fifth generation models were then coming up when and as he wrote it. As per his review, a good number of models belong to the earliest generation; these were obviously the most severely constrained by a variety of data problems on top of the usual hurdles and disadvantages associated with new explorations; most of the First Generation models were PhD dissertations largely prepared under the supervision of Nobel laureate Lawrence R. Klein; time and resources, apart from data availability, were severe constraints on the researchers. Krishnamurty commented that, unlike their counterparts working on developed countries, researchers on Indian models have had very little to draw upon in term of sectoral econometric studies; therefore, it was not surprising that they had to be small, simple and often rather close to the textbook macroeconomic theory; nevertheless, these models served well as explorations in an important branch of economic analysis; they uncovered

the weaknesses of the available data base – many of which had been removed since then – and also prompted further quantitative research at the sectoral level. He felt also that many in-depth sectoral studies emerged and provided the needed back up for latter macroeconomic models; even though models belonging to the First Generation were simple, they were by no means routine; despite considerable odds, each model had a specific focus wherever it dealt with problems common with other models. He reported that, to be specific, the major focus in different models includes issues such as price behaviour (Choudhary 1963; Marwah 1963 and 1972; Chakrabarty 1977), investment behaviour and endogenous population expansion in a two sector model focused on growth (Krishnamurty 1964), integration of real, monetary and foreign trade sectors with endogeneous capacity utilisation (Choudhry and Krishnamurty 1968), role of food grain output in growth and price stability (Pandit 1973), interaction between monetary and real variables in the monetised component of the economy (Bhattacharya 1975), the structure of monetary and financial markets (Gupta 1973; Mammen 1973), external trade (Choudhary 1963; Dutta 1964), and growth in a dualistic economy (Agarwala 1971). Krishnamurty wrote next about the Second Generation models, where there were the ones by Pani (1977), Ahluwalia (1979), Bhattacharya (1982), Pandit (1982), Srivastava (1981)

and Rangarajan (1982); the most important feature that distinguishes these models from the earlier ones was their emphasis on policy analysis; most of the other features follow from this objective; they were more disaggregated and, therefore, much larger; in these models there were an explicit recognition of the mixed nature and some other institutional characteristics of the Indian economy; they also went one step ahead of their predecessors by allowing for lagged, more varied and somewhat more complex adjustment processes; unlike their predecessors, the Second Generation models had the advantage of a considerably improved data base, a large variety of rigorous micro and sectoral empirical studies that had emerged since the sixties, and an increased professional interest in applied econometric research;

As per Krishnamurty - despite the above fact, until about the mid-seventies, progress had not been smooth; it proceeded by fits and starts; progress of macroeconometric research had been considerable in the eighties; several models were estimated; they are labelled as belonging to the Third Generation; these include (a) Ghose, Lahiri, Madhur and Roy (1983), (b) Pani (1984), (c) Bhattacharya (1984), (d) Krishnamurty (1984), (e) Pandit (1984, 1985, 1985a, 1986, 1986a and 1989), (f) Bhattacharya and Rao (1986), (g) Ahluwalia and Rangarajan (1986), (h) Narain Sinha (1986), (i)

Pandit and Bhattacharya (1987), (j) Bhattacharya (1987), (k) Madhur (1987), (l) Chakrabarty (1987), (m) Krishnamurty, Pandit and Sharma (1988), (n) Kannan (1989), (o) Panchamukhi and Mehta (1991), and (p) Bhattacharya and Guha (1992); apart from these, there were several important sectoral studies of relevance and they provided backing to macromodelling; though not exhaustive, some of these studies are (1) Krishnamurty and Sastry (1975) on investment and financing in the corporate sector, (2) Rangarajan, Basu and Jadhav (1989) on dynamic interaction between government deficits and domestic debt, (3) Kannan (1985) providing analysis of foreign trade sector, (4) Marwah (1987) modelling the exchange rate, (5) Rangarajan and Singh (1984) dealing with reserve money multiplier, (6) Ghose, Lahiri and Wadhwa (1986) on quantitative restrictions and imports, (7) Virmani (1991) providing analysis of the role of supply and demand factors in influencing foreign trade, (8) Krishnamurty and Saibaba (1982); Krishnaswamy, Krishnamurty and Sharma (1987); Krishnamurty, Krishnaswamy and Sharma (1987); and Pandit (1991) on savings behaviour, (9) Pradhan, Ratha and Sharma (1990) on an analysis of interrelationships between public and private investments as well as its implications for income distribution through input-output based model, (10) Ahluwalia (1991) on productivity and growth in Indian manufacturing, (11) Pandit

(1978), Balakrishna (1991), Bhattacharya and Lodh (1990), Krishnamurty, Pandit and Palanivel (1995) on price behaviour, and (12) Krishnamurty and Pandit (1996) on exchange rate, tariffs and trade flows with alternative policy scenarios.

As per Krishnamurty's comparison, the Third Generation models cited above were in many ways similar to those belonging to the second generation, but they were larger in size, better disaggregated and seek to carry forward the analysis of policy issues initiated by the Second Generation model builders; the distinguishing features of the Third Generation models were that they explicitly deal with the problems of macroeconomic adjustment and venture to address issues that have not been discussed earlier in formal quantitative terms; many of these models were put to policy simulations more rigorously than those belonging to the Second Generation; they also enjoyed the back-up of many early sectoral studies.

As per Krishnamurty - the Fourth Generation models were developed in the nineties; these models to name a few, are (1) Anjaneyulu (1993), (2) Chakravarty and Joshi (1994), (3) Bhattacharya, Barman and Nag (1994), (4) Rangarajan and Mohanty (1997), (5) Mammen (1999), and (6) Klein and Palanivel (1999); they all addressed issues relevant to new policy regime and

carried out many 'what if' policy scenario simulations; these models are large in size, provide emphasis on sectoral details and inter-links and trade-offs between sectors;

As per Krishnamurty's generalization, each successive generation of models had benefited from the earlier generation of models by avoiding pitfalls of the earlier ones and gaining from the advances made earlier even if such advances were only incremental in character.

Soumya et al. (2005)

Soumya et al. (2005) seemed to extend Krishnamurty's tenor of argument further. Soumya et al. commented that there was no mention of the treatment of the monetary sector in the models prior to 1970s; after 1970s modelling monetary sector and its links with the fiscal and external sectors became a challenging task in India; and, modelling money and monetary policy for the determination of real output and price level had increased considerably in India.

Soumya et al. reported that above issues were highlighted in models built by Rangrajan and Arif (1990) and Rangrajan and Mohanty (1997); in these models money stock varied endogenously through feedback from reserve money, which changed to accommodate fiscal deficit and changes in foreign

exchange reserves; reserve money credit to finance public sector investments lead to monetary expansion and investment which together might lead to higher output with a lag; again models by Rangarajan and Arif (1990) and Pandit and Krishnamurty (1984) showed links between real, monetary and fiscal sectors.

Conclusion

In the tune of Krishnamurty (2002), as could Soumya et al. be interpreted, the shift from net domestic assets to net foreign assets on resources side of the monetary base in the wake of financial liberalization and the ensuing changes in the monetary policy i.e. relying more on market based direct measures than on direct monetary controls had given birth to the Fifth Generation models, where these issues have been addressed by modelling money supply process in India, e.g. Rath (2001) and Nachane (2001). The latter discussed the impact of liberalization on monetary policy and the link between monetary base and money supply for the post reform period. Models in these works deserve to belong to Fifth Generation models, which, in the language of Krishnamurty (2002), "are large, dynamic, incorporate better inter-dependence of sectors compared to many of the earlier models and attempt to incorporate change in policy regime" and in the language of

Bhide (2001), "are those that clearly capture the new policy regime where the prices are market determined, role of public sector is limited to a few sectors and monetary policy becomes independent of the fiscal stance."

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