

showed figures around 90 for all five months. We then realised, however, that our preoccupation with nearness to the border had led us to ignore the need for the "neighbour" to be on the route to the inland markets. Inspection of the map showed that the surplus rice from Thakurgaon would go to inland markets via Dinajpur, so that the price there would be higher, whether or not there was large-scale smuggling; nothing whatever can be deduced from the figure of 90, and we should not have included this pair of places on our original list.

3 The fraction is put low, because one really wants only the addi-

tional distance away from the frontier.

4 If, to take purely illustrative figures, one assumed that this area produced one-fifth of the country's rice, and that one-tenth of that output was surplus to the area's need for consumption and seed, and was all smuggled into India, then one comes to rather over 2 lakh tons for what is intended to be a high estimate. This is not more than an illustration, but we feel confident that any figure like a million tons gets no support whatever from our results.

5 So far as we understand it, an independent estimate was so made and agreed closely for each of the two years.

## Money Supply Analysis

Srinivas Madhur

his article, 'Factors Affecting Money Supply — Critical Examination of Reserve Bank's Analysis', (January 26, 1976), S B Gupta argued that the RBI analysis of the factors affecting money supply is 'empty' as well as 'faulty', and he suggested an alternative scheme based on the money-multiplier theory of money supply determination.<sup>1</sup> Criticising Gupta's article, N A Mujumdar has argued that "the RBI analysis is superior to the analysis based on the money-multiplier theory if only for the reason that, while the latter provides a mechanistic explanation of money-supply variations, the former provides an economic explanation".<sup>2</sup> In their supplement to Mujumdar's article, S L Shetty, V A Avadhani and K A Menon, raised a number of other issues, which, according to them, though incidental to Gupta's main theme, are important in themselves.<sup>3</sup> A critical evaluation of some of the issues that sprang up during the controversy is the primary concern of this short note.

In section I, we discuss some of the issues raised by Mujumdar's critique of the money-multiplier theory. Section II is devoted to an examination of the further issues raised by Shetty and others. The last section summarises the tentative conclusions which the preceding two sections lead us to.

### I

Mujumdar summarises what he calls the main ingredients of the money-multiplier theory as follows: "Firstly, the supply of money (M) is a highly stable increasing function of high-powered money (H) alone. Secondly, factors governing high-powered money and changes in it are largely policy controlled; and

thirdly, factors governing the money-multiplier (m) are largely endogenous, i.e., they are dependent upon the behavioural choices of the public and the banks."<sup>4</sup>

The second and third propositions seem to be alright, except that one has to give due importance to the term *largely*. However, the first proposition is not carefully worded. Since the statutory reserves which the commercial banks keep are not available to banks to meet their currency drains or clearing drains of cash, it is necessary to adjust the data on H for the statutory reserve changes. The H so adjusted is known as *adjusted high-powered money*.

Symbolically,

$$H^* = H - \Delta R.R. (AD)$$

where  $H^*$  is the adjusted high-powered money, H total high-powered money, R.R. required reserve-ratio, and AD the aggregate deposit of the commercial banks. It is clear from the above equation that, if the required reserve-ratio remains the same during the period under consideration, there cannot be any difference between high-powered money and the adjusted high-powered money; thus the first proposition would be unexceptionable. But if this ratio changes during the period under consideration, the first proposition would be misleading. Suppose, the required reserve-ratio is stepped up during the period under consideration. Other things remaining the same, the money supply would fall even though high-powered money remains the same. This is because the adjusted high-powered money has shrunk. Hence, to guard against such pitfalls, it would be wise to read the first proposition as follows:

Other things remaining the same, the supply of money is a highly stable, increasing function of *adjusted high-powered money*. Perhaps, much of Mujumdar's confusion regarding the money-multiplier theory could have been avoided had he read the first proposition in these terms. Let us illustrate this point. After summarising the main ingredients of the money-multiplier theory, he speaks of a corollary of the multiplier approach, viz, "the larger the proportion of bank reserves in reserve money, the higher the value of the money multiplier is likely to be".<sup>5</sup> Observing what he calls "the typical illustration of 1973-74", he considers the corollary misleading. No doubt, the corollary is misleading. But the misleading nature of the corollary is inherited from the loosely-worded first proposition of the multiplier theory. A careful reading of the first proposition (as indicated above) would have led him to believe that, through the technique of variations in the statutory reserve-ratio, the central bank can affect the supply of *adjusted high-powered money, leaving the money multiplier to be determined endogenously*, by the behaviour of the banks and the public.

Perhaps one could attribute this confusion about the money-multiplier theory to Gupta for not introducing the concept of adjusted high-powered money and its importance in the semantic exercise of section I of his paper. Later, when presenting the money-multiplier theory also, he says: "In its simplest form, the theory says that the supply of money ( $M^s$ ) is a highly stable increasing function of high-powered money (H) alone. In other words, it says that as H changes M also changes in the same direction."<sup>6</sup> On another occasion too, he wrote: "Ordinarily, the higher the proportion of reserves in H, the greater also the high-poweredness of H in that the same H, other things being the same, will come to be associated with a larger amount of money."<sup>7</sup> One does not know whether Gupta included the constancy of the required reserve ratio in his "other things being the same" assumption. These misleading wordings of the money-multiplier theory might have caused confusion in the minds of many, including Mujumdar. But the fact that Gupta was very much aware of the limitations of such loose wording is apparent from one of his DSE working Papers in which he discusses this problem of adjusting the high-powered

money in an appendix.<sup>8</sup> In fact, he derived time series data on the adjusted H for India. But, why he did not state this explicitly in his presentation of the money-multiplier theory is not understandable.

Another important point raised by Mujumdar was that the distinction between the high-powered money, which is policy-controlled, and secondary money, which is not amenable to policy control, is getting blurred in the Indian context where 'credit planning' has, over the years, become an integral part of developmental planning.<sup>9</sup> The same view has been expressed by Shetty and others.<sup>10</sup> This seems to be an exaggeration of the efficacy of credit planning in controlling the expansion of secondary money in India. An example might throw some light on this.

In May 1973, and immediately after, the RBI in a bid to restrain bank credit took a number of credit control measures. The plan was to allow for a credit expansion of Rs 600-650 crores for purposes other than food procurement during the busy season of 1973-74. This credit limit was later raised in two steps, once to Rs 740-790 crores, and then to Rs 950 crores. Despite these two upward revisions, bank credit exceeded the planned magnitude; it swelled by Rs 1281 crores of which only Rs 190 crores was on account of food procurement credit. The explanation given for the subsequent revisions was that, some of the assumptions on which original credit projections were based were invalidated by subsequent developments.<sup>11</sup> Two points are worth mentioning here. The admission that the original assumptions went wrong points to inefficiency in the projecting of credit requirements on which credit planning is based. But what is important is that, when the planning authority (in this case the RBI) yields too much to subsequent developments and revises its plans now and then on an *ad hoc* basis (that too, on a very large scale), such planning loses much of its discretionary content. In the 1973-74 busy season, the ultimate increase in credit worked out to be almost double the originally planned magnitude of Rs 600-650 crores. The argument that this was made possible by the revisions in the credit limit (which in turn was due to 'subsequent developments') only amounts to a disguised admission that bank credit is largely outside the control of the RBI.

The explanation for the failure of

credit planning can be given in terms of the money-multiplier theory itself. There is very little point in trying to control bank credit without controlling the very base of such credit expansion — *viz.* high-powered money (or more precisely, the adjusted high-powered money). It is understandable that the RBI can do very little about the variations in high-powered money. In India, the fiscal policy of the government is the major factor determining the variations in high-powered money. All that the RBI can do is to affect the supply of the adjusted high-powered money, by manipulating the statutory reserve ratio. That even here the RBI failed to enforce its authority is evident from the fact that, in the 1973-74 busy season, very few banks reached the cash reserve ratio stipulated by the RBI. In the face of such experiences, it may be an exaggeration to adhere to Mujumdar's contention that bank money is determined by the credit planning of the RBI and, as such, the money-multiplier theory has no relevance in the Indian context.

## II

In their effort to supplement Mujumdar's critique of Gupta's paper, Shetty and others have raised some of the issues which, according to them, are incidental to Gupta's main theme but are important in themselves. In a nutshell, the issues raised concern:

- (i) the nature of the data on money supply analysis published by the RBI;
- (ii) the universality of the money-supply theory;
- (iii) the cause and effect relationship between credit and money supply;
- (iv) the significance of reserve money in monetary analysis; and
- (v) the economic distinction between government borrowings from the central bank and from commercial banks.

At the very outset, let us dispose of what can be considered a less important point. The main advance of the paper by Shetty and others on the nature of the data published by the RBI, is the adoption of a classificatory scheme based on the analytical content of data. Shetty and others distinguish between "primary and derived analytical data", and argue that the latter form the basis of research and policy formulation. The very classificatory scheme based on the criterion of analytical significance of the data seems to point out that the former group of data, *viz.* primary, is devoid of analyti-

cal content. But it was clear from Mujumdar's article that he was referring to the analytical superiority of the former set of data; nowhere could one ascertain that he was referring to the latter set of data. Inevitably, according to Shetty and others, the former set of data seem to be devoid of analytical significance. To this extent, it seems unlikely that the article by Shetty and others 'supplements' Mujumdar's article.

Coming to the existence of a universally acceptable money-supply theory, the authors seem to be a little confused. Their main argument seems to be that "the money-multiplier theory seeks a solution to money supply variations within the monetary sector alone, whereas, those variations are in fact the combined result of real and monetary factors . . . . It is, therefore, impossible to find the determinants of the stock of money in the monetary sector alone."<sup>12</sup> It is precisely for this reason that, in monetary literature, the three ratios (C/D, TD/D and R/AD) are called the *proximate determinants* of the money multiplier. They help determine the stock of money "in the arithmetic sense that knowledge of their numerical values permits computation of the money stock."<sup>13</sup> They are not the ultimate determinants of the stock of money because they themselves are behavioural ratios and, as such, functions of other variables — real, monetary, and institutional. This framework of proximate determinants is designed to help provide highly useful vantage points from which to observe the simultaneous interaction of the various forces determining the money stock and not to separate them into water-tight compartments.

In an in-depth analysis of the money multiplier process one should go beyond the derivation of the equation of the money multiplier and analyse the behaviour of each of the ratios entering this equation. What is important for monetary planning purposes is the stability of the multiplier. Between 1961-62 and 1973-74, the marginal money multiplier ranged between 1.4 and 1.8 — except in 1972-73 when it reached 2 — and the average money multiplier during this period ranged between 1.3 and 1.5 (All figures derived by using the adjusted H). Thus, there is no reason to believe that the money multiplier is highly unstable in India. Viewed from this point, the money-supply theory embodied in the equation —  $M = H.m$  (..) — can be looked upon as a simple yet highly

useful theoretical framework. Rather than mixing up two heterogeneous components of the stock of money, *viz*, high-powered money and ordinary bank money, the multiplier theory concentrates on them separately. It is certainly simple but not 'superficial'.

Coming to the cause and effect relationship between credit and money supply, Shetty and others reject the view that credit expansion and deposit expansion go hand in hand. In their opinion "that there is a causal relationship between bank credit and monetary expansion is a basic principle of meaningful monetary analysis".<sup>14</sup> To elaborate this, they work out a numerical example which is reproduced here in order that the rhythm of their argument is not lost.

Let us assume, as did Shetty and others, that money supply at a point of time consisted of only currency worth Rs 1,000. Suppose, an amount of Rs 500 out of this is deposited in a current account with a bank by the public. By definition, money supply will comprise currency with the public, Rs 500, and deposit money, Rs 500. Let us further assume that from these deposits the bank lends to the public, say, a sum of Rs 300. There are two choices open to the public: they may either withdraw the entire amount of credit in cash or keep it as demand deposit with the lending bank, though for a temporary period. In either case, there would be an expansion in money supply. But in the former case, the composition of the money supply will be as under: currency Rs 800, and deposit money Rs 500. In the latter case, while the currency component remains unchanged at Rs 500, the deposit money goes up to Rs 800. Of this, Rs 500 is in the nature of primary deposits and the balance Rs 300 is in the form of secondary or 'created' deposits.

Surprisingly enough, the authors conclude very abruptly: "That the process of credit expansion is more complex does not detract from the basic causal relationship between credit expansion and money supply."<sup>15</sup> This conclusion does not stem from the example just worked out. The increase in money supply by Rs 300, from the initial Rs 1,000 to Rs 1,300, was due to the money-multiplier process and the base for this multiple expansion was provided by the high-powered money which existed in the beginning. The two cases to which Shetty and others refer can be summarised very succinctly

thus: the multiplier was higher in the latter case than in the former — a perfectly sensible conclusion to draw because the money-multiplier theory says that, other things remaining the same, the higher the currency to demand deposit ratio (C/D), the lower the money multiplier. This ratio was 8/5 in the former case and 5/8 in the latter. The economic rationale of this result is simple: an increase in C/D ratio represents a greater leakage or drain of high-powered money from the banking system into currency holdings of the public. To that extent, other things being the same, the capacity of the banks to expand credit is limited.

If one were to say that the increase in money supply was the result of credit expansion by the bank, the question crops up as to where the bank lent from. From the primary deposit which the public kept with the bank. Where did this deposit come from? From the high-powered money which the public had in the beginning — a clear and simple answer indeed! Their own numerical example has deceived Shetty and others. They thought that the example would disprove the money-multiplier theory, but it disproved their own contention.

After discussing the cause and effect relationship between credit and money supply, the authors go on to interpret the relationship between the compulsory deposit scheme and the money supply. Other things remaining the same, nobody would deny that such a scheme affects the money supply. What is important, however, is this: The government estimated that a sum of Rs 450 crores would go into this scheme in 1974-75. Given that all payments to the RBI on this account have to be made in terms of high-powered money, high-powered money would contract

by Rs 450 crores. Given this contraction in high-powered money, the money-multiplier theory says that the contraction in *money supply* would depend on the marginal money multiplier, all other things remaining the same.<sup>16</sup> To say that money supply would contract by Rs 450 crores, as did the official statement, is to assume that the marginal money multiplier is equal to unity. If it is greater than unity, the contraction in money supply would be higher than Rs 450 crores. If it is less than unity, the contraction would be less than Rs 450 crores. There was no reason to assume that the marginal money multiplier was equal to unity in 1974-75. In Mujumdar's table (where the H is not the adjusted H), the marginal money multiplier for 1974-75 was given as 2.485. Thus the contraction in money supply, owing to the compulsory deposit scheme, would have been equal to Rs 450 crores multiplied by 2.485, i.e., approximately Rs 1,100 crores.

The official figure, i.e., Rs 450 crores as constituting the total impact on *money supply* of the compulsory deposit scheme, was the direct outcome of the RBI's so-called 'total explanation' of variations in money supply. By mixing up two heterogeneous components of the supply of money — *viz*, high-powered money and ordinary bank money in its process of consolidating the balance sheets of the entire banking system — the RBI forgets the significance of the difference between high-powered money and ordinary bank money. It is in such a context that the money-multiplier theory comes into prominence. So far as the RBI follows the 'total explanation' of changes in money supply, to quarrel over the question whether or not the RBI is ignorant of the significance of reserve

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money in monetary analysis, just by citing quotations from the blue-books, would be a futile exercise. The same is true of the qualitative difference between the central bank credit and the commercial bank credit to the government sector. One can cite any number of quotations from the RBI publications which give the impression that the RBI believes that the commercial bank credit to the government has a one to one impact on money supply. But that is not important. What is important is to recognise that this treatment of commercial bank credit to the government is inherent in the RBI's so-called 'total explanation' of variations in money supply.

III

To summarise the tentative conclusions to which the preceding discussion leads us to :

- (1) Mujumdar's criticism regarding the internal inconsistency of the money-multiplier theory is largely misconceived.
- (2) His contention that bank money is determined by the credit

planning of the RBI seems unlikely to hold good most of the time.

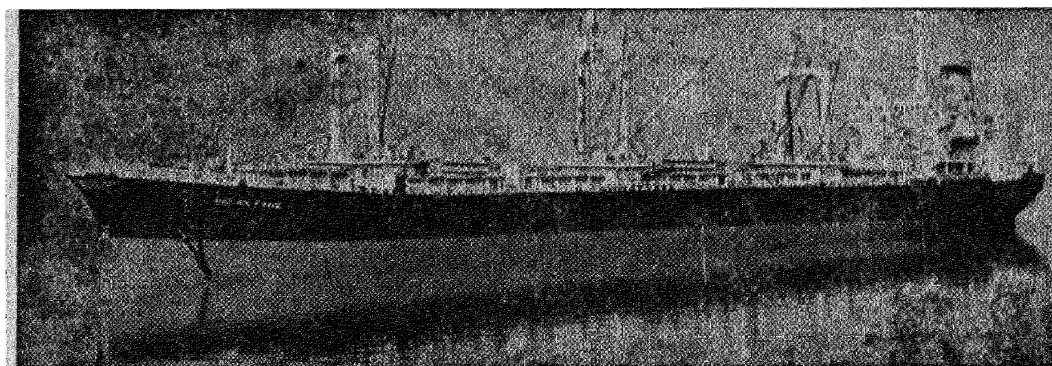
- (3) On closer examination, the allegation by Shetty and others of the 'superficiality' of the money-multiplier theory turns out to be a mis-hit.
- (4) The effort invested by Shetty and others in working out a numerical example to exhibit the cause and effect relationship between credit and the money supply seems to be suicidal.
- (5) Citations from blue-books do not throw any light on whether the RBI gives due importance to the difference between high-powered money and ordinary bank money. The RBI's practice of mixing these two heterogenous components of money supply is inherent in its 'total explanation' of variations in money supply.

Notes

- 1 Gupta, S B, 'Factors Affecting Money Supply -- Critical Examination of Reserve Bank's Analysis',

*Economic and Political Weekly*, January 26, 1976.

- 2 Mujumdar N A, 'Money Supply Analysis: Mechanistic and Economic Explanation', *Economic and Political Weekly*, February 28, 1976, p 371.
- 3 Shetty S L, V A Avadhani, and K A Menon, 'Money Supply Analysis -- Further Comments', *Economic and Political Weekly*, April 10, 1976.
- 4 Mujumdar, *op cit*, p 371.
- 5 *Ibid*, p 372.
- 6 Gupta, *op cit*, p 118.
- 7 *Ibid*, p 118.
- 8 Gupta S B, "Reserve Bank's Analysis of Factors Affecting Money Supply in India -- A Critical Evaluation", Working Paper No 150, Delhi School of Economics. Cf Appendix II.
- 9 Mujumdar, *op cit*, p 372.
- 10 Shetty and others, *op cit*, p 573.
- 11 *RBI Annual Report 1973-74*, p 26.
- 12 Shetty and others, *op cit*, p 571.
- 13 Friedman M and A. Schwartz "Monetary History of the United States -- 1867-1960", Princeton, 1963, p 51.
- 14 Shetty and others, *op cit*, p 573.
- 15 *Ibid*.
- 16 The problem of adjusting the H for changes in statutory reserve ratio should be kept in mind.



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