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THE CHANGING MONETARY PROCESS IN THE INDIAN ECONOMY

The Interlinks between Money, Exchange Parity, Share Prices and Wholesale Prices

P.R. Brahmananda
D. Anjaneyulu
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Issued for Discussion

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Development Research Group,
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Department of Economic Analysis and Policy
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The study outlines the dynamic monetarist approach under Indian conditions. Professor Brahmananda would like to take responsibility for any weaknesses and biases that may be present in the hypotheses, theories and methodologies adopted in this study as also for excesses, errors and omissions, if any, in the paper.

THE CHANGING MONETARY PROCESS IN THE INDIAN ECONOMY

I. INTRODUCTION

THE DYNAMIC MONETARIST FRAMEWORK

The monetary process involves (A) variations in narrow money (M1), broad money (M3), the components of M1 consisting of currency and demand deposits and, of M3 comprising M1 and time deposits; (B) variations in the factors determining money supply, like, for instance, the net RBI credit to the Government, Commercial banks 'credit' to the Government, meaning thereby changes in the portfolio of Commercial banks in Government securities, commercial banks' credit to the commercial sector and net foreign exchange assets of the banking system; (C) effects of the above on the general price level (Wholesale Prices Index) and the price level of wage-goods and other leading categories of prices like the prices of shares; (D) interest rate changes and effects of the same on money supply magnitudes, the components of money supply, and prices; and (E) interaction between changes in money supply, changes in levels of prices of commodities and shares, changes in interest rates and changes in levels of real activity, like, real investment, real savings, growth rates of industrial and other products and the growth rate in general.

1.02 Several of the above variables mentioned are subject to trends and fluctuations. In general, these variables are susceptible to changes in the short-period. Hence, the analysis of monetary process in a general sense concerns itself with short-period, often sequential, changes and their effects.

1.03 The framework of analysis is the usual segmented or generalised quantity theory in its various consistent versions. Where changes involving shifts in proportion occur, one would be concerned with the inter-mixture of the quantity theory framework with that of portfolio analysis which essentially deals with changes in the preferences for different assets specially financial assets and placements.

1.04 The generalised monetarist approach based on the classical quantity theory examines, among others, the effects of money supply variation on (a) non-durable goods and services; (b) durable goods consisting of capital goods and consumer durables; (c) non-reproducible durable assets like land; and (d) financial assets like Government bonds, debentures and equities. If we assume that an economy is in static equilibrium, with real conditions maintained in that state, any permanent variation in money supply tends to lead to a proportionate variation in money prices of non-durable goods, money rate of wages and emoluments, money prices of durable goods and of their services and money value of non-reproducible assets like land.

1.05 However, the *volume* of shares, bonds and debentures will be so increased as to keep the real rate of return on assets, like, the rate of profit and rate of interest unchanged.

1.06 In the immediate short period, when money supply is increased, prices of goods respond more quickly than prices of labour services; prices of non-durable goods respond more quickly than durable goods. Prices of services of durable goods also respond less quickly than prices of non-durable goods and services. Prices of financial assets move up in the immediate short period. The yield rates on shares and bonds will fall but after a rather long time lag, the supplies of financial placements will go up and the yield rates will return to their original levels.

1.07 Thus, the general theorem that variations in the supply of money by themselves tend to lead to proportionate variations in the level of prices of goods and services, and nominal assets must be taken with reference to static equilibrium state with due allowance for time lags. In a static equilibrium framework, the underlying expectations will not be subject to change.

1.08 In any actual economy through time, the hypothesis of static equilibrium cannot be applied. There will be changes, often continuing, in the real capital stock and output states and Money

Supply. The lag effects among these variables, however, cannot be taken as of fixed lengths. The supply of financial assets will also be undergoing a variation dependent of the response to changing yields and rates of return. Expectations will not be static; they will surely be not self-maintaining. Even in a closed economy, it will be difficult for us to empirically perceive, during short periods, unit elasticity response in the price levels with respect to variations in the quantity of money.

1.09 A more troublesome problem would be that the factors determining money supply may not have a proportionate variation effect on the supply of components of money. If the relative components of money vary, along with changes in the supply of money, there will be alterations in the aggregate velocity of money with consequent effects on money prices of goods, and services and, in the interregnum, on assets.

1.10 Another difficult problem would be that there may emerge substitutes for traditional money supply components.

1.11 The generalised quantity theory theorem assumes a more or less static or slowly changing institutional framework. This assumption cannot be accepted in dynamic states even in the short-period and specially in regard to the monetary framework.

1.12 If we find it difficult to obtain a one to one correspondence between money supply changes and changes in the level of prices, the reasons may be sought more in the bewildering complex of changes that occur in successive short-period intervals rather than in any deficiency in the basic theory itself. What we should reasonably expect empirically in short-period situation would be the tendency for a strong and significant and positive effect of money supply on prices of goods. So far as financial assets are concerned, the elasticity in respect of the supplies of these assets in response to falling yields may *not* be noticed, till some length of time, at least in full measure.

1.13 When we deal with the Indian economy, particularly with reference to the recent period, we are also confronted with the impact of fundamental dynamic changes also in institutions and policies; as the economy is being incresingly opened up, new variables are seen to be entering the scene. Changes are also taking place in a number of magnitudes, because of the structural adjustments.

1.14 New exogenous elements have entered the economy. Further, because of the slow real responses in the supply of real stocks etc. and because of a share boom of unprecedented dimensions, there have been disturbances in the working of the monetary mechanism. New channels of transmission of monetary impulses have also emerged.

1.15 The quantity theory *framework* of analysis more than the basic quantity theory *theorem* is extremely useful in this context. This framework will enable us to perceive the economy not necessarily as an equilibrating process, not in any case, as a quickly equilibrating process, but as successions of temporary equilibrium-groping states, continuously getting disturbed by exogenous, or largely so, changes and their feedbacks. We have to permit here changes in the monetary framework, monetary-cum-financial institutions, and evolution of new credit/liquidity instruments. The policy makers will themselves be hard put to understand the bewilderingly complex processes and iteration therefore has to be the watchword. The policy approach has to be, what may be best described as discretionary monetarism, rather than rules/ automatic monetarism. Short period disturbances would be the order of the day. We, therefore, place emphasis on sequential weekly/fortnightly/monthly monitoring of information with a look out always for new data. Whereas, rules monetarism with set limits dispenses with a central bank, the discretionary monetarism would perceive a strong role for the same as also for monetary policy. Money matters; however, money alone does not always matter; money matters in new and unpredictable ways; and the real variables too often interact with the monetary variables in the

same non-routine manner. Discretionary monetarism in successive temporary - equilibrium - groping states subject to continuous shocks is the heart of the economics of sequential short periods.

1.16 This paper in three parts hopes to demonstrate to the extent possible, the methodology of dynamic monetarist approach to the Indian economy.

1.17 Our objective is to examine some of the changes in the effects of factors determining money supply and components thereof, in the new situations. We then examine the factors determining the wholesale prices of commodities and of sub-set of wage-goods and the price index of industrial shares. The reference period is from January 1990 to May 1992. We have experimented with multiple regressions for both monthly time series and weekly time series. Since the reference period is of very great interest from the point of economic and specially monetary policy and changes have occurred in the political regimes during this period, we have also broken up the whole period into convenient sub-periods.

1.18 At the outset, we may refer to the limitations concerning the basic data. Not all time series are available on weekly basis. The RBI's own data are available on weekly basis. The commercial banks' data are not, but are available on fortnightly basis. We have to use some surrogate concerning real domestic product. Here the split up on the monthly basis is based on the quarterly split up and its forecasts concerning the same. We have not been able to get suitable velocity measures. Exchange parity i.e. rupees per dollar, the interest rate data and the prices data are available on both weekly and monthly basis. The non-homogeneity in the data base of the weekly series has been unavoidable. Our defence is that the longer the interval period in the time series, the more do underlining tendencies get smoothened out. Structural changes are not very easily discernible. Also monitoring becomes more difficult.

1.19 It is well-known that regression results on time series very conspicuously suffer from autocorrelation. This is more so parti-

cularly in regard to data on successive intervals of weeks and months. It is possible to experiment by removing autocorrelation through the usual Cochrane-Orcutt and/or Hildreth - Lu procedures; it is also possible to enter lagged variables. We have preferred to present the uncorrected and unmodified DW values. The autocorrelation emerges because of the powerful trend element in the different variables. If we introduce the trend element as a separate variable, often the regression coefficients of the primary variables becomes unimportant. Since much of economic and specially monetary policy is aimed at operating on money supply, exchange rate and the call rate and supply variables like supplies through public distribution, it is accepted that the authorities seek to treat them as instrument variables. It is only after a very long period of observations that we may be able to perceive the random nature of the policy shocks.

1.20 Theory treats many of the above variables as capable of being altered by quick economic policy.

1.21 We have taken for a detailed examination the monetary process during the broad period from January 1990 to May 1992 with convenient sub-periods; and for this purpose weekly, fortnightly and monthly data series have been utilised. The above period has been subject to considerable changes. Some of them are stochastic in character. During 1990-91 the Indian economy was subjected to the impact of Gulf oil crisis. At the same time, a major boom in share prices was taking place though its process was interrupted briefly by the impact of the Gulf crisis. Commodity prices were also rising very sharply with the rate of inflation going up and from the latter part of 1990-91 till July 1992 the economy was subjected to a severe foreign exchange crisis. There were also two changes in Governments, and the yearly Budget for 1991-92 had to be postponed. India had to sell/mortgage a portion of its gold stock. A new economic era with the advent of a new Government, seems to have commenced from July 1991. Beginning with the depreciation of the exchange value of the rupee, a number of new economic policy measures have been announced. The Indian

economy started expanding with an increasing measure of openness; fiscal and monetary incentives were introduced with a view to attracting non-resident and foreign capital and foreign exchange. Major revisions in interest rates and in credit policies were also effected. The fiscal system was also altered in two bouts. The latter half of 1991 also witnessed a continued acceleration of the boom in share prices. It is hoped that an in-depth empirical study of the whole period from January 1990 to May 1992 would be of considerable interest from the point of view of understanding the past and of learning lessons for the future.

1.22 Our study concerns itself first with the changes in the narrow monetary process and magnitude of money supply, M1 and M3, their components and factors influencing the same. We seek to examine whether the monetary process has witnessed the emergence of new factors in money supply determination and whether various factors influencing money supply have a neutral impact on the components of M1 and M3. The second part of the paper deals with the determination of the share prices and the factors concerning the behaviour of the share prices during the period. We examine the various factors which exercise an impact on the share prices and we proceed to pinpoint the connection between monetary factors and share prices. In the third part of the paper we have taken up the examination of the course of the wholesale prices and the factors determining the same. A subset of prices concerned with wage goods is also taken into account. Thereafter, in the fourth part, we outline the broad propositions emerging from the study and in the next part, we briefly note the theoretical and policy significance of the above. The statistical statements including results of regression exercises are given at the end.

II. THE MONEY SUPPLY PROCESS

The monetary and financial process has been undergoing significant changes in the recent period. Statement No.1 at the end gives some relevant and significant data in respect of the Indian economy concerning its real, money, financial, trade, stock market sectors for the financial years 1990-91 and 1991-92.

(i) Whereas during 1990-91 there was not much of a difference in the growth rates of M3 and M1, during 1991-92 M1 has grown significantly at a higher rate than M3.

(ii) During 1990-91 the growth rates of currency with the public, demand deposits of the public and the time deposits of the public were more or less the same as the growth rates of M1 and M3. During 1991-92 demand deposits of the public have grown at a rate about double of that in currency with the public and time deposits of the public.

(iii) Whereas in 1990-91 the growth rate of net RBI credit to the Government was as high as 21 per cent, during 1991-92 it came down to about 1/4th of the rate of growth in 1990-91; however, commercial bank credit to the Government (which also includes cooperative banks' credit to Government but which in our analysis is subsumed and not explicitly referred to) expanded in 1991-92 at a rate one quarter above that in 1990-91.

(iv) There has been a significant acceleration in the growth rate of net foreign exchange assets of the banking system. In 1991-92, net foreign exchange assets increased at a rate five times of that during 1990-91.

(v) The proportion of currency to M3 and M1 had come down significantly in 1991-92 as compared to 1990-91.

(vi) The growth rate of reserve money was about the same in 1991-92 as in 1990-91. However, both the average and incremental money (M1 and M3) multipliers have moved up significantly during 1991-92 as compared to 1990-91. The incremental M1 multiplier went up by about 60 per cent.

(vii) The financial year 1991-92 witnessed substantially higher annual average rate of inflation than during 1990-91. This was despite a major reduction in the monetised deficit to GDP. The rate of increase in wholesale prices was also higher during 1991-92 as compared to 1990-91.

2.02 It should seem from the above that the monetary process during 1991-92 witnessed some structural alterations. The traditional view so strongly put up by the Chakravarty Committee on the Working of the Monetary System that substantial reduction in the growth rate of net RBI credit to the Government is the primary-instrument for bringing out a major reduction in money supply magnitudes seems to be no longer tenable. Again the view that by controlling the reserve money growth rate and by holding it constant one can keep the overall growth rate in money magnitudes constant has also become untenable. The incremental money multipliers which were generally stable in the previous year went up significantly indicating the importance of the need for new instruments of money supply regulation. The money market process seems to have generated its own devices to bring about increases in short term liquidity credit and money. The traditional view that the various factors influencing money supply are structurally inter-linked and they all tend to have a neutral effect on the money supply process has also not been borne out.

2.03 While it is not possible to examine all the above aspects in detail in one paper, we have subjected the factors influencing money supply on the growth rates of components of money

supply to some detailed study. We also seek to throw some light on the growing importance of net foreign exchange assets and of commercial bank portfolio management in Government securities as important factors affecting rate of growth of money supply. It seems the commercial bank operations with their portfolios of Government securities did have an important effect on the growth of bank money particularly of demand deposits. This may partly explain why the incremental money multiplier rose so sharply in 1991-92.

2.04 The money supply process is generally analysed in terms of changes in high powered, or reserve money, consisting of aggregate of the currency with the public and banks' cash balances in their vaults and with the RBI, and money multiplier, or as a result of changes in the net RBI credit to the Government and to the commercial sector, and net foreign exchange assets of the RBI. The money multiplier would vary depending upon the cash ratio maintained by the banks partly as a result of statutory requirements and changes therein, and the ratio of deposits to the currency with the public, the latter ratio being determined by the public's preference as between currency and deposits. If there are any autonomous factors affecting money supply and changes thereof, the money multiplier would certainly undergo a change.

2.05 Autonomous factors would emerge when the institutional process is undergoing a change and new instruments facilitating credit/money generation are emerging; also when excess liquidity in the monetary-cum-financial system is being activised in the form of money/credit. These factors would depend a great deal, upon shifts in the demand schedule for active funds in the market. When such shifts come about, the money multiplier would undergo a change sometimes in a significant way depending upon the circumstances. It is, therefore, often contended that traditional money multiplier approach concentrating on the high powered money, cash ratio and the ratio of deposits to the currency with the public becomes inadequate when shifts in the demand schedule for loanable funds emerge, bringing in new instruments and new

channels for augmenting the flow of supply of loanable funds. Such influences from the side of demand for loanable funds can arise when the short term funds market is affected by the emergence of high and rising implicit rates of return in transaction in shares out of alignment with the return rate for other uses of funds. The money multiplier process would not then proceed on a smooth trajectory. The traditional approach to money supply process in India has been to lay emphasis on reduction in the fiscal and monetised deficits or in their ratios to GDP with a view to restricting money supply and bank credit. The above is supplemented by variations in the cash reserve ratios within the statutory limits. In order to restrict commercial banks' credit to the commercial sector, margins are raised and often some proportions of incremental deposits are impounded. Despite such measures, it is possible that money supply process may go up beyond the usually desired rate and may even get accelerated. It is possible to conceive of changes in money supply even when all formal factors affecting money supply are constant. Portfolio operations with given stocks of securities may bring excess liquidity into monetary form.

2.06 The weekly statistical supplement of the Reserve Bank of India publishes the fortnightly data on monetary aggregates like M1, M3 their components alongwith the sources of M3. The data for the period January 12, 1990 to May 15, 1992 form the basis for our analysis. The monitoring of the monetary policy can best be done if these aggregates were measured on a weekly basis. In the absence of these, the factors affecting money supply were studied on the available fortnightly data and to show the relevance of weekly data in such exercises, the weekly data on the monetary aggregates were artificially created by using the fortnightly data. The need for weekly data is felt because aberrations if any, get smoothened out within a fortnight thus not allowing the authorities a scope for close scrutiny.

2.07 It is well known that the time series data on economic variables generally suffer from serial correlations in them. There-

fore, the regression equations have to be interpreted with care, after convincing oneself that the explanatory variables are properly specified and ascertaining the proper functional form. With this in mind, the results of the regression equations in the original form and after adjusting for auto-correlation through Cochrane/Orcutt and similar procedures form the basis for conclusions; but we have presented the uncorrected results in the statements. The results based on fortnightly data are first discussed followed by results based on weekly data. Regressions on monthly data were also conducted. The results on all the three sets of data are generally harmonious.

2.08 Net foreign exchange assets (NFEA), net RBI credit to Government (NRCG), commercial banks' credit to commercial sector (BCC) showed significant impact on narrow money (M1), currency (C), broad money (M3) and demand deposits (DD) during the entire study period. However, the impact has varied among these variables. The equations have high $\bar{R}^2$ (0.94 to 0.99) and the coefficients of these variables are highly significant though the D.W. is low (0.56 to 0.85). An increase of Rs.100 crore in net foreign exchange assets increases M1 by Rs.96 crore, Rs.37 crore in currency, Rs.45 crore in demand deposits, Rs.10 crore in time deposits, Rs.106 crore in M3. Thus the impact is large on M1 and M3. This has an important implication on M1 growth when exchange reserves are built up as it happened during July 1991 to May 1992 (Statement No.4).

2.09 Net RBI credit to Government has a positive impact on all the variables. The coefficient is highly significant except in case of demand deposits. Its impact is largely felt on M3, in which an increase of Rs.100 crore causes an increase of Rs.56 crore in M3. Surprisingly, contrary to the general impression, net RBI credit to Government has relatively low impact on currency. It has a significant impact on demand deposits and time deposits but not on currency, thus implying that funds are locked up in the banking system. (Statement No.4). Banks' Credit to Government involves portfolio management and switches and swaps intra-bank wise.

Because of lags, there is a float element which can become active leading to, say, transactions in shares, and credit generation thereof.

2.10 The regression equations after adjusting for auto-correlations through Cochrane Orcutt procedure substantiates the earlier findings. The net Reserve Bank credit to Government continued to have an impact on currency and time deposits.

2.11 Commercial bank credit to government showed a highly significant impact on time deposits whereas its impact is significant on demand deposits, thus confirming our earlier observation on locking of funds in the banking sector. In the case of commercial bank credit to commercial sector there is a significant impact on currency and time deposits but not on demand deposits. These observations also emanated from first difference equations.

2.12 In order to capture the nature of changes that have taken place in the economy during the study period and their differential impact on the monetary variables in various periods, the study period was conceived originally in terms of three periods. The periodisation was made on the basis of net foreign exchange assets. The net foreign exchange assets stood at Rs.6,407 crore at the beginning of the study period and there was a depletion of these assets to Rs.4,134 crore on October 5, 1990. On October 15, 1990, gold was revalued close to international market prices. This kind of appreciation has a corresponding effect on RBI net non-monetary liabilities. With this revaluation the value of NFEA has grown more than 2-1/2 times on October 19, 1990. However, the depletion of foreign *currency* assets (i.e., excluding gold) continued upto October 4, 1991. Subsequently, the increasing trend in net foreign currency assets (and thereby in NFEA) was observed mainly due to non-resident inflow and investments. The first two periods will be similar as far as the behaviour of the variables is concerned and therefore it was felt that the entire period could be divided into two instead of three periods which indeed is distinct and will be optimal to know the varied impact of the variables,

as can easily be seen from Statement No.5. This presents the compound rate of growth estimated through semi-log trend equations. From this it can be seen that the rate of growth in the second period is almost double to those observed in first period in case of currency and demand deposits. In the case of time deposits, it is the same in both the periods and there was an increase in M3. The net Reserve Bank credit to Government which was sharply rising at a rate of 0.69 per cent per fortnight in the first period, showed a decline to 0.03 per cent per fortnight in the second period. The higher increase in the NFEA in the first period reflected the revaluation of gold in that period. It may be interesting to note that the rates of growth are higher in the second period in case of banks' credit to government and banks' credit to commercial sector. (Statement No.5).

2.13 The ratio of currency to M1 which was on the average around 57 per cent in the first period, declined to 54 per cent in the second period, thus showing a corresponding increase in the demand deposits. There was not much of a change in the proportion of currency to M3 in the two periods whereas there was a decline in TD/M3 in the second period, thus showing that the increase in DD/M3 confirms that the funds are gravitating to the Banking system.

2.14 The regression equations for the first period (Jan.12, 1990 to October 4, 1991) have shown high $\bar{R}^2$ with D.W. ranging between 0.88 to 1.05. The standard errors are low with reference to the mean of the dependent variable. The general observations are: NRCG and BCC and BCG are statistically significant for TD and M3. The signs are proper and an increase of 100 crore in BCG, NRCG and BCC will have respectively an increase of Rs.167, 27 and 42 crore in TD; 136,71 and 107 crore in M3. The NFEA turned out to be insignificant though it has a positive impact on TD and M3. The coefficients turned out to be more or less similar after Cochrane-Orcutt (CO) correction, implying the importance of these variables. In case of DD, BCG and BCC have significant impact. (Statement No.6)

2.15 The impact of these four variables is shown with proper sign in M3 and M1 for the second period. The impact of NFEA, NRCG, BCC is highly significant in M3 whereas NRCG and BCC are significant in M1. NFEA and BCC are highly significant for TD. An increase of Rs.100 crore in NFEA showed an increase of Rs.131 crore in M3, Rs.97 crore in TD and Rs.33 crore in M1. The findings are more or less substantiated even after the equations are adjusted for autocorrelation. This clearly suggests that net foreign exchange inflow has shown its impact on M3. (Statement No.6).

2.16 The changes in money stock measures can be looked at in another way. During the period many important policy changes have taken place in regard to liberalising industry, trade, etc. These changes in turn will have a say in the behaviour of the money stock measures. It is, therefore, felt that the study period can be divided into two periods : pre-liberalisation period and post-liberalisation period. The impact of the liberalisation policies has changed the financial variables as revealed by the compound growth rates. Excepting for net Reserve Bank credit to Government, all the other variables had shown increase in growth rates in the post-liberalisation period. In the case of time deposits and bank credit to commercial sector, the increase was marginal whereas the growth rate in net foreign exchanges assets in post liberalisation period was six times that of the first period. The growth rate in demand deposits in the second period was two times that of the first period. This clearly brings out the differences in these two periods. (Statement No.7).

2.17 The variables that explain the money stock measures also showed varied impact in the two periods. Banks' credit to commercial sector was a significant variable in explaining the money stock measures in both the periods; however its impact was felt more on M3 in the first period. An increase of Rs.100 crore in BCC increased Rs.115 crore in M3 during the first period and Rs.67 crore in the second period. Net foreign exchange assets had also showed a significant impact in the second period on M3 through

time deposits. A Rs.100 crore increase in NFEA contributed to an increase of Rs.41 crore in time deposits and Rs.96 crore in M3. Net Reserve Bank credit to Government had shown significant impact in currency as well as demand deposits in the second period. An increase of Rs.100 crore in NRCG increased Rs.53 crore in terms of currency and Rs.24 crore in demand deposits. Its impact was Rs.96 crore in M1. Banks' credit to Government has a significant contribution on time deposits and M3 in both the periods and in the second period on M1 and demand deposits. A Rs.100 crore increase in BCG increased time deposits by Rs.146 in the first period and Rs.160 crore in the second period. The impact of this variable on M1 is significant and positive in the second period. An increase of Rs.100 crore in BCG caused an increase of Rs. 79 crore in M1 and thus Rs.239 crore in M3. (Statement No.8).

III. INTERLINK BETWEEN MONEY AND SHARE PRICES

3.01 The Indian stock market which has a history of more than a century and a score and has seen several cycles of intensive fluctuations in the past has experienced a major boom phase from around the middle of the financial year of 1990-91. The BSE national index of equity prices (1983-84 = 100) moved up sharply from around 430 in the beginning of June, and 450 in the beginning of July, to around 550 in the beginning of August and further galloped to around 710 by the end of September 1990. In other words, within a period of 4 months, the index had gone up by about 70 per cent. The index stood at around 800 in August 1991 and then moved up to around 900 by the first week of January 1992. Thereafter, it started moving up and specially in an accelerated manner between the beginning of February 1992 when the index was around 1050 to around 1900 and above by the beginning of April 1992 manifesting an increase of about 80 per cent in just three months. It may be noticed that there were two major bouts of rapid increase; one during the middle of 1990 and the second during the early months of 1992. As the boom was

advancing, the probability of losses was becoming less and less as reflected in the dips in share prices index. Taking the period from mid-June 1990 to the beginning of April 1992, the index of share prices seems to have more than quadrupled. The turn-over data indicates that monthly turn-over in the stock market which deals primarily in equities, preference shares and debentures, went up from around Rs.3,800 crore in mid-June 1990 (with an average daily turn-over rate of around Rs.175 crore) to around Rs.6,500 crore in the monthly turnover in June 1991 (with an average daily turnover rate of around Rs.340 crore). In March 1992 the monthly turn-over had reached around Rs.8,760 crore (with a daily turn-over of Rs.917 crore) and in April 1992 the monthly turn-over was around Rs.7,400 crore (with a daily turn-over of around Rs.620 crore). During 1990-91 the aggregate turn-over was around Rs.38,000 crore and in 1991-92 this jumped to around Rs.70,000 crore. In 1990-91 the annual transactions were around 7.5 per cent of GDP at market prices; in 1991-92 it had gone up to above 12 per cent. The total capital raised in 1990-91 through the stock market was around Rs.4,230 crore. In 1991-92 it was around Rs.5,749 crore. It would seem that the extraordinary boom in the share prices and the increase in the volume of transactions did not appear to have been accompanied by any significant increase in the levels of capital raised even in nominal terms. The elasticity of response of nominal capital issues to the boom in share prices seems to have been rather low. The RBI data on gross savings indicates that whereas in 1990 and 1991 the gross domestic savings were around 22.2 per cent of GDP, in 1991-92 it was around 23.2 per cent. Household savings in the financial assets was 8.9 per cent and 9.5 per cent respectively in these two years. There is no evidence that the share boom had led to any substantial rise in the savings rate. Statement No.1 gives some useful statistical details.

3.02 The causes for the galloping rise in share prices could be several. The upward trend certainly started as mentioned above even before the advent of New Economic Policy in July 1991. As noted, there was, however, no underlying real basis for extra-ordinary rate of growth in share prices. No doubt, the index of

industrial production as also agricultural supplies went up at a reasonably high rate during 1990-91. But there was no major uptrend in real investment. Investment and saving ratios were also at their usual level : nevertheless the gallop occurred.

3.03 Will there be a substantial acceleration in the capital raised in the stock market as a lagged response to the share boom of the previous period? This does not seem probable at this stage. There seems to be, therefore, strong support to the hypothesis that the recent share boom is primarily monetary in character, as reflected in the enormous increase in the turnover ratios of given scrips. It is true that this increase in activity and turnover has been reflected in the rapid increase in the number of investments currently placed at about 15 million. The number of companies' shares which were traded in the stock market went up only by a small amount, from 6,200 in mid-June 1991 to around 6,500 in August 1992. Because of the high extent of rise in the index of share prices the market capitalization rate moved up substantially and currently stands at about 40 per cent of GDP but this high level in the ratio again seems to have been the result of the high turnover caused by monetary factors.

3.04 A number of factors gave enormous liquidity specially with banks and other financial institutions. The rate of growth in M1 was very high. The rate of inflation was also very high and consequently the real return from interest rate which was already relatively low, was turning negative. The banks were also subjected to constraints for investing a large part of their deposits in Government securities earning low interest. At the same time, they had to earn profit for the managements to show their efficiency. The natural question is whether these factors led to a condition for diversion of funds to stock market particularly as the opportunity for investment in real sector was curtailed due to supply-based sectoral recession in 1991-92. Before we go into these aspects, let us briefly explain the theoretical considerations to prepare the setting for the empirical analysis.

Theoretical Explanation of Share Price Movement

3.05 According to the theory of business cycles, a boom in share prices is generally occasioned by spurts in the real economic activity as reflected in the levels of real investment, growth in industry, trade, construction and various services. Concomitantly there would be rise in employment. The spurt in share prices is also promoted by expectational factors resting with future levels of real economic activity. Thus the possibility of a recovery in real economic activity, be it due to change in economic policy, invention of new technology or discovery of natural resources like oil, may kindle high expectation about the future growth of the economy and thereby create a favourable climate for investment in share market. The policy initiatives to create a favourable investment climate through, for instance, fiscal and/or monetary policy measures, thus raise the potential for new investment and contribute to rise in share prices.

3.06 The international economic scenario, which also influences domestic economy, was however not very conducive in 1990 for inflow of funds from abroad to the share market. Most of the countries in the western world were fighting recession and had balance of payment problem. India had a similar balance of payment problem at the beginning of 1991, leading to devaluation of her currency by the middle of 1991, and prior to it, imposed various restrictions on imports. Therefore, the opportunities for investment in the real sector were greatly restrained by foreign exchange crunch. But the devaluation and the rising exchange parity in rupees made foreign currency worth high in terms of its purchasing power in India. This could lure non-resident Indians to remitting money for investment in profitable opportunities. And the boom in share prices provided that opportunity. In view of this, exchange parity appears to be an important factor in explaining changes in share prices.

3.07 The above considerations indicate that the change in share prices would depend to a large extent on impulses of growth in

the real sector, favourable exchange rate and incentives provided through economic policies.

3.08 In case the share prices increase substantially in spite of the fact that the real economic factors did not give a cause for boost in share prices, then the onus should squarely be on monetary factors because all transactions in share market have to be settled through matching monetary transactions. This implies that there must have been a high rise in the supply of money to support huge transactions in the share market.

3.09 Another important factor is that investment in shares is considered as a means to supplement wage income. If returns on shares are much higher than the interest earned elsewhere then there will be a rush of funds to the share market. As share market has attracted huge funds, it implies that the return on shares was much higher than what was available as interest rate from other investments. This can possibly be measured by anticipated future growth in price of shares. We have taken the growth in share prices to account for this factor in our explanation of share market boom.

3.10 The theoretical considerations above indicate that in the absence of any impetus from the real sector the boom in the share market has been occasioned by monetary factors. In other words, the share boom according to us is a monetary phenomenon. We agree that normally one does not witness a sustained correlation between money and share prices. But in the case of the recent share boom in India, this seems to be the distinct possibility. Therefore, we perceive a strong relationship between growth in money, specially in deposits and share prices. The spurt in monetary expansion has also been accompanied by inflow of capital from abroad. This has been facilitated by rise in exchange parity rate. High and rising net rates of return after adjusting for probability of loss has also led to 'imaginative' means of raising funds through operations in Government securities. Also the flow of funds to the share market has been accelerated by the direct and

indirect effects of further expectations concerning the course of share prices.

3.11 The share boom could not have lasted long without the accelerating pace of investment in real sector. The process of reduction in the growth rates of money supply and in relatively upward drifts in interest rates in the other sectors would naturally bring down the pace of the boom. Further, when the expectational factors supported by monetary expansion get reversed, there are bound to be huge capital losses. Therefore, we call this share boom a bubble.

3.12 There are limitations to the extent to which the monetary expansion process can go on blowing the bubble. There are various other implications of share market bubble including its positive effect on prices, to which we will turn later.

Data

3.13 We have selected RBI index of share prices in preference to other indices. The reason is that the RBI Index is comprehensive in its coverage and therefore, gives a more realistic representative picture of movement in share prices compared to others. The RBI index of share prices went up over the period of 72 weeks at a semi-log weekly rate of 0.7 per cent. The rise in share prices during the whole period from January 1990 to March 1992 thus works out to 43.7 per cent. However, the trend in respect of these different periods are widely different. During the first period from January 1990 to December 1990, the weekly semi-log rate of rise was around 55 per cent on annual basis. For the second period it was around 50 per cent, for the third period from May 1991 to December 1991 it was 80 per cent. But in the last period from December 1991 to May 1992, the rise was sky high at 188 per cent which was fuelled to a considerable extent by fiscal incentives by way of reduced rate of capital gains tax on return from stock operations provided in 1992-93 budget. The semi-log rate of rise for the entire period from January 1990 to May 1992 works out to

46 per cent which indicates that the galloping rise in share prices continued for a long time. (Statement No.3). It is interesting to note that there were several weeks during which the weekly rate of rise was above 6 per cent. The highest rate of rise was around 12 per cent. To recapitulate, the bulk of the overall rise in the index seems to have occurred between end-June 1991 and end-September 1991 and again between end-January 1992 and end-May 1992. What is important to note is that though we have a large number of observations (124), it is only in less than 20 per cent of the above number of observations that decline or moderate decline in share prices were noticed. The crude probability for a rise was 4 to 1. Obviously there must have been a strong and sustained expectation of a continuous rise in share prices. The upward gallop was quite strong even before the budget of 1992-93.

3.14 Our data on liquidity indicate that M1 had powerful jumps during the period of boom in share prices. The semi-log growth in M1 between January 1990 to December 1990 was 10 per cent which went up to over 26 per cent during December 1990 to May 1991. The rise was at 17 per cent during May 1991 to December 1991 which jumped to 23 per cent in the next period i.e. December 1991 to May 1992. Demand deposits, being the major component of M1, had also increased at a high rate during this period. (Statement No.3).

3.15 The exchange parity of the Indian rupees per U.S. dollar also started moving up from 1990-91 onwards. Between January 1991 to January 1992 the parity moved from 18.29 to 25.87 with major shift coming in the month of July 1991 through the devaluation of the rupee. The next major jump in exchange parity occurred in March 1992 with the partial convertibility of the rupee. The upward movement in the exchange parity provided an opportunity for inflow of foreign currency into India; and the boom in stock market provided an avenue for parking a part of this fund in shares. The flow of foreign currency as reflected from net foreign exchange assets, which combine both official and private transactions, registered a growth (semi-log) of 33 per cent in 1990. The

annual rate of rise was highest at 102 per cent between May 1991 to December 1991 and in the next few months up to May 1992 the rate was 88 per cent. It is thus evident that net foreign exchange assets contributed sizeably in the growth in liquidity measured by M1. (Statement No.3).

3.16 Commercial banks' portfolio in government securities, though relatively inconsequential in the past, became an important instrument in the hands of banks for diverting funds to the stock market during the recent period. The question examined is that from which period this factor started exerting positive influence on share prices.

3.17 The other important variable included in the model relates to growth in share prices representing expectational impulse that propelled share market boom. As noted earlier, share prices continued to grow at a very high rate resulting in funds gravitating continuously towards the share market.

3.18 The above analysis of data indicates a positive relationship between share prices and M1, its various components, exchange rate, expectations arising from continued rise in share prices. The theoretical considerations explained earlier justifies inclusion of these variables for explaining the boom in share prices. This relationship will be brought into sharper focus when the parameters are estimated by the regression method.

Results

3.19 Statements 9 to 12 present the results of the empirical exercises to understand the behaviour of share prices in the recent period. In Statements 9 and 10 we have taken month-end data from January 1990-March 1992. The whole period has been divided into two sub-periods - January 1990 to March 1991 and January 1991 to March 1992. The dependent variable is the RBI Index of share prices. The independent variables are : Narrow Money (M1), Commercial Banks' Credit to the Commercial Sector

(BCC), Commercial Banks' Investment in Government Securities (LBIG), Net Foreign Exchange Assets (FEA), Exchange parity of rupees per U.S. dollar (XR), Nominal Capital Issues (CPI), Growth Rate in the Index of Share Prices during the past month (PSHG) and Call Rate (CLL). The regressions have been on the logs of variables. From Statement 9, it would appear that commercial bank credit to the commercial sector seems to be having a positive effect on share prices. So also foreign exchange assets and the exchange rate. Capital issues are having broadly a positive but *feeble* effect. The growth rate in share prices is having a positive effect. The sign of the effect of the call rate is negative. Commercial banks' investment in Government securities is having a strong effect depending upon the assortment of independent variables in the regression. The crucial result is that money is having, in all the equations, a positive effect on share prices which is also largely significant. Turning to the period-wise data, money, exchange rate, commercial banks' investment in Government securities, and the growth rate in share prices are taken as independent variables. Money's positive effect is felt over the whole period and very strongly in the second period. Commercial banks investment in Government securities is having a strong positive effect in the second period. The exchange parity too is having a strong positive effect in the second period. (Statement No.10).

3.20 We now turn to the exercises based on the week-end series. (Statements 11 and 12). Here the periodisation is in four parts - the first period from January 1990 to December 1990; the second from December 1990 to May 1991; the third from May 1991 to December 1991 and the fourth from December 1991 to May 1992. The week-end values are important because they reduce to a minimum the smoothening impact of the dynamics of the variables. We have also taken demand deposits and a proxy of velocity as an independent variable. For the whole period, money has a very significant positive effect on share prices. So are the call rate and the exchange parity. Theory would expect the call rate to have a negative effect on share prices. In equation 2 for the whole period, in place of money we have included demand deposits. It is interesting to note

that demand deposits have a very strong positive effect on share prices, the elasticity being close to two.

3.21 Looking at the sub-period-wise data, money becomes important with a positive effect in the second period and strongly so in the last period. The call rate has a negative sign only in period 3. The growth rate of share prices is having a strong positive effect in period 4. The demand deposits too emerge with a very strong positive effect in period 4. It seems that exchange parity had a very powerful effect in periods 1 to 4. (Statement No.11).

3.22 We have also studied the effect of some of the factors determining money supply on share prices. We have taken three factors (i) Commercial banks' investment in Government securities; (ii) Commercial bank credit to the commercial sector; and (iii) Net foreign exchange assets of the banking system. Both for the whole period and for the sub-periods 1, 3 and 4, commercial banks' portfolio in Government securities is seen to be having a very strong positive effect on share prices. It seems that for the whole period a 10 percent change in Commercial banks portfolio in Government securities has a 46 percent upward effect on share prices. For the fourth period a 10 percent change in commercial banks' portfolio in Government securities has had a 68 per cent change effect on share prices. Commercial banks investment in Government securities would be having effects mostly through demand deposits, which too are seen to be having a very strong positive effect on share prices. (Statement No.12).

3.23 The equations generally explain to a high extent the course of share prices; this should be deemed as surprising and contrary to expectations as per theory which would expect the course to be a random walk. This is one of the important reasons why we have termed the share boom as primarily a monetary phenomenon. The exercises give some hope to the belief that if a surrogate to the call rate in the official interest rate structure existed and had it been quickly responsive and flexible over a wide range, probably the

intensity of the share boom could have been moderated to a great deal.

3.24 Again, contrary to theory, the commercial banks' operations in Government securities seem to be having a strong positive effect on share prices. The boom seems to have been accelerated because of this factor. We wanted to find out through sequential roll-over regression exercises, the probable month from which commercial bank operations in Government securities tended to exercise a positive effect on share prices. A perusal of Statement No.13 indicates that it is from the period July 1990 the sign of the effect of the variable representing commercial banks' portfolios in Government securities started having a positive effect. It is seen that the effect persists for all subsequent roll-over periods. Commercial banks' portfolio in Government securities seems to have a theoretically satisfactory negative effect in periods beginning with June 1990 and earlier. It may be recollected that the first bout of the share boom began during the middle of the calendar year of 1990. The boom persisted despite the Gulf oil crisis in a manner contrary to world trends elsewhere where the share prices started tumbling down as an aftermath of the crisis. Probably, this is a hunch based on the empirical results, the monetary factors affecting the boom started exerting their potent influence from around June 1990 onwards. Certainly the monetary factor did have an acceleration effect on the boom also during the post-December 1991 phase.

3.25 As noted earlier, the share boom seems to have commenced around June 1990. We have noticed that the portfolio management operations of commercial banks have started having their effect on share prices from around that period. These operations involving sweeps and swaps in Government securities among the banks generated additional liquid credit and money specially in the form of demand deposits. These were directed towards the share market bringing about a large rise in share prices. With the expectation that more funds would be injected in this manner as well as through other channels to the share market, the share prices kept on rising. However, the Gulf oil crisis placed a

dampener on the share prices and other upward trends in share prices. This situation seems to have continued for quite some time but from the middle of 1991 share prices again resumed their steady upward movement. The various new economic policy measures alongwith the increase of foreign exchange in the context of the prospect of a reduction in government's share in economic activity seem to have created conditions ideal for the resumption of the boom. Portfolio management operations got a boost when all around there were expectations of steps to increase profitability of commercial banks' operations. The Budget for 1992-93 seem to have been given a further fillip to the share market. But no boom can be sustained without being propelled by continuous injection and prospects of some movement of funds to the market. A monetary boom is defined as a boom which is carried forward primarily by expansion of money and liquidity and expectations of a continuance of such expansion. A monetary boom can sustain itself for quite some length of time by the sequential impulses. We wanted to find out whether M1 or demand deposits *per se* had a more significant role in the share boom. We took the period from January 1990 to March 1992. (Statement 13A). The notional BSE Index of share prices was taken as the dependent variable. While working out an index of turnover in share transactions and dividing the above by the index of share prices we obtained the index representing the quantum of activity in share market. The independent variables now are M1, Call Rate in the prices, Exchange parity, Yield of Government securities and the index of quantum of activity in the share market. It is found in the regression exercises on logarithmic form that M1 has a strong positive effect on share prices. For a 1 per cent change in M1, the index of share prices goes up by 2 per cent. Gold prices have a negative though insignificant effect. The exchange parity has a positive and significant effect. Yield of Government bonds has a significant negative effect. The call rate has a moderate negative effect. The index of quantum of real activity has negligible effect. We now substitute demand deposits in place of M1. The regression results indicated that demand deposits had a strong/significant positive effect on share prices. As compared to M1 the effect of

demand deposits is greater and significant. The other variables are the same as in the earlier exercises and have same effects. It appears from the comparison of the two exercises for the same period that demand deposits had a more powerful effect on share prices than M1. It may also be noticed that the explained value of the equation in demand deposits (0.87) is more than the M1 (0.85). The standard error in the equation is also lower than that with M1. The share boom which was earlier termed as a monetary bubble may more appropriately be characterised as a 'bank money bubble'.

IV. MONEY, WHOLESALE PRICES AND WAGE-GOODS PRICES

4.01 In the previous Chapters we have noted the changes in the money supply process and how it has affected the course of share prices. The monetary process engulfs a number of markets for example, the markets in financial assets, as well as in new capital issues, the market in gold and silver, the markets in commodities (including futures) and of course the market in foreign exchange. All these come under the rubric of monetary process in one way or the other. In this connection, these markets are also inter-linked as the various categories act and interact with each other.

4.02 The Wholesale Price Index went up by about 32 per cent between January 1990 and May 1992. The simple average monthly rate of rise was more than one per cent. Except between November 1991 and December 1992, when it fell by about 1 percentage point, the index was by and large rising *continuously*. If we take July 1991 as the beginning month of the structural adjustment process, between that month and May 1992, the WPI had risen by about 9 per cent (i.e.) it recorded almost the same percentage rise as during the period from October 1990 to July 1992. Against the above backdrop, a major concern for the Government has been the containment of inflation rate which was set as a top goal of its short-term economic policy. The Finance Minister had been

repeatedly stressing that inflation containment has to be the dominant objective in a developing economy like ours where the majority of workers do not get their money incomes and balances indexedly compensated for inflation. Incidentally, the International Monetary Fund with whom we are having a stand-by arrangement treats inflation rate reduction as the most important objective.

4.03 The object of this section is to (a) find out the probable factors responsible at the proximate level for the inflation during January 1990 to May 1992 on the basis of time series data on monthly and weekly basis, (b) ascertain the hypothetical effect on wholesale prices, in the event of a lower order of money supply growth, (c) examine the factors affecting wage-goods prices, and (d) note some implications of the results for future monetary policy.

4.04 We begin with monthly data as the basis. There are four magnitudes or variables which according to monetary theory have an effect upon the price level. These are : (i) money supply, narrow or broad money as the case may be, as a measure of aggregate monetary demand for commodities and services; (ii) a measure for aggregate supplies/production of commodities, normally real net domestic product; (iii) a measure of an active interest rate; (iv) a measure for incorporating the influence of price level expectations; and (v) a measure of velocity.

4.05 In an international context, the exchange parity say, in terms of Rupees per U.S. Dollar, the inverse of the exchange rate, is an important variable affecting the domestic price level. It is generally established that under Indian conditions, narrow money, M1, consisting of currency with the public and demand deposits with the public, is the proper measure of aggregate monetary demand. Since currency constitutes nearly 60 per cent of M1, one may take currency with the public also as an alternative to narrow money (M1). M1, or, in the alternative, currency with the public, will tend to have a powerful direct impact on the price level. Strict theory would maintain that if the supply side does not undergo any

variation and other conditions are equal, a 10 per cent increase in M1 should have an effect of a 10 per cent increase in the level of prices. But this strict mathematical relation will not hold true as the supply side itself would be changing and the other conditions would not be equal. Real national product, the proxy for aggregate supplies, should theoretically have a negative effect on the price level. But if M1 changes are very high, the supply effect may be dampened out. Aggregate production or measure of supplies may not necessarily imply market supplies. It is possible that hoarding and dishoarding of commodities may enter as a barrier. The measure of short-term interest rate has to be the highest noticeable in the market. In our case, the highest short-term rate, which theoretically is the market determined rate, a very short-term rate, is the call rate. The call rate was freed by Reserve Bank sometime ago and it has been fluctuating in a wide range thereafter. Sharp rises in the call rate should tend to exercise a dampening effect on the level of commodity prices, other conditions being equal. To the extent the official rate of interest in the short-term corresponds to the call rate, the effect could be more powerful. Unfortunately, in India the Bank Rate is rather rigid and/or varies very infrequently. Hence we have preferred to treat the call rate as a more powerful market signal. Certainly under ideal conditions of monetary policy, the Bank Rate should be fluctuating within a wide range and should tend to be *above* the call rate. There are wide choices in regard to the price expectational variable. We have preferred to take the rate of change in the price level in the current month over the previous month as the price expectation variable from our standpoint. Generally, if prices are going up in the past up to the present there would be a feeling that the prices would be going up in the future also. Common people stubbornly believe that if prices are rising, they will continue to be rising.

4.06 We have taken initially four important short period variables whose impact on the price level may be studied in the monthly series data. Since we are concerned with the short-period, and this happens to be the dominating reference standard in economic/monetary policy, we have to hit upon an ideal reference interval. Monthly time series are not available in respect of magni-

tudes like the real GDP. While real GDP estimates are available for the whole year, quarterly estimates of GDP magnitudes could be worked out based on assumptions some of which may not always be tenable. Since there is no superior alternative at present and as we are concerned with macro behaviour, we take the quarterly estimates as our basis and split them for different months of a particular quarter. For 1990-91, the quick estimates point to a 5.2 per cent growth rate in real GDP and for 1991-92 the forecast rate is 2.5 per cent. Quarterly break-ups are made out of this on the basis of past averages derived from past studies and out of the latter monthly figures have been computed.

4.07 We may now express the form of the equation for the price level:

$$Pwh = F(M1, Y, rc, Px)$$

where M1 is narrow money, Y is real GDP, rc is the call rate and Px is the price expectational variable.

When econometrically presented, we have to provide for the constant term and an unobservable error term. The ideal function is the double logarithmic form, since we think of the course of the price level in terms of percentage rates of change.

4.08 The period under observation, to repeat, is from January 1990 to May 1992. We have on the whole 29 observations. We graphed the price level series and divided the whole period into two sub-periods. The first period has 18 and the second 11 observations. Statements 15 and 16 give the detailed regression results. We give below the results of regression exercises for the whole period.

$$\text{Log } Pwh = \underset{(-4.07)}{-2.64} + \underset{(16.15)}{0.67}\ LM1 + \underset{(0.52)}{0.03}LY$$

$$\underset{(-0.142)}{-0.02}\ Lrc + \underset{(1.68)}{0.01}\ Px$$

$$\bar{R}^2 = 0.91; \quad DW = 0.43$$

4.09 The meaning of the results of the exercises for the whole period is given below:

M1 has a very powerful effect upon the Wholesale prices. A 10 per cent increase in M1 has an effect of near 7 per cent increase on the level of prices. The effect of real supply is insignificant. However, the call rate has a negative effect upon the level of prices. The effect is not significant but the sign has to be noted. Looking to the nature of the short period which we were examining, the effect may be considered as reasonably important. The price expectation variable has a reasonably important positive effect upon the level of wholesale prices.

4.10 Had money supply been checked severely, the course of the price level would not have probably risen. Had market interest rates risen sufficiently high, the price level again would not have risen and if rising price expectations had been smothered, the price level would not have risen as much.

4.11 We now give the results for the first sub-period i.e., January 1990 to June 1991 :

$$\text{Log Pwh} = -3.30 + 0.75\ \text{LMI} \quad (-2.82)\ (8.22)$$

$$-0.003\ \text{LY}\ -0.03\ \text{L rc} \quad (-0.05)\ \ (1.49)$$

$$-0.002\ \text{Px} \quad (-0.16)$$

$$\bar{R}^2 = 0.84;\ \text{DW} = 0.75$$

In the first sub period, a 10 per cent increase in money supply seems to have had the effect of nearly 8 per cent increase in the level of prices and the relationship is significant and powerful. The effect of real supply is negligible but the important point is its negative sign which means that if the real supply side had

increased, the price level would have been negatively affected. The call rate again has a negative effect and its effect is important as in the earlier case. The price expectation variable has an insignificant, negative effect.

4.12 Let us now come to the second sub-period i.e. July 1991 to May 1992.

This is the period when the structural adjustment process has been introduced at several layers. Let us examine the results :-

$$\begin{aligned} \text{Log Pwh} = {} & 1.81 + 0.27\ \text{LM} + 0.05\ \text{LY} - 0.005\ \text{Lrc} \\ & (3.11)\ (5.85) \qquad (1.30) \qquad (-0.56) \\ & -0.001\ \text{Px} \\ & (-0.36) \end{aligned}$$

$$\bar{R}^2 = 0.82;\ \text{DW} = 1.7$$

4.13 Let us note the meaning of the results :-
Again M1 has a significant effect on the price level. A 10 per cent increase in M1 leads to a 3 per cent increase in the level of prices. The supply effect however is insignificant though the sign is proper. The call rate and the price expectation variables have no significant effect on the price level.

4.14 What is important to note is that the elasticity of Pwh to M1 has got reduced to 0.27 in the second period as compared to 0.75 in the first period. This may mean that the effect of money supply on prices has got a bit diluted. Probably money has shifted from commodity markets to some other markets. The hunch is that more of money has gone in the second period to the share market than in the first period.

4.15 In the above analytical frame-work, we have not brought in two additional independent variables, viz., the measure of the velocity of money and the exchange rate in terms of Rupees. We

have also to examine the influence of Public Distribution System in place of Net Domestic Product. The equation thus is :

Log Pwh = [Log M1 (or Log Cu),
Log Y, (or Log PDS),
Log Xr, Log rc, and Log V]

where PDS refers to substitutes through Public Distribution System, Xr to exchange rate in terms of Rupees per US Dollar, V to the velocity measure.

4.16 The proxy for the velocity we have chosen is the measure of cheque clearances in Bombay and Calcutta divided by the monthly deposits in these two centres. Statement-16 gives the results of the regression exercises first for the whole period January - May 1992 and the second for the 2 sub-periods - (1) January 1990 - June 1991 and (2) July 1991 - May 1992.

4.17 The broad meaning of the results is given below :
Money supply has a powerful effect all through. When the equation is specified in terms of all relevant variables, a 10 per cent increase in money supply i.e. M1 would lead to 3.3 per cent increase in the level of wholesale prices. The monetary variable also emerged statistically significant in both the sub periods. It may be noted that in the second sub-period, the influence of money, however, got reduced with a corresponding decline in the elasticity coefficient. The call rate throughout has exercised a negative influence on the level of prices, though its coefficient is not statistically significant. The effects of velocity and of NDP (or of Public Distribution System) are not significant. However, when we take the two sub-periods, the sign concerning both NDP and PDS becomes negative. Probably, the shorter the period of observation, the greater the impact of the supply factors on the wholesale prices. Velocity effects are not significant. It is the exchange parity, rupees per dollar, which shows up as having a rather significant effect on the level of prices. A 10 per cent rise in the exchange rate of Rupees per Dollar would imply nearly a 2 per cent effect upon the level of wholesale prices. Interestingly, in the

second period, the significance of the effect is at a lower end as compared to that in the first period.

4.18 In order to find out the change in the impact of different independent variables on the wholesale price index, we conducted rolled-over regression exercises sequentially for time spans from January 1990 to January 1991 consisting of 13 observations and January 1990 to May 1992 consisting of 29 observations. Statement 17 gives the full results of these rolling econometric exercises. A study of these results may throw some light upon the dynamically changing impact of crucial independent variables on the level of prices. This technique may also give some clue to the probable quantitative effect of policy changes. The main findings are given below :

(i) The impact of money supply as reflected in the measure of elasticity of Log Pwh on Log M1 went on falling from a time span of January - May 1992 to that of April 1991 - May 1992. The elasticity came down about 0.34 to about 0.18. Thereafter, the elasticity started rising and for the time span August 1991 to May 1992 it had gone up to 0.22

(ii) The impact on Log Pwh of Log CLL increased from its value as found in January 1990 - May 1992 to a higher value in May 1991 - May 1992. Thereafter, the coefficient started declining and the significance was also coming down.

(iii) The impact on Log Pwh of Log Xr (exchange parity) from January 1990 - May 1992 to July 1990 - May 1992 showed a steady rise for spans thereafter, the coefficient, however, started declining. It had almost become negligible by August 1991 - May 1992. For the whole period of 29 observations, a 10 per cent rise in the exchange parity would have led to a 2.23 per cent rise in the level of prices. There is some evidence that in the post-July 1991 period, the exchange parity's effect has been tapering out.

4.19 The following policy conclusions may be tentatively drawn : An active call market with rates reflecting supply-demand influences in the funds market can certainly have a downward effect on the level of prices provided the short-term discount rate and quantitative credit control policies and the supply-demand forces are influenced by the Authorities. The Bank Rate should theoretically be above the call rate. Since the call rate has been fluctuating within wide limits, to the extent that the Bank Rate is also allowed to vary in response to market influences and policy goals, it may be possible to exercise some influence on the behaviour of prices. The exercises reveal that the exchange rate *does* play an important role in influencing the price behaviour; a reduction in the exchange parity (Rupees per US Dollar) tends to have an upward effect on the price level; under Indian conditions, a rising exchange rate (in terms of Dollars per Rupees) is a damper on domestic inflation. The rolling exercises reveal that the exchange rate has been having a strong and significant impact on the price level. The inverse relation between the exchange parity in terms of Rupees per Dollar and the price level is too important that it can not be ignored. The influence of the exchange rate is reflected on the prices of various articles and more particularly on the prices of imported articles. Among the latter, the prices of bulk imports and products dependent upon them are susceptible to greater influence. The authorities have so far dampened the potential effect of the foreign exchange rate by the application of the official exchange rate to 40 per cent of the exchange earnings with a view to keeping down the domestic prices of bulk imports. Any quick shift towards full convertibility will give a boost to the price level and this would be independent in the short period of the monetary factors.

4.20 The wholesale price index went up during January 1990 - May 1992 at a semi-logarithmic rate of 1.03 per cent per month, the annual rate being about 12.9 per cent. During the first sub-period January 1990 - June 1991, the monthly rate of progression was 0.97 per cent and during the second sub-period June 1991 - May 1992, when the adjustment process has been mostly at work, monthly progression rate was 0.81 per cent. (Statement 14). The above order

of progression of the price level which would imply a double digit inflation rate was contrary to the officially pronounced policy. As we have noted, it is the high M1 growth rate which was having a dominant effect on the wholesale price index. For the entire period of 29 months, M1 had been progressing at a monthly rate of about 1.49 per cent. The annual rate of this would have worked out to about 18 per cent. During the first sub-period, the monthly progression was at 1.29 per cent giving an annual rate of about 15 per cent. In the second period the monthly progression rate was 2.28 per cent giving an annual rate of 27 per cent. (Statement 14). We put ourselves a question as to what would have been the course of the price level had growth rate of money supply during the above period of 29 months been 50 per cent less or about 1/2 of what it actually was? The methodology behind this exercise is given in the Appendix. The results are extremely important. We find that the wholesale price index, under the above assumption of a 50 per cent decline in the growth rate of M1 during the period, would have risen at a monthly rate of 0.51 per cent. The annual rate for the same would be around 6.08 per cent. In other words, a substantial reduction in the rate of inflation could have been obtained by a uniformly proportionate reduction in the M1 growth rate. Any simulation is subject to certain assumptions. We abstract from the hypothetical effect of a reduced growth rate of M1 upon real GDP growth, and upon the exchange rate changes and the call rate changes. It is believed that the GDP growth rate under Indian conditions is largely autonomous. The authorities can certainly, within limits, regulate the exchange rate and the call rate. Thus, to hold the proposition that a substantial reduction in the M1 growth rate would lead to a near proportionate reduction in the rate of inflation is probably not wide off the truth.

4.21 We now turn to the regressions on weekly time series. The index of wholesale prices, to repeat, is a most important policy goal variable. The monetary, fiscal and supply authorities seek to influence this variable by means of policies connected with variations in money supply, and in physical supplies through the public distribution system. The authorities also are concerned with

the effects of exchange rate variations on prices. Monetary theory would induct short-period interest rate variations also as an important instrument in the moderation of the course of prices. Since it is only the call rate that is the most highly sensitive variable in the short-period and the normal official rates are rather sluggish, we seek to perceive the influence of the call rate on prices. The period under study has witnessed a phenomenal boom in share prices. We are also interested in knowing as to whether share prices have an important effect on wholesale prices of commodities. Monetary theory has also indicated velocity as an important variable in understanding of the behaviour of prices. Data in this respect at a macro level for short period purposes is difficult to obtain. We have, as indicated earlier, taken a surrogate for velocity by obtaining numbers by dividing cheque clearances at Bombay and Calcutta by demand deposits for all-India. This is because we could not obtain at the time of study, suitable reliable data concerning all-India cheque clearances.

4.22 The basic equation is set out below in the logarithmic form.

LPWH = f [M1 (alternatively CU or M3), PDS, rc, Xr, PSH, VTY]

where PDS = Public Distribution Supplies,
rc = Call Rate,
Xr = Exchange parity of Rupees per US$,
PSH = Index of share prices
VTY = Surrogate for velocity.

4.23 This is a comprehensive equation entering all the important, relevant, independent variables (other than the constant term). Statement 18 gives the results of regression exercises for the four sub-periods, (1) January 1990 to December 1990, (2) December 1990 to May 1991, (3) May 1991 to December 1991, (4) December 1991 to May 1992; and for the whole period (5) January 1990 to May 1992. The broad drift of the results is given below:

i) The explained portions are generally very high in all the equations;

ii) In general, CU (currency) or narrow money (M1) or broad money (M3) has *definitely* exercised a statistically significant effect in the different equation-sets on the price index. For the entire period, *all* the monetary magnitudes have statistically significant, and reasonably strong coefficients.

iii) Except in period January 1990 to December 1990, in all other periods, generally, there is no definite and/or positive auto-correlation element in the equations involving more than 3 independent variables.

iv) An extremely important finding is that when we choose currency with the public as the monetary variable, the autocorrelation is throughout low. It seems that the currency variable is least affected among the monetary variables by the trend element.

v) The coefficients for M1 and for currency varies in the equations between 0.3 and 0.7. The coefficient in M3 is higher and generally above 0.5 and close to 0.8. One may not casually dismiss the high value of the effect of money on prices.

vi) The call rate is having a highly significant negative effect as theory would expect in sub-period January 1990 to December 1990 and in some equations for the whole period. In most equations, it emerges with a negative sign. The inverse relation between call rate and wholesale prices seems to be worth further probing.

vii) The exchange parity i.e., Rupees per US $ which has been generally going up has a strong positive upward effect for the whole period and for most of the sub-periods except for the period between December 1991 to May 1992. For the whole period, in many equations, share prices have had a significant upward effect. This is strongly noticed during the period May 1991 to December 1991.

viii) In many equations, the public distribution system emerges with a negative sign though it seems to be highly significant also with a negative sign during May 1991 to December 1991 and also, though mildly during December 1991 to May 1992.

ix) The velocity factor seems to be significant in some equations generally, though often, with a negative sign. This may be because of the absence of a crucial correct data series regarding this variable.

4.24 One broad monetarist stance seems to be in empirical order. Currency or M1 or M3 is a crucially important magnitude affecting wholesale price index. This would imply that monetary policy stance emphasising the strong relations between money and prices is well founded even in the short period. It is generally true that over a longer period the relationship becomes stronger and stronger. The regression results also support the general hunch that exchange parity in terms of Rupees per $ has an upward effect on commodity prices. Policy makers should be on guard in isolating the trade segment from the general economy. Many commodity prices, because of direct or indirect import content or import relation, are sensitive to the exchange parity and rightly so. This observation is specially true in regard to many administered prices. Hasty decisions in this respect by considering only the export sector or the fiscal sector may land the economy in a tight spot. The stability of the exchange rate is an important constituent of stability in general prices. Since we notice that the public distribution system has probably a negative effect, the strengthening of the public distribution system would be a useful instrument/weapon in the fight against inflation. The relationship between PDS and prices will have to be further explored.

4.25 It seems that in the Indian economic policy framework, the potency of monetarism would be considerably enhanced to the extent that administered prices do not go on increasing, at the same time as policy is aimed at reducing the rate of growth of

monetary magnitudes. Yet the important factor is that despite all the hurdles in the way of effective monetarism, the monetary magnitude does come out with an empirically strong and significant impact on prices. If we treat the exchange parity also as an indirect money magnitude, the two together can empirically dominate the price level behaviour.

4.26 Wage-goods are the sub-set of commodities which are generally consumed by labour who constitute the mass of the population. These are generally essential consumption goods like food articles including foodgrains, edible oils, sugar etc; and items like clothing and kerosene. We have taken the sub-set from wholesale prices and have tried to study factors determining their fluctuations during January 1990 to May 1992 and the four sub-periods therein. The data base is the weekly time series. The regression are in log form.

4.27 Narrow money (M1), or currency (C) Public distribution supplies (PDS), exchange parity (XR), call rate (rc), share prices (LSH) and the expected growth rate of wage-goods prices (LRWG) are the independent variables (Statement-19). For the whole period M1 or C is having the usual strong and significant effect. rc is having a significant negative effect. Xr is having a rather strong upward effect. A 10 per cent upward change in rupee per dollar will imply a 2.8 per cent increase in wage-goods prices. Share prices are having an upward effect. In the sub-periods, during January 1990-December 1990 money (also currency) and share prices have a strong upward and the call rate a strong downward effect. During December 1990 to May 1991 currency has an upward effect. During May 1991 - December 1991 exchange parity has the strong upward effect as also share prices. During December 1991 - May 1992 M1 has a strong upward effect; so does share prices, though moderately.

4.28 Regression exercises show that invariably wage-goods prices move strongly in the same direction as general wholesale prices. As expected currency is a stronger factor than M1. And the

exchange parity does have a rather powerful upward effect. The sign of the call rate is always negative. We should conclude that the monetary magnitude alongwith the exchange parity is the crucial factor in wage-goods prices in the short period. PDS is yet feeble but the sign is not negative in all periods.

V. IMPLICATIONS AND LOOKING BEYOND

5.01 A few key propositions seem to emerge from our investigations.

i) The money supply process, specially when connected with high powered money, is no longer dominated by the increase in the net RBI credit to the Government (also termed as monetised deficit). One element that has entered the process is the spurt in foreign exchange inflows (non-IMF drawing-inflows) in 1991-92.

ii) Secondly, commercial bank operations in Government securities, have been an important source for generating credit, liquidity and money. Portfolio management involving switches and swaps in Government securities among the banks have created liquid instruments (e.g., Bankers' Receipts) on whose basis credit and money *can* expand because of the lags involved between intentions of sale/purchase and the actual sale/purchase of Government securities. We notice that the money multipliers have expanded when the growth rate of reserve money is largely unchanged.

iii) The monetary process as described above has coincided with and probably in an indirect way contribute to the boom in share markets. Consequently, the implicit rates of return after adjustment for crude probability of losses have tended to move up to levels significantly out of alignment with profitability in investments in conventio-

nal portfolios of investors. Expectations of continuous injections of fresh funds to the share market and the consequent scope for capital gains to parties with access to funds have been the major factors in sustenance of the boom. The wide and rising differentials in the net earning rates in operations in the share market and those elsewhere, support the dictum that in the market, the highest rate of return rules the roost and that funds often tend to gravitate to that sector with the highest rate of return.

iv) The hinterland interest rates and rates of return on short-term deployment of funds have been substantially lower than the implicit rates of return in the operations in the share market. The movements in the call rate do not seem to have checked the boom; so too the Bank Rate, the structure of discount rates and rates of interest on short-term deposits etc.

v) The injection of funds to the stock market has been helped by the inflow of foreign currency associated with the amnesty, creating in the process domestic counterpart funds.

vi) The money supply process and specially the changes in the factors influencing money supply have not been neutral in their effects. The concept of a homogeneous 'factor' influencing money supply is not tenable. So also, when components of money are changing, the homogeneity of money gets vitiated since such changes would affect velocity.

vii) The monetary process has witnessed both new sources of injection of money as well as an upward drift in velocity. It seems that the opening up of the economy as well as the freeing of restrictions on portfolio management by commercial banks, in the context of the relative rigidity in hinterland interest rates, seem to have led to a distortion

in the flow of short-term funds. To the extent that the economy has targets of real gross investment allocation in a short period, the distortion in the use of short-term funds is bound to vitiate the real credit process. This is apart from losses to genuine depositors of banks.

viii) The share boom is primarily a monetary phenomenon since the supplies of shares have not responded adequately to the upward drift in share prices. There seems to be no real impact in terms of a substantial rise in real investment arising as a result of the share boom.

ix) Our study of factors determining commodity prices indicates that there is a strong relation between money and its components, and/or commodity prices. We have also noticed an interesting correlation between share prices and commodity prices. Further, exchange parity in terms of Rupees per Dollar seems to have had a powerful upward effect on commodity prices. A most important result is that the call rate seems to show a perspectively strong negative effect on commodity prices. The public distribution process seems to have only a feeble effect on prices.

x) That money plays an important role in the short-period in causing upward drift in prices gives support to the policies to restrict growth rates of money supply with a view to reducing the inflation rate. However, the fact that the exchange parity also seems to be having an upward effect on prices points to the caution that is required in regard to fixation of the exchange rate. Contrary to the general impression, the strong relation between the exchange parity and the commodity prices points out the futility of the treatment of depreciation process of the exchange rate as a factor which can promote exports since any depreciation will tend to have an upward effect on commodity prices in general as also on prices of export-

able commodities. One cannot treat exchange rate management in isolation from the effects of such management on the general economy.

xi) The negative effect of the call rate on commodity prices points to the need for adopting the short-term interest rate changes as a way of dealing with the problem of inflation.

xii) It is probably true that if the public distribution system is enlarged substantially, it may have a favourable effect on prices in course of time.

xiii) Our study shows that a proportionate reduction in monetary growth rate uniformly through time can lead to a similar proportionate reduction in commodity prices.

xiv) On account of paucity of data we have not been able to capture suitable surrogates for studying changes in the velocity and the effects of the same. There is a general impression that velocity factors have moved up.

xv) From the point of view of short-period monetary policy to contain inflation, it seems that reductions in the growth rates of credit/money supply as also stability of exchange rates accompanied by flexible short-term interest rate policies are important. In order to freeze or reduce the impact of foreign exchange inflows, it may be necessary to bring into play new instruments.

xvi) Our study also indicates that the share boom seems to have begun in the middle of June 1990. Our study does not support the view that the new economic policy measures since the middle of 1991 were a *direct* cause of some of the adverse consequences of the monetary process and the share boom.

xvii) Wage-goods prices so important from the angle of labour classes are positively affected by monetary magnitudes

and exchange parity in terms of rupees per dollar. The PDS has a feeble impact.

5.02 Since the dynamics of the economy are continuously getting disturbed and changes are occurring in speeds of expansion, in proportions and in ratios, the monetary process which bears the full impact of the above, needs to be monitored in a close, careful and sustained manner. From the angle of policy, discretionary monetarism rather than rules monetarism *per se* is a better presumption. But the interaction between monetary factors and real variables is a complex matter and a one to one correspondence will not emerge. Again the system has deficiencies and gaps which lead to distortions in the real process. It is proposed to touch briefly on a theory that may throw some light on the period under study.

5.03 The period is underlined by a strong boom in share prices. All indicators do not bear out to any underlying boom trend in real activity levels.

5.04 We place the origins of the boom at around the middle of the calendar year of 1990. The implicit rates of return through speculative transactions went out of alignment with hinterland rates. This hiatus prevailed almost throughout the period.

5.05 In Wicksell's terminology in a nominal and not real context, the market rates of return in short-period speculative transactions ruled higher than the formal, short-period, lending rates of banks, the rediscount rates of the Discount House, the treasury bill rate, the implicit short-period rate of return in the holding of gold etc. The expected and actual usual profit rates in the operations of companies were also lower than the marginal efficiency of speculative placements in the share market.

5.06 The above hiatus which persisted by and large along the period caused a pull-out of funds from other uses to transactions in shares. The fiscal environment was also conducive for the same.

Probably a great deal of unaccounted funds could have moved to the share market.

5.07 But if overall money supply was static or only changing at a very slow and low rate, the boom in share prices could not have lasted. This however was not possible because of large inflows of foreign exchange especially since the latter part of 1991-92. Inter-bank transactions for portfolio management helped sustain liquidity.

5.08 In Wicksell's market, a sudden and steep rise in the money market rates brings the boom to a halt. We had nothing corresponding to the above; our formal rates of interest were relatively rigid. But the boom did get a jolt when there was a discontinuous closure of the share market. The rapid roll-over of the churning of funds in the market had to cease. And this further upset the sequential upward gallop in share prices and expectations thereof. If the boom had a real basis probably this sort of a climb down in share prices may not have occurred. Of course on a real basis, the pace of rise in share prices would have been substantially lower.

5.09 What are the lessons from all this? If our reasoning is correct, and we have some statistical support for the same, the idea of stimulating a real boom through a monetary-cum-fiscally attractive environment has *not* caught off in the economy. Business cycle history does not warrant the faith in economic policy processes by themselves causing and sustaining a real boom. Animal spirits as motivate the latter are not a function of economic reforms *per se*. On the other hand business cycle history has several instances of a strong boom dragging the monetary process with it.

5.10 We have termed the share boom as a monetary bubble or bank money bubble. Such a bubble had to burst one day or the other, sooner or later, with all its attendant consequences to the banking system and probably to exchange inflows. That it burst soon enough has mitigated the extent of the potential damage that would have been caused eventually.

5.11 In the meantime lest the experience recur again we have to fill the crucial systemic gaps and shortfalls which can detect, check and nip in the bud a purely monetary boom. To do so the Central Banking Authority has to be strengthened. Its spheres of supervision, control and operations have to be enlarged. A Central Bank is the only body that can, and is expected to function in a detached and alert manner. All this means a need for more autonomy to it and for this, it is necessary to expand the ambit of its operations and to remove the deficiencies inhibiting its functioning.

5.12 We now propose to touch briefly on the deficiencies in the monetary system and in its working particularly in the context of the rapid changes in policies, environments and perspectives that are taking place in India and abroad. Our perception which of course may be challenged is that, had some of these deficiencies and inadequacies not existed, the monetary process including the price level process could have been managed more suitably according to the overall requirements in the community and the policy goals broadly accepted by the authorities. It is agreed that whereas over the immediate future substantial reductions in the inflation rate is the primary goal of the economy, we have to go a long way to get on to a long term process in which the price level is reasonably stable year by year and is strongly expected to be so. This is necessary both from the point of view of economic security to the vast masses whose incomes and nominal balances are unindexed but also to promote exports, to keep the exchange rate stable, to develop the propensities of thrift and the habit of investment in medium-term and long-term financial and other assets. The motive to 'invest' primarily for making capital gains has to give way to the motive to invest with a view to obtaining a steady and stable yield. The financial system in its evolution and the instruments offered by it must satisfy the above requirement.

5.13 We have noticed that the Monetary Authority of the country which has been assigned the task of achieving and maintaining monetary stability does not yet possess the all desired authority, discretionary powers and independence to achieve the monetary

goal specified to it. Monetary stability in our conditions cannot be divorced from price stability. Since different sets of prices are inter-connected and since share prices influence commodity prices, stability in the markets in shares, bonds and debentures is an important concomitant of monetary and price level stability. It is necessary that the Reserve Bank of India's ambit of monitoring, control and supervision must encompass both the commodity and the financial asset markets. Obviously, stability in these markets is upset by operations of financial institutions like Mutual Funds, Finance Companies, Finance Houses, etc. It is, therefore, necessary that the Reserve Bank of India's power to impose liquidity, cash reserve and portfolio management discipline must encompass these institutions as well. Probably, a National Financial Council with the Reserve Bank of India at its helm, and including all the financial institutions and the stock market agencies not excluding the SEBI may be constituted for the purpose.

5.14 Over the next few years, efforts should truly be made to develop a broad, deep and resilient market in government securities. Currently commercial banks are large holders of the government securities primarily because of the statutory liquidity ratio requirements. The incremental statutory liquidity ratio is going to be lowered. But this may not lead to a large scale disinvestment of Government securities. Open market operations would have to be turned to bring about appropriate yield structure of the securities as well as liquidity. It is suggested that in all these matters further steps should be taken with great care.

5.15 Any reduction in the inflation rate in any one year does not automatically imply that medium-term and longer time yields can come down. In the case of such yields the expectation year by year of a low rate of inflation has to be strongly built into the framework. This is perhaps one reason why an upper bound to overall rate of growth of money and quasi-money supplies as suggested by some Indian economists a few years ago (The FULLMANGAL RULE - Five per cent upper linear limit in money's annual growth rate as per law) could be of help.

5.16 We have noticed that the monetary process has been influenced by foreign exchange inflows and inter-bank switch-and-swap operations in Government securities. While we have to think in terms of new instruments for reducing the liquidity of the monetary counterparts of foreign exchange inflows, the Reserve Bank of India has also to influence inter-bank transactions in Government securities.

5.17 It is, in this connection that attention may be drawn to the most important limitation in the operation of the monetary-cum-financial system. During the period under study, a formal moderation of the rise in net RBI credit to the Government did not prevent high growth rates in M1. Unfortunately, the monetary authorities did not have sufficient flexibility and maneuverability in regard to short-term interest rates. When outside rates of return are not aligned with normal/official market rates, there is bound to be an exodus of funds to the booming market. Had the short-term rates gone up, the boom would have chocked at an early stage.

5.18 We have noticed that the call rate which has now been liberated has been extremely sensitive but the call rate is an internal market rate and not a formal/official rate. There are wide gaps between the call rate and the treasury bill discount rate. The Bank Rate is virtually in a *'Nirvana'*. The official/formal rates have to emerge as true signals of opportunity and real cost of credit in the market. They have to be above the net return rates in speculation in shares and in hoarding of commodities. It is true that shares and commodity prices may fall but what the formal/official rates framework will have to adhere to would be a wide ranged flexibility in terms of upper and lower bounds of these rates. It may be suggested that the Bank Rate could be linked to the broad mean of explicit and implicit rates of return in the previous week/fortnight. Theoretically, the Bank Rate will have to be slightly above the mean of previous weeks/fortnights' rates. Without this sort of fundamental reform in rates, it is extremely difficult to establish monetary stability in future.

5.19 In a wider sense, the rate of a price rise either on a sustained or on an expected basis is a sort of a gross interest rate. The formal, official, rate of interest in the shortest end will have to be such as to discourage the tendency towards speculative purchases of any commodity/input which is essential in the economy. It should similarly be so in regard to many assets which are not easily/ quickly reproducible on an expanded basis and for which substitutes are hard to come by. In a poor, developing country, generally all speculative tendencies tend to get out of control and attract funds to themselves. The monetary framework has only the interest instrument to combat the above tendencies. Probably, in the above extended sense interest policy is going to become more and more important in the years to come. To provide a strong empirical/practical basis for the same, considerable further research in this area is required. The environment in which the Chakravarty Committee made its recommendations no longer holds good. If discretionary monetarism is to get a sound policy basis for the new environment, surely more work is needed particularly, in the sphere of optimum interest rate policy.

APPENDIX

A note on the method of estimation of parameters assuming that the growth rate in M1 is 50 per cent of what actually obtained

Steps

1. We adjusted M1 reducing the growth rate by half.

2. We estimated WPI assuming that the parameters estimated earlier remained same but M1 (ADJUSTED) is taken as independent variable instead of M1.

3. The estimated value of WPI (WP STAR) was taken as dependent variable and M1 along with other variables as independent variables in order to estimate the parameters afresh.

4. With parameters at (3), we estimated (WPSTAR2).

5. We took WPSTAR2 as the dependent variable and reestimated the parameters using M1 along with others as independent variables.

6. We continued this exercise till the parameters got stabilised and the estimated dependent variable (WPSTAR) converged.

7. We estimated the parameters replacing M1 with M1 (ADJUSTED).

This exercise gives us the estimates of parameters under the assumption that the growth rate in money supply (M1) is hypothetically restricted to half of the actuals. This also gives what would have been the rise in prices under the above assumptions.

List of Statements

List of Statements (Contd.)

Statement 1 : Indian Economy - Select Indicators

	1990-91	1991-92
GDP Growth Rate (%)	5.6	2.0
Domestic Saving Rate (%)	22.2	23.2
Gross Aggregate Investment (%)	25.0	24.5
Industry Growth Rate (%)	8.3	0.1
Infrastructure Growth Rate (%)	4.8	6.0
Index of Agricultural Growth (%)	4.3	-1.0
Wholesale Price Index Increase Rate (%)	12.1	13.6
Offtake from Public Distribution System (million tonnes)	16.1	19.0
Average Annual Rate of Inflation (%)	10.4	13.8
Growth Rate of Government Expenditure (%)	13.5	7.8
Ratios of Monetised Deficit to GDP	2.78	0.89
Ratio of Gross Central Fiscal Deficit to GDP	8.43	6.50
Reserve Money Growth Rate (%)	13.1	13.4
M3 Growth Rate (%)	15.1	18.5
M1 Growth Rate (%)	14.6	22.8
DD Growth Rate (%)	14.7	32.7
C Growth Rate (%)	14.6	15.4
TD Growth Rate (%)	15.4	16.2
NRCG Growth Rate (%)	20.6	5.8
BCG Growth Rate (%)	18.1	22.5
BCC Growth Rate (%)	13.2	11.2
NFEA Growth Rate (%)	27.2	125.2
Credit Deposit Ratio of Banks	60.4	54.4
Cash Ratio of Banks	11.2	54.5
Currency to M3 Proportion (%)	19.3	16.6
Bank Rate	10.0	12.0
Internal Debt of Central Government (Ratio of GDP)	29.1	27.5
Highest Coupon Rate on Government Bond (%)	11.5	12.0
Call Rate [Average months (%)]	15.0	18.4

Statement 1 : Indian Economy - Select Indicators (Contd.)

	1990-91	1991-92
Estimated Income Velocity		
M1	6.06	5.95
M3	2.124	2.126
Average Narrow Money Multiplier	1.109	1.342
Average Broad Money Multiplier	3.026	3.353
Incremental M1 Multiplier	1.161	1.801
Incremental M3 Multiplier	3.423	4.199
RBI Index of Share Prices [Growth Rate (%)]	39.2	55.1
B.S.E. National Index	536.99	916.63
Coefficient of variation thereof (%)	14.66	27.04
Range	258.6	948.4
Capital raised from Stock Markets (Rs.crore)	4,230	5,749
Public Sector Bond Issues (Rs. crore)	5,463	4,228
Stock Market Annual Turn-over (Rs. crores)	35,786	72,000
Ratio of above to GDP (%)	7.5	12
No. of days of Working of Stock Market	190	216
Average Daily Turnover of Stock Market (Rs. crore)	188	333
Growth in Assistance by Financial Institutions - Disbursals	29.1	19.6
Discount House Cumulative Turnover (Rs. lakh crores)	2.51	3.32
Increase in Gold Prices (%)	6.9	24.5
Merchandise Deficit (Billion Dollars)	7.7	3.1
Current Account Deficit (Billion Dollars)	7.7	2.8
Current Account Deficit as rate of GDP %	2.3	0.8
External Debt (Billion Dollars)	67.1	68.7
Debt Service Ratio (%)	25.2	26.2
Exchange Parity [(Rs. per dollar) (Yearly average)]	17.9	27.5

STATEMENT 2: TIME SERIES DATA ON WEEKLY BASIS (JANUARY 1990 TO MAY 1992)

Period	M1	M3	C	DD	TD	NRCG	NFEA	BCG	BCC	WPI	SHARE	PDS	CLL	EXRT	WGIND	VTY
JAN.5 '90	78247	221615	44215	33507	143369	72458	6279	42511	95639	167.4	396.3	0.318	11.12	16.9887	167.32	46.95
JAN.12 '90	78262	222332	44957	32814	144070	73850	6407	42429	96212	168.0	404.6	0.318	10.26	16.9453	168.49	47.56
	78064	222673	44689	32869	144609	73761	6242	42816	96344	168.3	411.4	0.318	10.69	16.9612	168.66	48.19
JAN 26	77866	223013	44420	32923	145147	73671	6076	43202	96475	168.3	399.2	0.318	8.77	17.0074	168.57	48.82
	78410	223579	45081	32834	145169	73835	6269	43194	96894	168.4	387.1	0.318	9.59	17.0293	168.55	46.86
FEB. 9	78954	224145	45741	32744	145191	73999	6461	43186	97312	168.7	377.8	0.318	9.82	17.0051	169.17	44.98
	79370	225114	45742	33156	145744	74106	6414	43146	97333	169.0	368.0	0.318	11.59	16.9845	169.85	43.17
FEB. 23	79785	226082	45743	33567	146297	74212	6367	43106	97354	169.0	371.5	0.318	13.86	17.0173	169.45	41.44
	80360	227143	46360	33366	146783	74517	6310	43167	98043	169.5	372.6	0.318	15.77	16.9708	170.83	44.17
MAR 9	80934	228203	46977	33165	147269	74821	6252	43228	98731	169.7	370.6	0.325	9.89	17.0481	171.12	47.08
	81178	228929	46812	33556	147751	73935	6420	43345	99651	169.6	367.1	0.325	17.74	17.1138	170.85	50.19
MAR 23	81421	229654	46646	33947	148233	73049	6588	43462	100571	170.6	367.2	0.325	13.79	17.1138	170.63	53.49
	83330	232673	46905	35560	149343	74054	6569	44043	102366	171.1	385.7	0.325	34.29	17.2392	171.60	57.02
APR. 6	85238	235691	47163	37173	150453	75058	6549	44624	104161	172.2	400.0	0.265	14.56	17.1997	173.25	53.02
	85243	236693	47991	36427	151451	75732	6462	44769	104131	172.8	405.7	0.265	13.63	17.2693	174.06	49.30
APR. 20	85247	237695	48818	35680	152448	76406	6375	44914	104100	172.9	396.7	0.265	13.66	17.3413	174.24	45.85
	85190	237721	49092	35261	152531	76807	6071	45384	104796	173.5	395.6	0.265	19.76	17.3435	175.05	42.63
MAY 4	85133	237746	49365	34841	152613	77207	5766	45854	105492	173.7	401.6	0.275	18.01	17.3501	175.41	44.04
	85384	238309	49981	34647	152925	78391	5699	45829	104944	174.4	402.7	0.275	17.85	17.3088	176.57	45.49
MAY 18	85635	238871	50596	34452	153236	79575	5631	45804	104395	174.5	409.7	0.275	21.99	17.3310	176.67	46.99
	85796	239184	50327	34574	153388	79374	5928	45887	104351	174.6	411.7	0.275	21.33	17.3723	177.19	48.54
JUNE 1	85957	239496	50057	34696	153539	79173	6224	45969	104307	175.3	413.5	0.242	17.32	17.3920	178.19	47.15
	85828	239517	50542	34379	153689	79520	6114	46122	104146	176.2	420.0	0.242	14.97	17.4211	179.58	45.79
JUN. 15	85699	239537	51027	34062	153838	79867	6004	46274	103984	177.1	414.2	0.242	9.59	17.4827	180.55	44.48
	85687	240521	50084	34891	154835	79789	6120	46406	103928	177.7	408.9	0.242	12.80	17.4559	181.21	43.20
JUN. 29	85674	241505	49140	35719	155831	79710	6236	46538	103871	178.2	412.1	0.242	9.77	17.4809	182.33	41.96
	85614	241955	49478	35283	156341	80916	5997	46459	104255	178.8	419.3	0.298	12.63	17.4645	183.34	42.64

STATEMENT 2: TIME SERIES DATA ON WEEKLY BASIS (JANUARY 1990 TO MAY 1992) (Contd.)

Period	M1	M3	C	DD	TD	NRCG	NFEA	BCG	BCC	WPI	SHARE	PDS	CLL	EXRT	WGIND	VTY
JULY 13	85554	242405	49816	34847	156851	82122	5757	46380	104639	179.2	430.4	0.298	10.29	17.5037	183.59	43.34
	84722	242011	48782	35156	157289	81175	5688	47323	104633	179.5	441.4	0.298	7.15	17.4540	184.02	44.04
JULY 27	83889	241616	47748	35465	157727	80227	5618	48265	104626	179.8	450.4	0.298	8.62	17.4125	184.22	44.76
	83836	241837	48113	35161	158002	80657	5672	48136	104352	180.2	481.4	0.285	9.76	17.4178	184.53	44.44
AUG. 10	83782	242058	48478	34856	158276	81086	5726	48007	104078	180.2	498.5	0.285	8.75	17.3996	184.34	44.13
	83248	241982	47950	34854	158734	79846	5846	49002	104058	180.2	488.6	0.285	9.61	17.3779	184.26	43.82
AUG. 24	82713	241905	47422	34851	159192	78606	5965	49996	104038	180.3	510.8	0.285	9.86	17.3403	184.46	43.51
	82868	242706	47460	34960	159838	79453	5518	49879	103734	180.7	527.5	0.273	12.74	17.3710	185.06	43.20
SEPT. 7	83023	243507	47497	35069	160484	80300	5071	49762	103430	180.7	555.9	0.273	12.74	17.6602	185.45	43.08
	83248	244406	47480	35251	161158	79795	4944	50004	103307	180.8	580.3	0.273	13.52	17.7967	185.72	42.95
SEPT. 21	83473	245304	47463	35432	161831	79289	4816	50245	103184	180.9	604.6	0.273	16.31	17.8878	185.46	42.83
	84406	246937	47998	35810	162531	80264	4475	50302	104331	181.2	611.7	0.290	18.25	18.1004	185.22	42.71
OCT. 5	85339	248570	48533	36187	163231	81239	4134	50359	105477	182.1	643.0	0.290	20.95	18.1278	186.88	43.69
	85756	248883	49092	35894	163128	81849	7236	50334	105711	182.3	630.7	0.290	25.85	18.0743	186.82	44.69
OCT. 19	86172	249196	49651	35600	163024	82458	10337	50308	105944	184.3	654.2	0.290	29.77	18.0535	187.84	45.71
	86287	249590	49336	35582	163303	82499	10198	50645	106389	184.6	596.7	0.222	24.03	18.0445	188.05	46.76
NOV. 2	86402	249983	49021	35563	163581	82539	10058	50982	106834	184.8	587.4	0.222	18.10	18.0946	187.77	46.88
	87044	251039	49386	35728	163995	83565	9823	50835	106737	184.3	589.5	0.222	17.67	18.0853	187.99	46.99
NOV. 16	87685	252094	49751	35892	164409	84591	9588	50687	106639	184.4	608.7	0.222	17.77	18.0700	187.42	47.11
	88195	252717	49479	36750	164522	84907	9647	50592	107228	184.5	586.8	0.222	19.25	18.0991	187.86	47.22
NOV. 30	88704	253339	49206	37608	164635	85223	9705	50496	107817	184.9	567.3	0.335	15.30	18.0804	187.60	47.34
	88984	254157	50130	36847	165173	86251	9511	50561	107841	185.1	552.1	0.335	13.51	18.1042	188.15	47.36
DCE. 14	89264	254974	51053	36085	165710	87278	9316	50626	107864	185.3	519.1	0.335	11.27	18.1257	189.53	47.38
	89171	255555	50613	36783	166384	86268	9215	50837	108678	185.8	526.0	0.335	13.84	18.1006	188.91	47.41
DEC. 28	89078	256136	50173	37480	167058	85257	9113	51048	109492	186.0	503.5	0.353	14.03	18.2302	189.87	47.43

STATEMENT 2: TIME SERIES DATA ON WEEKLY BASIS (JANUARY 1990 TO MAY 1992) (Contd.)

Period	M1	M3	C	DD	TD	NRCG	NFEA	BCG	BCC	WPI	SHARE	PDS	CLL	EXRT	WGIND	VTY
JAN 4 '91	89794	257128	51009	37227	167334	86259	8751	50781	110294	188.5	490.7	0.353	13.89	18.1164	191.20	48.13
11	90510	258120	51844	36974	167610	87260	8388	50513	111095	189.1	471.5	0.353	14.21	18.1896	192.31	48.84
18	90270	258250	51639	37148	167980	87005	8368	50802	111331	190.2	469.8	0.353	14.29	18.4129	194.23	49.56
25	90029	258379	51434	37321	168350	86750	8347	51091	111567	190.6	469.5	0.368	13.71	18.3770	194.65	50.30
FEB 1	90619	259453	52233	36978	168834	87171	8711	50976	111630	191.1	463.6	0.368	13.14	18.5661	195.35	48.33
8	91209	260526	53032	36634	169317	87591	9074	50861	111692	191.8	462.7	0.368	13.64	18.6452	196.30	46.43
15	92033	261837	52784	37354	169804	87527	8894	51026	112054	191.8	482.8	0.368	14.70	18.7120	196.05	44.61
22	92857	263148	52536	38074	170291	87463	8713	51190	112415	191.8	476.8	0.328	13.50	19.0277	195.94	42.86
MAR 1	92950	263784	53256	37651	170834	87885	8595	51199	113153	191.8	510.8	0.328	14.41	19.0537	195.84	46.51
8	93043	264420	53975	37228	171377	88307	8476	51207	113891	191.6	532.5	0.328	15.50	19.0444	195.53	50.47
15	92907	264928	53531	38127	172022	88578	8521	51279	115118	191.6	536.2	0.328	20.89	19.1031	195.21	54.77
22	92770	265436	53087	39025	172666	88848	8566	51351	116345	191.7	529.2	0.328	19.50	19.3614	195.03	59.43
29	94967	269777	53434	40439	174810	89562	8317	52233	118236	191.8	530.9	0.375	21.29	19.4874	195.08	64.49
APRIL 5	97164	274118	53780	41852	176954	90276	8067	53115	120127	192.3	527.9	0.375	14.98	19.6939	195.42	60.48
12	96425	273179	54681	40583	176755	90493	7588	53411	119161	192.6	536.9	0.375	16.38	19.7565	195.49	57.66
19	95685	272240	55582	39314	176555	90710	7109	53707	118194	192.9	552.4	0.375	23.67	19.8229	195.76	54.52
26	96118	272862	55813	39369	176744	90861	7039	54398	117975	193.3	562.3	0.304	30.06	20.1434	196.57	51.56
MAY 3	96551	273484	56044	39423	176933	91012	6969	55088	117756	193.8	568.0	0.304	29.75	20.3647	197.03	50.81
10	97858	274974	57129	39571	177116	92441	7096	54659	118169	194.5	560.3	0.304	37.94	20.4679	198.02	50.06
17	99164	276463	58214	39718	177299	93870	7222	54229	118582	195.0	558.9	0.304	40.33	20.5298	198.97	49.33
24	99591	277324	58008	40114	177734	94185	7302	53937	118807	195.7	565.8	0.304	36.45	20.6459	200.28	48.61
31	100017	278185	57802	40510	178168	94499	7382	53645	119032	196.8	570.2	0.363	29.20	20.7858	202.45	47.90
JUNE 7	99346	277989	58374	39827	178643	95597	7295	54059	118535	197.6	577.9	0.363	23.69	20.9007	204.19	45.96
14	98674	277792	58946	39144	179118	96694	7207	54473	118038	198.5	566.6	0.363	23.30	20.9636	205.54	44.10
21	98854	277603	57901	39982	178749	96312	7274	54608	117817	199.2	563.8	0.363	29.76	21.0275	206.34	42.31
28	99034	277413	56855	40819	178379	95929	7341	54742	117596	200.1	579.6	0.405	22.05	21.0104	207.82	40.60

STATEMENT 2: TIME SERIES DATA ON WEEKLY BASIS (JANUARY 1990 TO MAY 1992) (Contd.)

Period	M1	M3	C	DD	TD	NRCG	NFEA	BCG	BCC	WPI	SHARE	PDS	CLL	EXRT	WGIND	VTY
JULY 5	99143	277579	56990	40693	178436	97027	7108	54923	117600	201.0	568.6	0.405	25.70	24.7784	209.03	42.09
12	99252	277744	57125	40567	178492	98125	6875	55104	117604	201.8	569.3	0.405	22.36	25.9253	210.09	43.64
19	98442	277867	55840	41309	179425	97899	6821	55464	117531	202.6	601.9	0.405	20.87	25.9381	211.29	45.24
26	97631	277989	54555	42051	180358	97672	6766	55823	117458	205.8	615.9	0.332	14.81	25.7527	212.89	46.90
AUGUST 2	97646	278684	54821	42028	181038	97660	7626	56205	117009	207.3	644.3	0.332	15.62	25.7890	214.49	46.55
9	97660	279378	55086	42004	181718	97648	8486	56586	116559	208.4	692.4	0.332	12.53	25.6822	216.19	46.20
16	97075	279559	54553	41755	182484	97530	8361	56846	116247	209.6	697.0	0.332	13.80	25.8726	218.00	45.86
23	96489	279739	54019	41506	183250	97412	8236	57105	115935	210.4	708.5	0.332	13.33	25.8058	219.40	45.52
30	96961	280802	54200	41721	183842	97695	8246	57117	115838	210.3	724.5	0.398	12.17	25.8884	219.45	45.18
SEPT. 6	97432	281865	54381	41936	184433	97977	8256	57129	115740	210.6	752.2	0.398	11.83	25.9599	219.86	43.27
13	97268	282748	54064	42211	185480	96944	8355	57623	115840	210.6	751.8	0.398	13.25	25.9795	219.80	41.44
20	97104	283630	53746	42485	186526	95910	8453	58116	115940	210.4	763.6	0.398	11.19	25.8571	219.10	39.69
27	98250	286081	53644	43777	187831	96644	8522	58330	117429	210.1	792.3	0.423	14.39	25.8769	218.99	38.01
OCT. 4	99396	288532	53541	45069	189136	97378	8591	58543	118918	210.0	779.9	0.423	28.19	25.8981	218.60	39.72
11	101512	290541	54720	45357	189030	98179	9107	58831	119049	210.1	781.3	0.423	24.27	25.8228	218.63	41.50
18	103627	292550	55899	45644	188923	98979	9623	59118	119180	210.2	755.9	0.423	18.99	25.9300	218.82	43.37
25	103515	292447	56075	46019	188932	97854	10022	59888	119089	210.4	750.9	0.300	18.56	25.8816	219.37	45.32
NOV. 1	103402	292343	56250	46394	188941	96728	10420	60657	118997	211.2	756.7	0.300	15.39	25.9032	220.32	43.48
8	105383	294374	57790	46851	188991	98054	10577	60536	119095	212.1	781.8	0.300	17.93	25.8981	220.74	41.72
15	107363	296404	59330	47308	189041	99380	10733	60414	119193	212.6	792.4	0.300	26.23	25.9030	221.45	40.03
22	107953	297462	58630	48069	189510	99730	11326	60647	119634	213.0	797.6	0.300	30.15	25.9385	221.75	38.41
29	108542	298520	57930	48830	189978	100079	11918	60880	120075	212.9	821.4	0.395	20.92	25.7671	221.42	36.85
DEC. 6	109791	300465	59037	48612	190674	101466	12510	61307	119821	211.4	813.4	0.395	14.92	25.9912	220.81	38.86
13	111039	302409	60144	48393	191370	102852	13102	61733	119567	211.1	821.0	0.395	9.65	25.8875	219.59	40.98
20	111400	303749	60457	48686	192349	102361	13933	61988	120167	210.6	803.6	0.395	12.41	25.8997	218.42	43.21
27	108784	301168	59206	48746	192384	96994	15079	62175	119579	212.0	788.5	0.308	10.28	25.9159	219.06	45.57

STATEMENT 2: TIME SERIES DATA ON WEEKLY BASIS (JANUARY 1990 TO MAY 1992) (Contd.)

Period	M1	M3	C	DD	TD	NRCG	NFEA	BCG	BCC	WPI	SHARE	PDS	CLL	EXRT	WGIND	VTY
JAN '92 3	110273	303129	59988	48862	192856	99432	14922	62209	120173	214.9	808.7	0.308	15.41	25.8437	222.07	45.45
10	111761	305089	60769	48978	193328	101870	14764	62243	120766	215.1	823.1	0.308	12.10	25.7384	222.52	45.33
17	111723	305550	60439	49393	193827	101405	14937	62294	120842	215.5	822.1	0.308	10.75	25.8788	223.69	45.20
24	111684	306010	60109	49808	194326	100939	15109	62344	120918	215.6	848.6	0.308	10.28	25.8999	223.81	45.08
31	112776	307503	60728	50139	194727	101757	15217	62426	121247	215.8	868.8	0.388	10.17	25.8368	223.80	44.96
FEB 92 7	113868	308995	61347	50469	195127	102575	15325	62507	121576	215.7	923.3	0.388	7.78	25.9506	223.78	44.19
14	113706	309839	61247	50637	196133	102087	15977	62762	121626	214.8	943.1	0.388	9.77	25.9045	225.32	43.43
21	113544	310682	61147	50804	197138	101599	16628	63016	121676	215.0	973.9	0.388	10.01	25.8789	225.24	42.69
28	113967	312684	61396	50767	198717	100989	16813	63441	121745	215.2	1015.8	0.365	9.79	25.8249	225.86	41.96
MAR 92 6	114389	314685	61644	50730	200296	100378	16998	63865	121813	215.8	1095.3	0.365	9.45	27.8854	225.44	43.95
13	115269	315967	61888	51121	200698	99367	17602	64044	123324	216.5	1271.5	0.365	10.54	27.8632	225.59	46.05
20	116149	317248	62131	51511	201099	98355	18205	64222	124835	216.5	1279.3	0.365	12.86	28.6581	225.40	48.25
27	115918	318473	61797	52010	202556	97565	18853	64933	127156	216.4	1312.9	0.310	21.46	29.1149	224.62	50.54
APR 92 3	115686	319698	61462	52508	204012	96775	19500	65644	129476	217.1	1485.4	0.310	33.76	29.1513	227.09	48.39
10	117866	321934	63045	53002	204068	97968	19303	65629	130320	217.5	1625.7	0.310	20.38	29.0531	227.87	46.33
17	120046	324169	64627	53495	204123	99160	19106	65613	131163	218.5	1587.9	0.310	24.84	29.0023	227.75	44.37
24	120060	324476	64513	53537	204416	98533	19108	66078	131503	218.6	1600.5	0.363	31.79	28.8129	227.42	42.48
MAY 92 1	120074	324783	64399	53578	204709	97906	19110	66542	131842	218.5	1630.1	0.363	51.74	28.7273	228.57	45.56
8	121255	326081	65393	53371	204826	98806	18527	66651	132783	218.9	1509.9	0.363	43.83	28.6350	229.72	48.86
15	122435	327378	66386	53163	204943	99706	17943	66760	133723	219.5	1354.4	0.363	36.65	28.4740	230.59	52.39

Legend :

NRCG : Net Reserve Bank Credit to Government (Both Centre & States) (Rs. Crores)

NFEA : Net Foreign Exchange Assets of the Banking Sector (Rs. Crores)

BCG : Commercial & Cooperative Banks' Credit to Government Sector (Rs. Crores)

BCC : Commercial Banks' Crdit to Commercial Sector (Rs. Crores)

SHARE : Index of Share Prices (All-India RBI Index, Base 1980-81=100)

PDS : Monthly offtake at Public Distribution System (Wheat,Rice & Coarse grains in MT.)

CLL : Call Rate

EXRT : Exchange Rate (Rs. per Dollar)

WGIND : Index of Wage-goods Prices

VTY : Velocity (Cheque clearances/Demand Deposits)

M1 : Narrow Money (Rs.Crore)

M3 : Broad Money (Rs. Crores)

C : Currency (Rs. Crores)

DD : Demand Deposits (Rs. Crores)

TD : Time Deposits (Rs. Crores)

WPI : Wholesale Price Index of All Commodities (1981-82=100)

SOURCE : Reserve Bank of India (for M1, M3, C, DD, TD, NRCG, NFEA, WPI, SHARE, XRT, Chque Clearances)

Ministry od Food & Civil Supplies, Government od India (for PDS)

Statement 2(A) : Monthly Data on Select Variables (January 1990 to May 1992)

Period	PDS	XRATE	MTSH	BIGS	GOLD	RDYILD	WGIND
1990:01	1.27	16.9227	2729.40	42928	3383.21	12.82	168.57
1990:02	1.27	16.9830	1414.81	42888	3495.71	12.93	169.45
1990:03	1.30	17.1274	2655.18	43469	3316.92	12.97	170.63
1990:04	1.06	17.2801	2269.62	45805	3416.50	13.13	174.24
1990:05	1.10	17.3635	3370.29	45707	3431.40	13.16	176.67
1990:06	1.21	17.4206	3505.75	46308	3314.35	13.20	180.55
1990:07	1.19	17.3807	4737.53	48045	3284.80	11.72	183.59
1990:08	1.14	17.4029	5157.11	49292	3414.71	11.80	184.34
1990:11	1.09	17.8385	2768.96	49940	3409.05	11.85	185.45
1990:12	1.16	18.0946	3744.90	50417	3490.76	11.88	186.88
1991:01	1.30	18.0725	2234.70	50252	3460.52	11.98	187.77
1991:02	1.43	18.1042	1487.35	50818	3453.20	12.10	187.60
1991:03	1.43	18.2895	1111.00	50841	3687.52	12.18	189.87
1991:04	1.46	18.8659	837.99	50947	3534.78	12.26	194.65
1991:05	1.64	19.2009	2426.99	51086	3520.70	12.35	195.94
1991:06	1.52	19.8373	3732.46	54159	3583.35	12.46	195.03
1991:07	1.46	20.5374	3248.52	53431	3750.77	12.57	195.76
1991:08	1.44	21.0053	6476.98	54471	3733.87	12.67	198.97
1991:09	1.62	25.4663	5940.82	55760	4065.54	12.82	205.54
1991:11	1.66	25.6303	3863.90	56736	4187.08	12.99	210.09
1991:12	1.59	25.8978	8284.46	57943	4246.48	13.17	216.19
1992:01	1.69	25.8131	5630.01	60080	4491.28	13.40	219.86
1992:02	1.57	25.8494	6631.39	61039	4713.55	13.67	218.60
1992:03	1.58	25.8747	6424.92	61731	4883.20	14.01	220.32
1992:04	1.65	25.9841	8759.88	62367	4930.84	14.45	221.42
1992:05	1.57	25.8986	6475.42	63002	4737.79	14.09	219.06

Legend :

PDS : Monthly off-take from Public Distribution System (Wheat, Rice, Coarse Grains) (in Million Tonnes)
XRATE : Exchange Rate (Rs.per U.S.$)
MTSH : Monthly Turn over of shares (Rs. Crores)
BIGS : All Scheduled Banks' Investment in Government Securities (Month End) (Rs. Crores)
GOLD : Price of Gold in Bombay (Rs. per 10 gms.)
RDYILD : Redemption Yield on Government Securities (per cent per annum)
WGIND : Index of Wage-goods Prices (Compiled)
SOURCES : Reserve Bank of India, Ministry of Food and Civil Supplies, Bombay Stock Exchange

Statement 3 : Semi-Log Growth Rates of Select Variables (Annualised on Weekly Rates)

	Jan. 90 - Dec. 90	Dec. 90 - May 91	May 91 - Dec. 91	Dec.91 - May 91	Jan.90 - May 92
M1	10.06	26.29	17.28	23.17	16.91
M3	13.53	20.36	15.82	20.05	15.32
C	8.75	30.88	2.19	20.77	13.67
DD	9.6	23.46	39.36	24.90	20.29
TD	15.3	17.14	14.97	18.25	14.45
NRCG	16.1	21.08	6.64	-8.10	14.84
NFEA	33.37	5.77	102.05	88.39	44.57
BCG	21.09	19.64	25.31	19.41	18.07
BCC	10.31	21.53	3.06	26.37	10.98
Share	54.57	49.94	79.56	187.68	49.45
WPI	11.29	8.52	14.32	7.57	12.04

Legend

M1	: Narrow Money (Rs. crore)
M3	: Broad Money (Rs. crore)
C	: Currency (Rs. crore)
DD	: Demand Deposits (Rs. crore)
TD	: Time Deposits (Rs. crore)
NRCG	: Net Reserve Bank Credit to Government
NFEA	: Net Foreign Exchange Assets of Banking Sector
BCG	: Commercial and Co-operative Bank Credit to Government
BCC	: Commercial Bank Credit to Commercial Sector
Share	: All India Index of Share Prices of RBI.
WPI	: Wholesale Price Index.

Statement 4 : Regression Equation–Monetary Components (Whole Period)

Fortnightly Data (Period : January 1990 to May 1992)

	Constant	BCG	NFEA	NRCG	BCC	R^{-2}	D.W.	SEE
Currency	-2759.28	-0.195	0.368*	0.205*	0.399*	0.94	0.85	1325.70
Demand Deposits	-2612.22	0.562*	0.446*	0.015	0.067	0.95	0.66	1375.70
M1	-6640.92	0.253	0.963*	0.267*	0.495*	0.97	0.56	2000.90
Time Deposits	13309.53	1.574*	0.098	0.296*	0.430*	0.99	0.74	1220.80
M3	6668.62	1.827*	1.061*	0.563*	0.923*	0.99	0.78	2042.60

Legend :

BCG : Commercial and Co-operataive Bank Credit to Government

NFEA : Net Foreign Exchange Assets of the Banking Sector.

NRCG : Net Reserve Bank Credit to Government.

BCC : Commercial Bank Credit to Commercial Sector

* : Significant at 5 per cent level of significance.

Statement 5 : Compound Rate of Growth (Fortnight) Estimated Through Semilog Trend Equations

(Per cent)

	Period I		Period II	
	(A)	(B)	(A)	(B)
C	0.48	12.48	0.9	23.40
DD	0.57	14.82	1.00	26.00
M1	0.53	13.78	1.00	26.00
TD	0.57	14.82	0.60	15.60
M3	0.55	14.3	0.78	20.28
NRCG	0.69	17.94	-0.03	-0.78
NFEA	0.80	20.8	0.46	11.96
BCS	0.66	17.16	0.74	19.24
BCC	0.46	11.96	0.77	20.02

Period 1 : January 12 1990 to October 4 1991
Period 2 : October 19 1991 to May 15 1992

Legend :
C : Currency
DD : Demand Deposits
M1 : Narrow Money
M3 : Broad Money
NRCG : Net Reserve Bank Credit to Government
NFEA : Net Foreign Exchange Assets of the Banking Sector
BCG : Commercial and Co-operative Bank Credit to Government
BCC : Commercial Bank Credit to Commercial Sector.

Statement 6: Trend Equations - Regression Equation Results Explaining Monetary Components (Two Periods)

(Fortnightly Basis)

	Constant	BCG	NFEA	NRCG	BCC	$\bar{R}^2$	D.W.	SEE
1. CURRENCY								
(A)	990.60	-0.508	-0.205	0.360	0.426	0.93	1.19	1000.6
		(-4.66)	(-1.81)	(4.70)	(6.81)			
(B)	-67881.14	1.184	-0.128	0.438	0.100	0.92	3.04	812.0
		(2.11)	(-0.52)	(3.89)	(0.71)			
2. DEMAND DEPOSITS								
(A)	-829.29	0.244	-0.065	0.792	0.179	0.88	1.05	1079.8
		(2.08)	(-0.53)	(0.96)	(2.65)			
(B)	-951.20	0.149	0.433	0.153	0.160	0.96	1.88	478.4
		(0.45)	(3.01)	(2.31)	(1.92)			
3. M1								
(A)	-1811.80	-0.317	-0.046	0.441	0.640	0.98	0.98	879.1
		(-3.31)	(-0.46)	(6.56)	(11.67)			
(B)	-93185.10	1.225	0.335	0.783	0.370	0.97	2.88	898.9
		(1.97)	(1.24)	(6.28)	(2.36)			
4. TIME DEPOSITS								
(A)	11057.00	1.670	0.166	0.265	0.425	0.99	0.88	1073.2
		(14.06)	(1.34)	(3.17)	(6.22)			
(B)	103913.60	0.411	0.971	-0.01	0.427	0.96	0.96	1198.0
		(0.50)	(2.70)	(-0.07)	(2.05)			
5. M3								
(A)	9245.18	1.358	0.12	0.706	1.065	0.99	0.90	1396.01
		(8.94)	(0.76)	(6.62)	(12.22)			
(B)	10728.6	1.636	1.305	0.771	0.797	0.98	1.63	1508.7
		(1.57)	(2.89)	(3.69)	(3.03)			

Values shown in brackets represent 't' statistics.

Legend :
(A) : PERIOD : JANUARY 12 1990 TO OCTOBER 4 1991.
(B) : PERIOD : OCTOBER 19 1991 TO MAY 15 1992.
* Significant at 5% level of significance.

BCG : Commercial and Cooperative Bank Credit to Government
NFEA : Net Foreign Exchange Assets of the Banking Sector
NRCG : Net Reserve Bank Credit to Government
BCC : Commercial Bank Credit to the Commercial Sector

Statement 7 : Compound Rate of Growth (Fortnight) Estimated Through Semi-Log Trend Equations (Pre-liberalisation and Post-liberalisation Periods)

(Per cent)

	Period I		Period II	
	(A)	(B)	(A)	(B)
C	0.57	14.82	0.87	22.62
DD	0.51	13.26	1.3	33.8
M1	0.57	14.82	1.1	28.6
TD	0.58	15.08	0.61	15.86
M3	0.57	14.82	0.79	20.54
NRCG	0.68	17.68	0.11	2.86
NFEA	0.94	24.44	5.1	132.60
BCG	0.66	17.16	0.84	21.84
BCC	0.53	13.78	0.55	14.30

(A) Compound Growth Rate on Fortnightly Basis
(B) Annual Compound Growth Rate

Period 1 : January 12, 1990 to June 28, 1991
Period 2 : July 12, 1991 to May 15, 1992

Legend :
C : Currency
DD : Demand Deposits
M1 : Narrow Money
M3 : Broad Money
NRCG : Net Reserve Bank Credit to Government
NFEA : Net Foreign Exchange Assets of the Banking Sector
BCG : Commercial and Co-operative Bank Credit to Government
BCC : Commercial Bank Credit to Commercial Sector.

Statement 8: Regression Equation Results Explaining Money Stock Measures (Pre Liberalisation & Post Liberalisation Periods)

(Fortnightly Basis)

	Constant	BCG	NFEA	NRCG	BCC	$\bar{R}^2$	D.W.	SEE
1. CURRENCY								
(A)	570.44	-0.441	-0.279	0.500	0.300	0.94	1.22	900.7
		(-4.09)	(-2.63)	(5.83)	(4.31)			
(B)	-38515.01	-0.132	0.412	0.531	0.392	0.92	1.71	1046.3
		(-0.43)	(1.91)	(4.11)	(4.05)			
2. DEMAND DEPOSITS								
(A)	125.71	0.053	-0.009	-0.075	0.371	0.91	1.94	720.5
		(0.61)	(-0.11)	(-1.11)	(6.67)			
(B)	-39691.98	0.968	0.129	0.239	0.023	0.97	1.76	719.8
		(4.62)	(0.87)	(2.69)	(0.35)			
3. M1								
(A)	-1396.30	-0.394	-0.056	0.439	0.674	0.98	1.02	896.8
		(-3.68)	(-0.53)	(5.17)	(9.73)			
(B)	-103666.10	0.792	0.554	0.957	0.506	0.98	1.58	1135.2
		(2.39)	(2.37)	(6.83)	(4.82)			
4. TIME DEPOSITS								
(A)	11918.82	1.460	0.106	0.324	0.472	0.99	1.10	910.7
		(13.41)	(0.99)	(3.76)	(6.71)			
(B)	87937.88	1.603	0.41	-0.191	0.165	0.97	0.86	1411.5
		(3.90)	(1.41)	(-1.10)	(1.26)			
5. M3								
(A)	10522.51	1.066	0.05	0.763	1.146	0.99	1.42	1087.15
		(8.20)	(0.39)	(7.42)	(13.65)			
(B)	-15728.24	2.395	0.964	0.766	0.671	0.99	1.5	1391.87
		(5.91)	(3.36)	(4.46)	(5.21)			

Values shown in brackets represent 't' statistic

Legend :
(A) : PERIOD : JANUARY 12 1990 TO JUNE 28, 1991
(B) : PERIOD : JULY 12, 1991 to MAY 15, 1992
* Significant at 5% level of significance.

BCG : Commercial and Cooperative Bank Credit to Government
NFEA : Net Foreign Exchange Assets of the Banking Sector
NRCG : Net Reserve Bank Credit to Government
BCC : Commercial Bank Credit to the Commercial Sector

Statement 9 : Variables Affecting Share Prices (Period : January 1990 to March 1992)
Dependent Variable : RBI Index of Share Prices

Constant Term	LM1	LBCC	LBIG	LFXA	LXR	LCPI	LPSHG	LCLL	$\bar{R}^2$	D.W.	SEE
- 9.52	1.13				0.89	1.06			0.83	0.48	0.14
(1.63)	(1.88)*				(2.39)*	(1.89)*					
31.57	1.08		-8.94		0.87	0.04		-0.09	0.83	0.58	0.14
(0.75)	(1.63)		(-1.02)		(2.26)*	(1.17)		(-0.83)			
-21.59	2.41					0.06			0.80	0.51	0.15
(-6.80)*	(8.51)*					(1.72)*					
38.80	0.88		-10.04		0.74	0.06	0.008		0.87	0.79	0.12
(0.96)	(1.59)		(-1.5)		(2.25)*	(1.90)	(3.31)				
44.89		1.36	-12.97	0.42		-0.91	0.01		0.85	0.84	0.13
(0.82)		(2.01)*	(-1.16)	(3.31)*		(-0.02)	(4.52)*				
24.22	0.05		-7.10	0.92		0.06			0.83	0.50	0.14
(0.60)	(1.49)		(-0.84)	(2.46)*		(1.89)*					
-32.58		2.62	1.25	0.29		0.04			0.73	0.51	0.18
(-0.54)	(3.13)	(3.13)*	(1.76)	(0.81)							

Values shown in brackets represent 't' statistic

* Statistically significant

Legend

LM1 = Log of Money Supply (M1)
LBCC = Log of Commercial Banks' loans to the Commercial Sector.
LBIG = Log of Commercial Banks' investments in Government Securities
LFXA = Log of net Foreign Exchange assets of Banking Sector
LXR = Log of Exchange Rate (Rupees per US Dollar)
LCPI = Log of Capital Issues (Nominal Values)
LPSHG = Log of growth rate in the Index of Share prices during the past month.
LCLL = Log of Call Rate

Statement 10 : Variables Affecting Share Prices (Sub-Periods)

Dependent Variable : RBI Index of Share Prices (Month-end Values)
Independent Variables

No. of Obser-vations	Constant Term	LM1	LXR	LBIG	LPSHG	$\bar{R}^2$	D.W.	S.E.E.
			Whole Period : January 1990 to March 1992					
27	52.36 (1.24)	1.13 (2.00)*	0.68 (1.97)*	-13.61 (-1.56)	0.009 (3.30)	0.86	0.61	0.12
			1st Period : January 1990 to March 1991					
15	135.85 (2.90)	-3.15 (-1.58)	4.95 (1.74)	-24.10 (-2.37)*	0.004 (1.18)*	0.59	1.30	0.10
			2nd Period : January 1991 to March 1992					
15	-462.50 (-3.07)*	1.29 (3.36)*	0.92 (5.08)*	100.57 (2.96)*	0.004 (1.82)	0.96	1.92	0.06

Values shown in brackets represent 't' statistic

* Statistically significant

LM1 : Log of M1
LXR : Log of Exchange Rate
LBIG : Log of Commercial Banks' Investment in Government Securities
LPSHG : Log of Growth rate in the Index of Share prices during the past month.

Statement 11 : Variables Affecting RBI Index of Share Prices

(Week-end Values)
Dependent Variable : RBI Index of Share Prices

Sr. No.	Period	Constant Term	LM1	LCLL	LEXR	DVTY	ESHR	LDD	$\bar{R}^2$	D.W.
	Whole Period									
1.	Jan.90-May.92	-15.23	1.62 (5.22)	0.05 (1.39)	0.71 (3.64)	0.006 (0.85)	0.94 (1.83)		0.83	0.06
2.		-15.74	-	0.08 (2.45)	0.24 (1.14)	0.06 (0.96)	0.66 (1.78)	1.94 (7.35)	0.86	0.10
	Period I									
3.	Jan.90-Dec.90	3.95	-2.56 (-6.64)	0.006 (0.02)	10.51 (17.36)	-0.005 (-1.04)	1.14 (4.25)		0.90	0.68
4.		-4.93	-	-0.01 (-0.31)	9.42 (11.68)	-0.006 (-0.90)	1.42 (4.06)	-1.65 (-3.12	0.84	0.55
	Period II									
5.	Dec.90-May 91	2.74	-0.04 (-0.04)	0.04 (0.86)	1.27 (1.31)	0.005 (1.65)	0.095 (0.31)		0.80	0.62
6.		-2.79	-	0.10 (1.99)	0.20 (0.31)	0.004 (1.45)	0.42 (1.30)	0.73 (2.00)	0.84	0.84

Statement 11 : Variables Affecting RBI Index of Share Prices (Contd.)

(Week-end Values)
Dependent Variable : RBI Index of Share Prices

Sr. No.	Period	Constant Term	LM1	LCLL	LEXR	DVTY	ESHR	LDD	$\bar{R}^2$	D.W.
	Period III									
7.	May 91-Dec.91	-13.51	1.54	-0.09 (-1.40)	1.11 (4.30)	-0.03 (-2.57)	-0.93 (-1.40)		0.72	0.77
8.		-9.42	-	-0.11 (-2.56)	0.46 (2.09)	-0.02 (-2.54)	-0.72 (-1.54)	1.46 (6.82)	0.86	0.77
	Period IV									
9.	Dec.91-May 92	-47.87	3.97 (6.74)	0.06 (1.82)	2.35 (5.65)	-0.01 (-1.82)	0.75 (3.23)		0.97	1.73
10.		-49.05		0.04 (1.39)	1.93 (4.84)	0.0003 (0.046)	0.48 (2.45)	4.53 (7.90)	0.98	1.45

Values shown in brackets represent 't' statistic

Legend

LM1 : Log of Money Supply (M1)
LCLL : Log of Call Rate (Weekly Average)
LEXR : Log of Exchange Rate (Rs. per dollar)
DVTY : First Difference of Velocity
ESHR : Share Index (T)/Share Index (T-1)
LDD : Log of Demand Deposits

Statement 12 : Money Supply Factors and RBI Index of Share Prices

(Week-end Values)
Dependent Variable : RBI Index of Share Prices

Sr. No.	Period	Constant Term	LBCG	LBCC	LNFEA	$\bar{R}^2$	D.W.
Whole Period							
1.	Jan.90-May 92	-14.10	4.60 (18.59)	-2.67 (-11.18)	0.095 (2.45)	0.95	0.41
Period I							
2.	Jan.90-Dec. 90	-16.10	3.76 (11.1)	-1.69 (-3.67)	0.08 (1.60)	0.87	0.56
Period II							
3.	Dec.90-May 91	-25.10	1.74 (1.82)	0.98 (1.70)	0.14 (0.47)	0.74	0.53
Period III							
4.	May 91-Dec.91	-22.11	3.87 (5.43)	-1.10 (-1.16)	-0.12 (-0.76)	0.86	0.44
Period IV							
5.	Dec.91-May 92	74.15	6.79	-0.01 (-0.011)	0.63 (1.98)	0.93	0.65

Values shown in brackets represent 't' statistic

Legend

LBCG : Log of Commercial and Co-operative Bank Credit to Government
LBCC : Log of Commercial Bank Credit to the Commercial Sector
LNFEA : Log of Net Foreign Exchange Assets of the Banking Sector

Statement 13 : Variables Affecting Share Prices (Roll-over Regression Results)

(Month - end Values)
Dependent Variable : RBI Index of Share Prices

Sr. No.	Period	Constant Term	Independent Variables LM1	LXR	LBIG	LPSHG	R-2	D.W.	SEE
1.	Jan.90-Mar.92	52.36	1.13	0.68	-13.61	0.01	0.86	0.33	0.12
		(1.24)	(1.99)	(1.97)	(-1.50)	(3.30)			
2.	Feb.90-Mar.92	52.36	1.13	0.68	-13.61	0.01	0.86	0.61	0.12
		(1.23)	(1.99)	(1.96)	(-1.50)	(3.30)			
3.	Mar.90-Mar.92	57.88	1.16	0.66	-14.90	0.01	0.84	0.61	0.13
		(1.20)	(1.96)	(1.84)	(-1.42)	(3.22)			
4.	Apr.90-Mar.92	50.22	1.12	0.68	-13.10	0.01	0.83	0.6	0.13
		(0.92)	(1.81)	(1.82)	(-1.07)	(3.15)			
5.	May 90-Mar.92	37.25	1.09	0.69	-10.13	0.01	0.82	0.58	0.13
		(0.61)	(1.71)	(1.81)	(-0.74)	(3.02)			
6.	June 90-Mar.92	7.90	1.05	0.69	-3.48	0.01	0.80	0.56	0.13
		(0.11)	(1.63)	(1.79)	(-0.22)	(2.92)			
7.	July 90-Mar.92	-339.10	0.54	0.82	75.09	0.01	0.84	0.83	0.12
		(-2.15)	(0.89)	(2.37)	(2.10)	(1.83)			
8.	Aug.90-Mar.92	-327.23	0.53	0.81	74.46	0.01	0.82	0.73	0.12
		(-1.85)	(0.85)	(2.25)	(1.83)	(1.66)			
9.	Sept.90-Mar.92	-495.87	0.66	0.89	109.67	0.00	0.84	0.89	0.12
		(-2.42)	(1.08)	(2.55)	(2.39)	(0.38)			
10.	Oct.90-Mar.92	-529.09	0.59	0.90	117.25	0.00	0.84	0.76	0.12
		(1.98)	(9.82)	(2.47)	(1.95)	(0.35)			
11.	Nov.90-Mar.92	-280.10	1.17	0.77	60.35	0.00	0.87	0.66	0.11
		(0.99)	(1.59)	(2.24)	(0.95)	(1.01)			
12.	Dec.90-Mar.92	-392.59	1.29	0.84	85.05	0.00	0.93	1.25	0.085
		(-1.81)	(2.32)	(3.23)	(1.74)	(1.03)			
13.	Jan.91-Mar.92	-462.50	1.29	0.92	100.57	0.00	0.96	1.92	0.59
		(-3.07)	(3.36)	(5.07)	(2.95)	(1.82)			

Values shown in brackets represent 't' statistic

Legend :

LM1 : Log of Money Supply (M1)
LXR : Log of Exchange Rate
LBIG : Log of Bank Investment in Government Securities
LPSHG : Log of Growth Rate of Index of Share Prices during the past month.

Statement 13(A): Variables affecting Share Prices

(Monthly Data Basis)

Dependent Variable : BSE Index of Share Prices

SR. NO.	PERIOD	CONSTANT TERM	LM1	LCLL	LGOLD	LXRATE	LRYILD	LIMTIB	LDD	R2	D.W.
1.	JAN. 90 - MAR.92	-12.99	2.01	-0.16	-0.48	1.28	-1.71	0.0002		0.85	0.63
			(3.05)	(-1.69)	(-0.73)	(2.70)	(-2.32)	(0.003)			
2.	JAN. 90 - MAR.92	-11.22		-0.10	-0.71	0.99	-1.83	-0.008	2.28	0.87	0.89
				(-1.23)	(-1.13)	(2.10)	(0.70)	(-0.14)	(3.65)		

Values shown in brackets represent 't' statistic

Legend :

LM1 : Log of Money Supply (M1)
LCLL : Log of Call Rate
LGOLD : Log of Gold prices
LXRATE : Log of Exchange Rate
LRYILD : Log of Redemption Yield of Government Securities
LIMTIB : Log of ratio of Monthly turn over of shares to BSE Index
LDD : Log of Demand Deposits

SOURCE : Reserve Bank Of India
Bombay Stock Exchange

Statement 14 : Regression Derived Semilog Growth Rates of Key Variables on Monthly Basis

(In per cent)

Variable	Whole Period	Period I (Jan.90 - June 90	Period II (June 91 May 92)	Extent of Change of II over I
(1)	(2)	(3)	(4)	(5)
Narrow Money	1.49	1.29	2.28	+77.0
Broad Money	1.32	1.25	1.66	+33.0
Currency	1.20	1.22	1.79	47.0
Demand Deposits	1.75	1.14	2.70	137.0
Time Deposits	1.23	1.25	1.31	5.0
Index of Wholesale Prices	1.03	0.97	0.81	-8.4
Call Rate	1.15	3.53	0.73	-80.0
Supplies of Public Distribution System	1.22	1.68	-0.98	-
Velocity & Cheque Clearings	-0.13	-0.13	0.29	-
Exchange Rate (Rupees per Dollar)	2.29	1.44	1.22	-15.0
Net Domestic Product	0.17	-0.062	0.43	-
Cheque Clearings	1.61	1.01	2.99	19.60

Statement 15 : Regression Results on Wholesale Prices

(Monthly Data)

Dependent Variable : Log of Wholesale Price Index

Sr. No.	Period	Constant Term	M1	LY	Lr c	P x	$\bar{R}^2$	D.W.
	Jan. 90-May 92							
1.		-2.64	0.67 (16.15)	0.029 (0.52)	-0.022 (-1.42)	0.01 (1.68)	0.91	0.43
	Jan. 90-June 91							
2.		-3.30	0.75 (8.24)	-0.0035 (-0.05)	-0.03 (-1.49)	0.002 (0.16)	0.84	0.73
	July 91-May 92							
3.		1.81	0.27 (5.84)	0.05 (1.30)	-0.005 (-0.56)	-0.001 (-0.36)	0.82	1.71

Values in brackets represent 't' statistic

LM1 : Log of Money Supply (M1)
LY : Log of Net Domestic Product Real GDP
Lrc : Log of Call Rate
Px : Price Expectational Variable $\left\{ = \frac{\text{WPI (T-1)}}{\text{WPI (T-2)}} \times 100 \right\}$

Statement 16 : Additional Regression Results on Wholesale Prices
(Monthly Series)

Dependent Variable : Index Number of Wholesale Prices

Period	Independent Variables									Form of Function Double Log	
	Constant Term	LM1	LCU	LY	LPDS	LNDP	LXRATE	LCLL	LV	$\bar{R}^2$	D.W.
Jan.90 - May 92	.91	.33			.09		.18	-.005	-.03	.96	.52
	(1.26)	(4.33)			(2.75)		(3.52)	(-.48)	(-.93)		
	.92	.33				-neg.	.18	-.005	-0.03	.96	.52
	(1.26)	(4.33)				(neg)	(3.52)	(-.48)	(-.93)		
	.72	.34		-neg.			.23	-.01	-.005	.94	.32
	(.73)	(3.84)		(neg.)			(3.99)	(-.89)	(-.13)		
	.88	.33			.086		.19	-.007		.96	.55
		(4.39)			(2.60)		(3.65)	(-0.64)			
	.74	.34		-.0014			.229	-.012		.95	.32
		(3.92)		(-.03)			(4.09)	(-.95)			
	-2.7	.65	.05					.05		.92	.50
	(-4.4)	17.93		(1.00)				(2.2)			
	-3.85		.76	.086						.85	.34
	-4.31		(82.67)	(1.24)							

(Contd.)

Statement 16 : Additional Regression Results of Wholesale Prices (Contd.)

(1) January 1990 - June 1991
(2) July 1991 - May 1992

Dependent Variable : LWPI

Period Covered	Independent Variables								
	Constant Term	LM1	LCLL	LPDS	LNDP	LXRATE	LVELC	$\bar{R}^2$	D.W.
Jan.90-June 91	-1.745	0.522	-0.047	-0.043		0.404	0.040	0.88	0.73
	(-0.93)	(2.34)	(-1.91)	(-0.66)		(1.34)	(0.79)		
	1.33	0.52	-.040		-0.02	0.316	.0.25	0.87	0.61
	(-.67)	(2.30)	(-1.88)		(-0.32)	(1.19)	(0.56)		
July 91-May 92	2.234	0.202	-0.013	0.050		0.239	-0.049	0.82	1.80
	(3.49)	(3.15)	(-1.35)	(0.64)		(1.58)	(-1.02)		
	2.19	.22	-0.01		0.02	.128	-.03	0.82	1.71
	(2.60)	(2.70)	(-.92)		(0.45)	(.75)	(-1.78)		

Values in brackets represent 't' statistic

Legend :

LM1 : Log of Money Supply (M1)
LCLL : Log of Call Rate
LPDS : Log of Monthly Off-take from Public Distribution System (Wheat, Rice, Coarse Grains)
LNDP : Log of Net Domestic Product
LXRATE : Log of Exchange Rate
LVELC : Log of Velocity
LCU : Log of Currency
LY : Log of Real GDP

Statement 17 : Roll-over Regression on Wholesale Prices (Monthly Series)

Dependent Variable : Index of Wholesale Prices

Period	Log M1	Log Call Rate	Log Exchange Rate	$\bar{R}^2$	D.W.
Jan.90 - May 92	0.337	-0.011	0.220	0.94	0.32
	(3.83)	(-0.90)	(3.99)		
February 1990	0.302	-0.015	0.247	0.94	0.36
	(3.43)	(-1.20)	(4.35)		
March 1990	0.269	0.018	0.257	0.95	0.42
	(3.26)	(-1.53)	(4.35)		
April 1990	0.238	-0.013	0.264	0.95	0.56
	(3.06)	(-1.23)	(5.44)		
May 1990	0.226	-0.013	0.261	0.96	0.72
	(3.31)	(-1.38)	(6.10)		
June 1990	0.218	-0.011	0.256	0.97	1.08
	(3.80)	(-1.38)	(7.13)		
July 1990	0.216	-0.014	0.250	0.98	1.35
	(4.51)	(-2.04)	(8.32)		
August 1990	0.210	-0.017	0.248	0.98	1.57
	(4.70)	(-2.57)	(8.87)		
September 1990	0.202	-0.017	0.247	0.98	1.70
	(4.57)	(-2.74)	(9.01)		
October 1990	0.193	-0.017	0.238	0.98	2.17
	(5.36)	(-3.31)	(10.58)		
November 1990	0.187	-0.016	0.239	0.98	2.28
	(4.92)	(-2.96)	(10.42)		
December 1990	0.182	-0.016	0.239	0.98	2.39
	(4.67)	(-2.91)	(10.24)		
January 1991	0.178	-0.108	0.237	0.98	2.42
	(4.59)	(-3.13)	(10.20)		
February 1991	0.179	-0.018	0.239	0.97	2.46
	(4.42)	(-2.83)	(9.61)		
March 1991	0.179	-0.018	0.238	0.96	2.45
	(4.18)	(-2.64)	(8.41)		
April 1991	0.176	-0.017	0.243	0.95	2.38
	(3.79)	(-2.45)	(6.56)		
May 1991	0.184	-0.017	0.221	0.94	2.29
	(4.08)	(-2.47)	(5.61)		
June 1991	0.192	-0.016	0.203	0.90	2.10
	(3.79)	(-1.97)	(3.56)		
July 1991	0.221	-0.011	0.128	0.81	1.71
	(2.70)	(-0.92)	(0.75)		
August 91-May 92	0.218	0.004	-0.002	0.98	2.00
	(12.00)	(1.13)	(0.05)		

Values in brackets represent 't' statistic

Statement 18 : Factors Determining Wholesale Prices (Weekly Series)

Dependent Variable : LWPI

Constant Term	C	M1	M3	PDS	CLL	XR	PSH	VTY	$\bar{R}^2$	DW	SEE
				Period : January 1990 to December 1990							
0.31 (-0.88)	0.36	-	-	0.01 (0.82)	-0.21 (-5.61)	0.37 (2.20)	0.10 (5.90)	Neg. (Neg.)	0.95	0.96	0.77
-1.16 (-2.990)	-	0.50 (7.79)	-	0.01 (1.01)	0.02 (-5.36)	0.03 (0.16)	0.11 (6.87)	Neg. (Neg.)	0.96	0.85	0.70
-3.46 (-9.16)	-	-	0.70 (14.10)	Neg. (Neg.)	-0.01 (-5.00)	-0.12 (-1,05)	0.05 (6.53)	Neg. (Neg.)	0.98	0.76	0.01
-3.10 (-3.72)	-	0.74 (9.97)	-	0.01 (0.39)	-	-	-	Neg. (Neg.)	0.70	0.11	0.18
-4.58 (-13.89)	-	-	0.79 (29.64)	0.01 (0.65)	-	-	-	Neg.	0.95	0.20	0.74
				Period : December 1990 to May 1991							
2.28 (3.26)	0.27 (3.47)	-	-	Neg. (Neg.)	-0.86 (-1.53)	0.18 (2.33)	-0.08 (-3.11)	Neg. (Neg.)	0.92	1.50	0.34
4.11 (3.28)	-	0.06 (0.45)	-	0.01 (0.29)	Neg. (Neg.)	0.34 (2.53)	-0.91 (-2.67)	Neg. (Neg.)	0.86	1.14	0.01
1.53 (3.72)	-	0.33 (8.86)	-	0.01 (0.27)	-	-	-	Neg.	0.81	0.62	0.01
-0.23 (-0.37)	-	-	0.44 (8.80)	0.01 (0.39)	-	-	-	Neg.	0.81	0.56	0.01

Statement 18 : Factors Determining Wholesale Prices (Contd.) (Weekly Series)

Constant Term	C	M1	M3	PDS	CLL	XR	PSH	VTY	$\bar{R}^2$	DW	SEE
				Period : May 1991 to December 1991							
4.74 (11.14)	-0.04 (-1.18)	-	-	-0.03 (-4.06)	-0.01 (-1.74)	0.09 (6.12)	0.12 (10.75)	-0.67 (-1.54)	0.98	1.24	0.01
4.62 (12.63)	-	-0.04 (-1.06)	-	-0.03 (-4.09)	-0.01 (-1.45)	-0.10 (6.64)	0.13 (10.50)	Neg. (Neg.)	0.97	1.30	0.01
5.34 (6.12)	-	-	-0.10 (-1.27)	-0.03 (-4.23)	-0.01 (-1.18)	0.10 (6.71)	0.14 (8.14)	Neg. (Neg.)	0.97	1.34	0.01
5.33 (2.90)	-	0.01 (0.07)	-	-0.01 (-1.70)	-	-	-	-0.01 (-2.22)	0.22	0.13	0.02
-3.06 (-1.19)	-	-	0.67 (3.32)	-0.01 (-0.34)	-	-	-	Neg.	0.47	0.08	0.01
				Period : December 1991 to May 1992							
3.47 (3.68)	0.18 (2.25)	-	-	-0.24 (-1.99)	-0.35 (-1.99)	-0.15 (-1.93)	0.43 (2.48)	0.96 (1.80)	0.82	1.34	0.01
2.07 (1.77)	-	0.29 (1.77)	-	-0.03 (-2.65)	Neg. (Neg.)	-0.12 (-1.70)	0.24 (1.27)	Neg. (Neg.)	0.85	1.50	0.01
-1.45 (-0.66)	-	-	0.57 (3.17)	-0.03 (-2.58)	Neg. (Neg.)	-0.11 (-1.61)	-0.11 (-0.05)	Neg. (Neg.)	0.85	1.28	0.01
1.95 (4.64)	-	0.29 (7.89)	-0.03 (-2.46)					Neg. (Neg.)	0.82	0.72	0.01
1.01 (1.78)	-	-	0.34 (7.46)	-0.02 (-1.63)	-	-	-	Neg.	0.81	0.60	0.01

Statement 18 : Factors Determining Wholesale Prices (Contd.)
(Weekly Series)

Constant Term	C	M1	M3	PDS	CLL	XR	PSH	VTY	$\bar{R}^2$	DW	SEE
				Period : December 1990 to May 1992							
1.05 (2.72)	0.32 (7.68)	-	-	0.03 (2.06)	-0.01 (-2.01)	0.23 (8.19)	0.25 (2.18)	-0.37 (-.84)	0.95	1.41	0.02
0.93 (2.14)	-	0.32 (7.01)	-	0.03 (1.92)	Neg. (Neg.)	0.21 (6.91)	0.01 (0.59)	Neg. (Neg.)	0.95	0.10	0.02
-3.12 (-7.35)	-	-	0.66 (16.79)	0.01 (0.50)	-0.01 (-2.05)	0.12 (6.20)	-0.03 (-3.65)	Neg. (Neg.)	0.98	0.16	0.01
-1.67 (-6.73)	-	0.62 (30.13)	-	0.06 (3.58)	-	-	-	Neg.	0.92	0.14	0.02
-2.54 (-8.76)	-	0.70 (29.19)	-	0.06 (3.41)	-	-	-	Neg. (Neg.)	0.92	0.15	0.03

Values in brackets represent 't' statistic

Legend :

C : Currency
M1 : Narrow Money
M3 : Broad Money
PDS : Monthly offtake of Public Distribution System (Wheat, Rice and Coarcegrains in MT)
CLL : Call Rate
XR : Exchange Rate (Rs. per dollar)
PSH : The growth rate of share index during the past month
VTY : Velocity (Cheque clearances/Demand Deposits)

Statement 19 : Factors Determining Price Level of Wage Goods (LWGIND) (Weekly Series)

Constant Term	LM1	LC	LPDS	LCLL	LEXRT	LSHARE	LRWG	$\bar{R}^2$	D.W.	SEE
				January 1990 to December 1990						
-2.26	0.63	-	Neg	-0.03	-0.19	0.16	-0.48	0.93	0.81	0.1
(-3.50)	(6.30)		(Neg.)	(-6.35)	(-0.70)	(6.45)	(-0.98)			
-1.57	-	0.52	0.01	-0.03	0.10	0.15	-0.74	0.94	0.94	0.97
(-3.23)		(7.36)	(0.76)	(-6.73)	(0.49)	(7.13)	(-1.60)			
				December 1990 to May 1991						
4.88	-0.03	-	-0.01	-0.01	0.50	-0.12	0.69	0.79	0.71	0.62
(2.71)	(0.14)		(-0.35)	(-0.59)	(2.53)	(-2.36)	(1.34)			
2.12	-	0.29	-0.01	-0.01	0.23	-0.10	0.27	0.84	0.86	0.53
(2.03)		(2.45)	(-0.23)	(-1.24)	(1.89)	(-2.46)	(0.60)			
				May 1991 to December 1991						
4.10	-0.01	-	-0.01	-0.01	0.11	0.15	0.37	0.96	0.78	0.53
(9.01)	(-0.14)		(-1.30)	(-1.11)	(6.07)	(8.50)	(0.69)			
4.01	-	0.03	-0.01	-0.01	0.11	0.15	0.38	0.96	0.79	0.53
(8.12)		(0.06)	(-1.24)	(-1.24)	(5.80)	(9.17)	(0.72)			

Statement 19 : Factors Determining Price Level of Wage Goods (LWGIND) (Contd.) (Weekly Series)

Constant Term	LM1	LC	LPDS	LCLL	LEXRT	LSHARE	LRWG	$\bar{R}^2$	D.W.	SEE
				December 1991 to May 1992						
1.75	0.33	-	-0.01	-0.02	-0.12	0.03	0.38	0.84	1.53	0.57
(1.33)	(2.82)		(-0.82)	(-0.68)	(-1.58)	(1.69)	(1.17)			
3.32	-	0.19	-0.01	.Neg.	-0.12	0.05	0.5	0.81	1.35	0.62
(2.99)		(1.93)	(0.25)	(Neg.)	(-1.44)	(2.59)	(1.43)			
				December 1990 to May 1992						
1.18	0.28	-	0.34	-0.01	0.27	0.02	0.61	0.94	0.12	0.23
(2.33)	(5.30)		(2.02)	(-1.55)	(7.96)	(1.61)	(1.04)			
1.04	-	0.30	0.03	-0.01	0.28	0.03	0.15	0.95	0.14	0.22
(2.25)		(6.19)	(1.98)	(-2.52)	(9.07)	(2.53)	(0.25)			

Values in brackets represent 't' statistic

Legend :

LM1 : Log of Money Supply (M1)
LC : Log of Currency
LPDS : Log of Monthly off-take from Public Distribution System (Wheat, Rice, Coarse Grains)
LCLL : Log of Call Rate
LEXRT : Log of Exchange Rate
LSHARE : Log of Index of Share Prices
LRWG : Log of Expected Growth Rate of Wage-goods Prices

Statement 20 : Intercorrelation Matrix of Select Variables (On Weekly Basis)

M1	M3	C	WPI	SHARE	PDS	CLL	EXRT	WGIND
1.00	0.99	0.98	0.94	0.87	0.48	0.33	0.92	0.94
0.99	1.00	0.97	0.98	0.88	0.51	0.32	0.94	0.97
0.98	0.97	1.00	0.92	0.81	0.47	0.39	0.88	0.91
0.94	0.98	0.92	1.00	0.80	0.55	0.24	0.96	0.99
0.87	0.88	0.81	0.80	1.00	0.3	0.36	0.84	0.81
0.48	0.51	0.47	0.55	0.30	1	0.05	0.53	0.55
0.33	0.32	0.39	0.24	0.36	0.05	1.00	0.24	0.24
0.92	0.94	0.88	0.96	0.84	0.53	0.24	1.00	0.96
0.94	0.97	0.91	0.99	0.81	0.55	0.24	0.96	1.00

LEGEND :

M1 : Narrow Money
M3 : Broad Money
C : Currency
WPI : Whole Price Index of All Commodities
SHARE : Index of Share Prices (All India RBI Index Base 1980-81=100)
PDS : Monthly Take-off from Public Distribution System (Wheat, Rice & Coarse Grains)
CLL : Call Rate
EXRT : Exchange Rate
WGIND : Index of Wage-goods Prices