Chapter V

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Summary and conclusions

This chapter deals with the summary of the study, major findings which emerge from our study and conclusion of this research undertaken. In this chapter most of discussion is in line with the objectives of this study.

(1) Nature of causal explanation is explored and we have examined the concept of "causality"; its philosophical as well as theoretical foundation; its historical meaning and then we have made attempt to connect it with modern meaning in the field of macroeconomics.

(2) However, controversy on the problem of cause and effect has divided thinkers into : (a) causalists (b) acausalists, and (c) semi-causalists.

(3) Our discussion highlights the belief that most of the events, process etc. at a given time and space are subject to the law of causation and effects. ie. all objects and events in the world are caused. It means that objects and events are linked (determined) to one another by causal laws.

(4) In our study the concept is discussed from western philosophy point of view and also from Indian philosophy point of view.

(5) We have also examined the role and scope of the concept in scientific research.

(6) We have also narrated empirical evidence related with causality test between various macroeconomic variables.

(7) We have explained C.W.J. Granger test (1969) and Sims.C.A.(1972) test which has been utilized to test empirically causal link among various macroeconomic variables related with

our study.

(8) Following Sims, all variables used are measured as natural logs and we have taken first difference of the variables (VIZ. $x^{*}_{t} - x_{t-1}$) to transform each of variables. Besides by using logarithmic and differencing for transformation of the raw data.The variables are presumed to exhibit the properties of stationarity that is constant unconditional mean and variance over the sample period. We had to drop seven observations as result introduction of 3 lags, 3 futures years in our test of causality.

Thus, arguments developed in the early discussion provide the point of departure and controlling reference for all subsequent discussion.

(9) Then, discussion is devoted to the analysis of theoretical development in the field of money income relationship in historical perspective. This discussion includes various theories related to money-income relationship from oldest classical approach upto restatement of quantity theory by M.Frideman looked from money-income viewpoint.

(10) Utilizing Granger and Sims tests, we have tested empirically causal relationships between money stock (M1 and M3) and GNP (at current prices)

(11) In order to evaluate the significance of the coefficients as group, F statistic have been utilized. We have used ANOVA Table (Analysis of Variance Table) and computed F statistics in tables II.1,II.2 and II.3 for the relevant regressions. As clearly brought out by Tables II.1,II.2 and II.3 the causality between money and money income has turned out to be bidirectional using Granger as well as Sims tests.

(12) In all the reported empirical results (except in one case), F valued level have been found to be significant at one percent level and this strongly gave the verdict that money stock (M1 and M3) and GNP are endogenous to each other in India.

(13) We have also realized that future coefficients are significant in all regressions. In all regressions values of F statistic is significant at the one percent level. We have tested the significance of coefficients on future variables taking them as a group. This is to avoid multicollinearity problem that usually arises and often turned out into spurious regression. However, our major finding is bidirectional causality between money stock and money income in India.

(14) The aim of the study has been to examine the substantive question whether there is statistical evidence that money is "Exogenous" in some sense in the money income relationship for the Indian Economy. The evidence from this exercise strongly suggests that the money supply changes do not seem to be independent of nominal income changes and hence denies the existence of unidirectional causality from money stock to money income. Existence of feedback clearly suggests that money and income are simultaneously determined. This also implies that neither money nor money income can be treated as strictly exogenous in their distributed lag regressions and failure to do so would lead to spurious statistical relationships and would render the estimated coefficients and ambiguous interpreatation. Importantly, the study contends that the sudies of the simple statistical relationship between movements in money stock and in money incomes can by themselves provide very little information about the strength of monetary policy. The

statistical relationship could be quite close, but this might reflect to a very large extend the accomodation of movements in the money supply to autonomous change in money incomes (given the authorities policy aims and operational techniques). If the authorities make an abrupt change in their operations, the established relationships or regularities might cease to apply. In such situation, attempts to measure the effects of monetary policy by correlating changes in the money stock with changes in money incomes probably greatly overestimate the stremgth of monetary policy. The overestimation occurs owing to the existence of a two way relationship between money stock and money income.

(15) Our results of a bidirectional causality between money stock and money incomes could be rationalised by three major reasons : it is probable that in an attempt to peg the interest rates on financial assets, the Reserve Bank has allowed the money supply to vary in order to offset changes in the demand for money as income varied. In this context, the money supply ceases to be exogenous and correlation between M amd Y represents a possible direction of causation from Y to M. Secondly the Indian Economy being an open econmy, the money supply can easily be altered by substantial changes in the flow funds from abroad (short run monetary movements). To the extent that greater capital inflows are attracted during times of high income and demand for money, which raise the rate of interest, a correlation between changes in M and changes in income will be observed which is not indicative of monetary changes causing the level of income. Thirdly, due to the policy of large scale deficit financing, changes in money supply have increasingly been dependent upon the budget deficit. In view of the substantial

magnitude of deficit financing it would be vary difficult to discriminate between the effects of the changes in nominal stock of money and the changes in autonomous expenditure. The functional dependence of money stock an budgetary policy necessitates a model in which nominal stock of money is also endogenised. However more important is the fact that the actions of the authorities in financial markets which will directly affect the money supply, will usually be strongly influenc by current and expected future developments in the economy and any attempts to disentangle this two way interaction by considering the lead/lag relationship reinforce the view that the monetary policy has some causal impact on money income, but do not allow this to be clearly isolated and quantified.

We reiterate our conclusion on an alternative interpretaion that with the existance of bidirectional causality, money stock as well as money income contain an efficient assessment of each other in as much as that movements of money (or money income) provide advance information to the movements, of money income (money stock). In this sense predictable movements of money stock cause movements in money income or other way round.

(16) The bidirectional causality between money stock and money income seem to be partly due to the policy of deficit financing in India. Owing the deficit financing, changes in money supply have increasingly become dependent upon the budget deficits. In view of the substantial magnitude of deficit financing and functional dependence of money stock on budgetary policy implies that money stock is endogenised. Further more a fixed exchanges rate system in which one country service as the reserve currency country has important asymmetrical proporties.

Indeed, only the reserve currency country can control its money supply. from this, several implications for concerning direction of causality follow. Control of money supply results in the ability to infulence price level and thus nominal income in the reserve currency country. These changes in prices an nominal income in the reserve currency country will simultaneously affect conditions in world market. Individuals in other countries reacting to these changes, adjust their portfolios. This adjustment process prompts simultaneous changes in price nominal income and the money stock in non-reserve currency countries. It is also interesting to note that in so far as the authorities primarily aim to regulate structure of interest rates, movements in money stock can be expected to respond to movements in nominal income. (Williams, Goodhart and Cowland.) Besides,GNP / or nominal income can be a cause of the money supply in a reverse direction if monetary policy is conducted so as to stabilise the rate of change in GNP, reducing the rate of change in the money supply when GNP grows too fast and increasing it when GNP slows down. All this is to emphasise that the observed empirical evidence for causality is justified and is consistent with prevalent features of Indian economy. The major implication is that form and direction of causal relationship do depend on the institutional context and that C.A.Sim's results do not have general validity.

(17) We have used various graphs to indicate behaviour of Money Stock (M1 and M3) and Money Income (GNP). Our graphs shows strong association between above mentioned important macroeconomic variables in India.

(18) We have also taken the care of analysis of theoretical development in the field of money price relationship

in historical perspective. We have included various theories and view points of old classical school, Fisher equation, Cambridge version of Quantity Theory, Keynes on money and prices, view points of Stockholm school, Keynesianism, Monetarist and Neo-Monetarist on money and price association.

(19) From theoretical survey (Money- price) we could understand that there has been agreement among all most all economists about relationship between money supply and price level. However major controversy is about the process through which money supply affect the price level.

(20) On the basis of Granger and Sims tests we have empirically investigated bidirectional causal relationship between money stock (M1 and M3) and wholesale price index. More specifically, using criteria following C.W.J Granger, the empirical results unambiguously supports two way causation between money and prices. However, on the basis of Sims test also, we have found that both money and prices are found statistically significant in causing each other except in one case, where wholesale price index has been found insignificant in causing variation in M1 .

(21) The causal role of money could easily be traced to the imbalances in the money market with excess money balances spilled over into the commodity market causing positive excess demand in that market; with output capacity being low, this could cause increase in prices. However, our results indicate that the process does not stop there. The rise in prices could inflate investment in the public as well as private sector which would result in higher demand for bank credit and money supply thereafter. There is one more mechanism which could also be used

to justify and rationalise our results of bidirectional causality between money and prices. This could be attributed to the link between money, deficits and prices; It is no gain saying the fact that Government's expendititure commitments in nominal as well as real terms far exceed its revenue receipts; this is partly due to the fact that government , revenues are collected withe a lag of one or two years and also that income elasticity of tax revenues is gap between expenditure and revenues widens and when this gap is matched by corresponding central bank credit, money supply increases further. Hence, on this count also, feedback from money to prices and vice versa, could easily be established.

(22) Milton Friedman, the "Inflation is always and everywhere a monetary phenomena ---- and can be produced only by more rapid increase in the quantity of money than in output. Though it is true, there are also other causes wnich are responsible for rapid rise in prices in our country. These causes are related with structural theory of inflation. It is found in work of Mydral and Streeten. The soci-economic-political structure of our country determines the source and character of inflation by determining the particular kind of sectoral demand-supply gaps or bottlenecks that emerge in the process of devlopment. The gaps or bottlenecks in our country are:
(1) Rosources Gap (2) Food Bottlenecks (3) Foreign Exchange Bottleneccks (4) Infrastructural (Physical) Bottlenecks and. (5) Other Structural Factors, like unproductive private investment, lack of spirit of entreprise, adventure and innovation.

(24) Over and above inflation in our country is caused by an increase in supply of money. Rise in stock of money work on price level is supported by our empirical findings. However, in

India, increased money supply leads to increase in aggregate demand. Higher the growth rate of nominal money supply, the higher is the growth rate in price level. Similarly, as mentioned earlier , increase in public-expenditure, Government activities have been expanding much with the result that government expenditure aggrevate demand for goods and services. Government of India and various state governments are providing more facilities under public utilities and social services. With the result that they help in raising aggregate demand. The expansion of private sector also tends to raise the aggregate demand. For huge investments, increases employment and income, thereby creating more demand for goods and services. But it takes time for the output to enter the market. In India existence of black money is also responsible to raise the price level further. Whenever the government repays its past internal debt to the public, it leads to increase in the money supply with the public. This tends to raise aggregate demand for goods and services and in turn raises the price level further. Thus, rise in money supply leads to increase in aggregate demand and this in turn raises the price level in India.

(25) There are also certain factors which operate on the opposite side and tend to reduce aggregate supply. for example shortage of capital, raw materials, drought, flood, artificial scarcities of goods created by hoarder etc.

(26) Our empirical results keeps no doubt in our minds that, whatever may be cause of rise in stock of money in India, it definitly leads to rise in price level. And rise in price level in turn raise the money supply. Therefore suitable monetary policy and fiscal policy are indespensible to create stability in

price level and in economy as whole. Because, economic policy, whether fiscal, monetary or combination of the two, has traditionally aimed at high employment, stable prices and rapid growth. There is widespread agreement on the virtue of these goals, but less on the degree to which one should be sacrificed to achieve another, and even less on the question of which policy instruments are to be utilized to achieve which targets.

(27) Our empirical investigation through Granger test and Sims test indicates that price act on money stock, in other words there is bidirectional causality exist between GNP and WPI in India.When the rise in prices is taking place, the money stock is also usually increasing. As a matter of fact, increase in money stock (M1 and M3) without any increase in the volume of transaction would raise prices, given the velocity of circulation. But however as a result of persistance price rise for some time, the rate of rising prices is likely to be accelerated due to the increase profitability of hoarding goods. As a result of rising rate of prices in India, a situation of uncontrolable price rise has emerged. In this situation in long run people lose faith in the use of money as a store of wealth and this has happened to people in India. Therefore there is general shift from money & near money assets into the real durable goods.Obvioulsy this shift indicate that there is general decline in the liquidity preference of people & a general rise in the velocity of circulation of money. Therefore in India not only the rise in money supply but also the rise in velocity is associated in accelerating the rate of rising prices. Due to this reason worst inflationary situation came into existance in India. Under the circumstances mainly due to decline in the liquidity

preference of people & rise in the velocity raise the money supply in India. Thus, in order to obtain economic stability, Government has to concentrate on control of money supply as well as price level. No doubt that control of money supply is necessary to have economic stability but at the same time it is not sufficient policy instrument. Therefore to formulate comprehensive economic policy one must concentrate on controlling stock of money as well as general price level, simultaneously. Thus our study reflect that there is a bidirectional causal relationship between Money Stock (M1 and M3) and Wholesale Price Index. This demand wider & comprehensive package of economic policy to ensure economic stability in India.

(28) We have also used various graphs to understand relationship between money stock (M1 and M3) and wholesale price index (WIP) in India. At first glance, various graphs indicates behaviour of money stock and price in India.

(29) From the historical survey of money supply theories it is evident that traditionally money supply has been seen in three ways; (i) as the product of gold and/or silver stock, (ii) as created by the central bank by means of open market operations and (iii) as a result of budget deficit financed by printing money. during the last 60 years three different kinds of econometric models have been produced. These are (i) multiplier, (ii) structural and (iii) reduced form models to determine the amount of money supply. During the half century from 1920 to 1970. economic analysis of money supply was based on Phillip's multiplier approach. Under this approach the bank behaviour is described by a set of fixed coefficients. Multiplier approach takes for granted a predictable relationship between bank

reserves and the money supply . It is positive function of demand deposit ratios and negative function of reserve ratios. As Jurg Niehans (1978) notes, "It may worth pointing out that, except for the inclusion of time deposits and the commission of equity the multiplier to the deposit multiplier for an individual bank".Even though this approach is useful as this elementary exercise of determination of money stock can be varied, extended and generalised in many ways, other assets can be added and non-bank intermediaries can be included but it has also serious limitation. According to this approach it seems as if money supply is purely supply determined and demand has no influence on the quantity available. Moreover whereas such fixed coefficient models are useful to make clear the basic quantitative relationships in the money supply process, their worth is surely limited by the fact that, these coefficients are calculated independent of rate of interest, prices, wages and like other market conditions. As Tobin has pointed out the multiplier approach is designed for imperfect credit markets where interest rates are rigid and fail to clear the market. More perfect credit market needs a more perfect approach. The purpose of structural and reduced form models are to specify the structural relationships. There are three sectors in this model :(i) Public,(ii) Commercial banks and (iii) the Government. The interaction of these sectors determines the total amount of money supply. Because the behaviour of these sectors are unpredictable this model does not necessarily provide the best tecnnique for forecasting the money stock.

(30) In summarising both the approaches it would be appropriate to quote Makinen (1978). "A general conclusion

emerging from that discussion was that both those in the quantity theory tradition and those adhering to the new view are applying portfolio type analysis to the supply of money in an attempt to explain commercial bank holding of excess reserves and the distribution of money holdings by individuals between currency and demand deposits."

(31) From the money supply studies that have so far been undertaken in India shows that the stock of money is the product of high power (or base) money and value of money multiplier. It is also evident that high powered money has played a more significant role in determining the money stock than the value of money multiplier. The different components of money-multiplier have also been estimated. Some have even divided the factors determining money supply into policy and non-policy variables..We found that the money stock was influenced by both exogenous and endogenous factors to the economic system. The studies also strengthened the notion that stock of money is the joint product of the central bank, commercial bank and non-bank public. Opinions differ on the point of central bank's control over money supply. stability of relationship between money supply and high powered money have also been considered.

(32) From the structural composition of high-powered money it is evident that most of high powered money 63.12 per cent is held by the non-bank-public in the form of currency. The remaining balance is with the R.B.I. in form of banks deposits with RBI. Which is 33.42 per cent. However, other deposits with RBI and cash with banks are not significant.

(33) The high powered money by the used to which it is put consists of currency in circulation and bankers deposit with

RBI.These are held by public in the form of "currency" by banks in the form of "reserves" of cash and by the RBI in the form of "other deposits". As a matter of fact, the uses of high powered money are primarily the monetary assets of commercial banks and the non-bank public. further, the size of high powered money is determined by the monetary authorities, the allocation of its use is determined by commercial banks and the non-bank public.

(34) Looked in terms of demand and supply, the "uses" is the demand for high-powered money and "sources" is the supply of high powered money. The "sourcebase" is always in balance to "usebase" because banks and non-bank public always compete for use of high powered money and hence entire pool is always claimed. An example to this effect is given in (Table IV.2).

(35) Our empirical results are also important and interesting in that they indicate causality from money stock to high powered money. This could be nationalised if one takes into consideration the monetary input of time deposits. Time deposits consitutes one major part of money stock, broadly defined. At least in the Indian context, the time-trend and structural features relating to time deposits establish that time deposits grow autonomously and on account of their rates of return. They are also income elastic and interest elastic. In India, the level of time deposits has grown so rapidly, over time, that they would before long, be as much as narrow money and thereafter exceed the sum total of currency and demand deposits.This is essence suggests that in the Indian context, time deposits may be regarded as a base for determining the "high powered money" and through which one can arrive at money supply in the narrow sense.

Our results of bidirectional causality pose an interesting question as to whether the equations forming part of the theory of supply of money cannot be suitably manipulated to make any of the components of money a base for estimating highpowered money-money supply.

(36) It seems higher growth of money stock attributable mainly to the growth of time deposits could exert an upward pressure on monetary base and could cause reserve money to increase to an appropriate level which can support a higher level of money stock.

(37) In all, both money supply and high powered money are found to be endogenous to each other; Variations in High Powered Money cause variations in money supply and on the other hand, money stock variations cause variations in high powered money.

(38) The empirical evidence does suggest that the reserve bank of India can control money stock by controlling the reserve money. (S.B.Gupta, 1972 and Kulkarni V.C.and Millier S.M. (1986)[1].It is found that the value of money multiplier in India does not show marked fluctuations over the period of 4-5 years which means that it can safely be assumed to be stable for the policy purposes over the same time horizon (Table : IV.3) This also means that variations in money stock could easily be ascribed to variations in high powered money, a policy variable. The existing empirical evidence supports the use of money multiplier models a guide to monetary policy. On a long-run basis, there exists a strong link between base-money growth and

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1. Gupta S.B. (1976) "Money supply analysis - A reply" Economic and Political weekly. November 20, 1934-44.

money-stock growth ; it is also found that short run movements in the money stock are primarily explained by short run movements in base money. In short, the bulk of evidence suggests that the money multiplier model has operational significance in the Indian economy. Gupta S.B(1972) , while examining money supply determinants and their relative contribution to monetary growth in India, has furnished the evidence which suggests that over the first three plan periods, the reserve money growth had accounted for on average, 85 percent of the growth of quantity of money: and contribution of money multiplier to the growth of the quantity of money was found to be only 6 percent over the sample period.

(39) Our objective in our study has been to examine statistically the direction of causality between money stock measures (both M1 and M3) and high powered money in India. Our results strongly suggest that the causality is bidirectional. Both money stock and high powered money are found statistically significant in causing movements in each other. It seems there exists a high degree of association between the base and the money stock in India and the propelling force influencing money stock rests with the monetary base; the role of the high powered money in money stock determination is found to be predominant one.

(40) We have also used various graphs related with HM and M1 and M3 which shows components of high powered money and behavior of M1 and and percentage growth rate of HM, M1 and M3.