3

THE MONETARY ASPECTS

3.1 Introduction

In the last chapter, we have discussed the rationale behind the stabilization policy and its implications for the monetary policy. We also discussed why the correspondence between the fiscal deficit and the external imbalance is likely to be weak. We argued that the three-gap model needs to be reformulated in view of some methodological issues and to incorporate the elements of the black economy, which is a significant part of our economy. Otherwise, we concluded that the macro analysis of the three gaps would remain incomplete.

Though the Fund stabilization package targets a fiscal variable, the underlying mechanism of the model is essentially monetary in nature. In fact, as discussed earlier, it was a precursor to the Monetary Approach to Balance of Payment (MABP) developed later in Chicago in the 1960s. A reduction in fiscal deficit will entail lower borrowing from the banking system, which would lead to a reduction in the generation of credit. The objective of bringing down the volume of credit is to make the volume of money supply in conformity with money demand, which is argued, in MABP, to be independently determined by interest rate and full employment level of output. The assumption that the money demand function is stable is crucial to such an analysis. The way the package is believed to operate, has, therefore, serious implications for the monetary behaviour of the economy.

In this chapter, we examine these issues in the context of the development of monetary theory to highlight those aspects of the theory, which are pertinent in the context of analysing the monetary aspect of the stabilization package in an economy with a sizable black economy. To begin with, we deal with the issue of constancy in the income velocity of circulation as assumed in a typical monetarist model and the broader issue of demand for money. We go on to discuss the monetary transmission mechanism and the role of credit in this context. We
carry out some empirical tests to find out the long-term relationships amongst the various monetary and real variables.

3.2 Demand for money

The formulation of the money demand theory has always been at the core of the evolution of the monetary theory. In fact, the demand for money function remains the key distinguishing feature amongst the various schools of thoughts. In this section, we begin our discussion with the theory of demand for money as evolved over time.

Demand for money arises on account of its multifaceted functions it performs. Money as a medium of exchange is held for temporal transactions as well as a store of wealth for inter-temporal transactions. In fact, it is uncertainty, which explains why money being a non interest bearing asset, is held. In presence of complete certainty, money would have been replaced by some interest bearing asset.

3.2.1 The Classical monetary economics

In the Classical model, money serves as a *numeraire* in terms of which the prices of all other commodities are expressed and also as a medium of exchange to facilitate transactions. Money is argued to have no influence on the equilibrium level of real output. Money is, therefore, neutral, a 'veil', with real variables being determined in the real sector and monetary variables being determined in monetary sector. This is known as the 'classical dichotomy'.

It was Fisher (1911) who popularised quantity theory of money (QTM) without any reference to the demand for money. It was stated in the following way,

\[ MV = PT \] (3.1)

Where \( M \) is the amount of money circulating in the economy, \( V \) is the transactions velocity of circulation, \( P \) is the general level of prices and \( T \) is the number of transactions carried out during the time period. This merely states that monetary value of all current transactions equals total spending (MV). It is interesting that in 1926, Fisher was distinguishing between two categories of transactions, the first category was related to

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finished output (real income), which he termed ‘income transactions’ (PT₁) and the second pertained to ‘financial transactions’ (PT₂). In this version:

\[ MV = PT₁ + PT₂ \]  

(3.2)

The earliest theory of money demand is encapsulated in the well-known Equation of Exchange, which can be written as,

\[ M_dV = PT \]  

(3.3)

or,

\[ M_d = \frac{1}{V}.PT \]  

(3.4)

Where \( M_d \) is the demand for money, \( V, P \) and \( T \) are as described above. The velocity of circulation, as it appears from the relation, is the average number of times money changes hands during the period to facilitate transactions.

This transition from identity to theory entailed specification of causality from money to prices, notwithstanding its short run impacts. The underlying argument was therefore, that an increase in money would have no lasting effect on total transactions. This can be achieved by subjecting the behaviour of velocity and volume of transactions to strict restrictions. It was argued that velocity would change slowly over time and the factors behind it are (i) the frequency with which income is received, (ii) pattern of expenditure and timing of payments, (iii) the degree of vertical integration in industry and the (iv) extent of use of credit. Under these restrictions, the impact of changes in money on total spending (MV) becomes predictable. The impact of total spending can be entirely on price in case total transactions are determined independent of demand by real forces like resources and techniques of production.

Money facilitates transactions related to both physical goods and services on the one hand and financial transactions on the other. This poses problem for the price level. The price level should therefore, reflect the price level of both financial assets and physical goods and services. This equation of exchange has never been comfortable with the growing complexities of the financial system.

Largely on account of the ambiguities arising from the concepts of ‘transactions’ and the price level, and in response to the treatment of income transactions in national and social accounting, the *income form of the quantity equation* came into being. The popular form being,

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\[ MV = P_y y \]  

(3.5)

Where, \( V \) is the average number of times per unit of time that money stock is used in making income transactions. \( y \) = national income at constant prices, \( P_y \) = price deflator for estimating national income at constant prices. This income version can be regarded as an intermediate step between the Fisher and the Cambridge version.

The income form (3.5) merely states that current output at market prices \((P_y y)\) equals in value to total spending on current output \((MV)\). In this form, current output is where spending is restricted to because we define velocity \((V_y)\) (as in 3.3) as the ratio of \(P_y y\) to \(M\). If the items under total spending as denoted by \((MV)\) is exhaustive, then \( V \) should refer to transactions velocity of money \((V_T)\) defined as the ratio of \(P_T \) to \(M\). This is because money is not merely used for transactions related to the recorded nominal income but a host of other types of transactions. Total transactions include \(y\) and other important categories like intermediate goods, second hand goods, financial assets and transactions related to the black economy. So the velocity of transactions is bound to be larger than the income velocity. Therefore,

\[ V_y = \frac{P_y y}{M} < V_T = \frac{P_T T}{M} \]  

(3.6)

Two propositions pertaining to the determinants of real income and velocity follow from this. Money is neutral with real income being always equal to ‘full employment’ level or natural level determined by tastes, production technology and endowments as captured by the vertical Phillips curve. Velocity of money circulation is also determined by institution and technological factors -it is a real variable and independent of quantity of money in circulation.

The alternative approach to QTM is associated with the Cambridge economists, Marshall and Pigou. It is as follows,

\[ M = k \cdot P \cdot y \]  

(3.7)

\(M, P\) and \(y\) are all defined as above and \(k\) is the inverse of \(V\). The Cambridge version emphasises money as an abode of purchasing power in the interim between sales and purchases, apart from money being regarded as ‘general purchasing power’. This seeks to address the issue how much money would people like to hold on an average as a temporary abode of purchasing power? Since income affects the volume of potential purchases, cash

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balances held can be assumed to bear a stable relation with income. It can be interpreted as either the observed ratio to make equation (3.4) an identity or a desired ratio so that $M$ is the desired amount of money. If $V$ (or $k$) can be treated as the desired ratio, which depends on institution and technology, stock of money demanded is proportional to money income. Constancy in the velocity of circulation is one of the main pillars of the monetarist doctrine. It is not important for the velocity to remain constant over time but to remain more or less stable.\(^1\)

As argued earlier, money is used for transactions related to the recorded money as well as other transactions not captured in the measure of income – a significant part of which can be called black transactions. So, equation (3.7) can be written as follows,

$$M = k (P_w P_w + P_b P_b) (y_b + y_w) \tag{3.8}$$

Small $p$'s indicate the share of black and white so that $P$ in equation (3.7) is replaced by the weighted average of the respective price levels. We can see, that now, there would be four terms on the right hand side indicating various combinations instead of only one in the conventional form which pertains to the entire economy. So, $k$ is likely to be different in equation (3.8) compared to that of equation (3.7).

In fact, a relationship may be established between the 'k', the reciprocal of $V$ and $V_T$. It can be shown that,

$$k = 1 / V_T (P_{T.T} / P_{w.y}) \tag{3.9}$$

In all likelihood, total volume of transactions would be greater than the nominal value of income. It is greater because money is used for various financial transactions, second hand asset and transactions related to intermediate consumption in the white economy. So, $(V_T k)$ is greater than one. Therefore, with the inclusion of black economy, the velocity of money circulation is actually higher than what is estimated.

In the 1970s and 1980s, the quantity theory became a popular framework and useful device for highlighting the importance of monetary rules. The equation of exchange was cast

\(^1\) Here we may distinguish between stability of the money demand function with the income velocity of circulation being constant. Stability of the money demand function means that money is related to the hypothesised independent variables like income and the rate of interest. Constancy in

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in the form of rates of change. This was used for ascertaining the required rate of growth in money supply consistent with a desirable rate of inflation or zero inflation.²

In most empirical work, the focus is on income velocity because conceptually and estimation wise, this is convenient. So the estimation of the velocity, the true and the relevant one, remains problematic. In fact, the true and the relevant velocity may actually be unstable as well as higher in value than the most referred one. As Shukla (1997) has shown that in India, the transaction velocity of money has been far greater than the income velocity of money. With the inclusion of black transactions, the transaction velocity rises further.

Money is after all, a non-interest bearing asset. Rates of interest on other financial assets are indicators of the opportunity cost of holding cash balances. Higher the interest rate, higher is the opportunity cost and therefore, lower will be the amount of cash balances held. Assuming interest rate to remain stable in the short run, we can afford to ignore it. So, we can state the money demand function as,

\[ M_d^* = L_f(P, y) \]  

(3.10)

Assuming that money supply is exogenous, equilibrium in the money market under the Classical hypothesis requires that aggregate demand for money should adjust through the price level to match the existing supply of money.

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2 As we have noted earlier that the equation of exchange is one of the constituents of the Fund stabilization package. From the QTM it follows that,

\[ \frac{dM_s}{M_s} = \frac{dP}{P} + \frac{dy}{y} - \frac{dV}{V} \]  

(3.9A)

or,

\[ \frac{dM_s}{M_s} = \frac{dP}{P} + g_y \]  

(3.9B)

with V being constant as also the rate of growth of output.

If the level of output corresponds to natural level of unemployment or what the Classicals would argue the ‘full employment’ level of output, then \( g_y \) is zero. For a growing economy it is not so, the rate of growth of output is assumed to be constant rather than zero. This still establishes the direct link between money supply growth and inflation, as output growth is independently given by real factors.
3.2.2 The Keynesian money demand function

Keynes (1936) argued that money is also held as a store of wealth for inter-temporal exchanges apart from as a medium of exchange for temporal transactions.

When money is held for inter-temporal exchange, expectations regarding future state of affairs attain importance. The alternative form for holding money is assumed to be a financial asset, say bond, the interest rate on which captures the long-term state of expectations. The choice, therefore, boils down to whether to hold money or to hold bond. Keynes (1936) called this additional demand for holding money as ‘speculative demand’ for money, which is hypothesised to be inversely related to the interest rate. The total demand for money can, therefore, be written as,

\[ M_d = M_d^T + M_d^S. \]  

(3.11)

In the light of the Keynesian development of money demand theory, we can now examine the QTM. It is evident that from the two formulations that it is only the speculative demand for money, which distinguishes Keynesian demand for money from the Classical one. Money supply is assumed to be controlled by the monetary authority both under the Classical system and the textbook presentation of the Keynesian system. The only manifestation of a change in money supply is the price level under the assumption of a stable velocity of circulation and exogenously determined level of output. The above formulation of QTM therefore, establishes the Classical dichotomy, which segregates the determination of real variables from the monetary variables. Keynes (1936) broke the segregation by formulating the demand for money a function of both income and the interest rate. In the Keynesian system, with the additional assumption of wage rigidity, money loses its neutrality.

Long-term expectations exert influence on holding of money which casts doubt on \( V \) to be treated as stable as it becomes a function of the interest rate as well.

3.2.3 Friedman’s money demand function

The New Monetarism under the leadership of Milton Friedman resurrected the old QTM in the garb of a completely new look function in the context of the challenges posed by Keynes. Friedman (1956) treated money only as one of the assets in conjunction with the other major types of assets in the economy. Whereas QTM was preoccupied with money as
the medium of exchange and not as an asset, Friedman's money demand function is elaborate
and all encompassing.

We can express the money demand function for an individual wealth holder as:

\[ M_d = P \cdot f(y, w, R_{M}^*, R_{B}^*, R_{E}^*, u) \] (3.12)

Where \( M, P, \) and \( y \) have the same meaning as in equation 2.3 above; \( w \) is wealth in
non human form; an asterisk denotes an expected value, so \( R_{M}^* \) is the expected nominal rate of
return on money; \( R_{B}^* \) is the expected nominal return on bonds including expected changes in
their prices; \( R_{E}^* \) is the expected nominal return on physical assets including expected changes
in their assets and \( u \) is a portmanteau symbol standing for other variables affecting the utility
attached to the services of money. \( y \) is Friedman's notion of permanent income, \( Y_p \) - a
weighted average of current and past values of income on the assumption that the ratio of
permanent income to wealth is roughly constant.

3.3 The emerging issues and the velocity of circulation.

1. The underlying assumption of the quantity theory of money is the constancy in
the income velocity of circulation. Here, as noted above, we must distinguish between the
stability of the money demand function and constancy in the velocity of circulation. Money is
not only demanded for transactions related to the final goods and services of the white
economy but there are transactions other than those related to economic activities like
financial transactions, second hand asset and black transactions. Since in the majority of
cases, we test for income velocity of circulation, the 'true' transaction velocity of circulation
remains untested and the behaviour unknown. Because of its coverage, the estimation of the
true velocity of circulation remains a difficult task.

2. The transaction velocity of money is far above the oft-quoted estimated income
velocity. Taking into consideration the black economy, the transaction velocity tends to be
even greater. Since the transactions other than that of final goods and services of the white
economy tend to be dominated by the financial transactions, the transaction velocity tends to
be unstable and fluctuating in nature. The markets for financial assets clear almost instantaneously and expectations being a major factor, the transactions related to financial assets in all likelihood will not be stable. The problem gets compounded with the black economy. Since the black consumption is likely to react to black income with a shorter lag and black saving is often invested in informal credit market and other assets or sectors with high rates of return, the true velocity of transaction becomes volatile and greater than the income velocity.

3. The other problem pertains to the nature of the data we use. In order to capture the true velocity of circulation, the appropriate database should be weekly or monthly. In annual data, the short-term fluctuations are unlikely to get captured. This becomes difficult for testing as though the weekly data for money is available but the corresponding weekly or monthly data for income is not available.

4. In the face of control of money supply by the central bank, new money forms of IOUs (‘I owe you’) types can emerge for transactions restricted within the private sector as a substitute for fiat money. In estimation of velocity of transaction, neither the numerator nor the denominator, are therefore, properly represented. Though the money supply measure is authenticate, the emergence of near money forms may actually inflate the actual level of money circulating in the economy. On the other hand, income estimates reveal only a partial picture of the functions money performs in the economy as a medium of exchange.

3.4 Monetary transmission mechanism under Keynes and Friedman

One important aspect of monetary economics follows from the money demand function as formulated by Keynes and Friedman and the overall construction of the macro framework, the monetary transmission mechanism. Since, the money demand function differs, the transmission mechanism differs accordingly amongst the different schools, the Keynesians and the Monetarists, in particular.

The monetarists assume that changes in money stock and aggregate demand to be directly linked whereas, the Keynesian variant claims that adjustment in asset prices as a result of changes in money supply leads to an increase in spending.
Keynes's ‘The General Theory of Employment, Interest and Money’ (1936) advanced an alternative analysis of the factors behind the Great Depression and put forward a framework of macroeconomic analysis to explain economic fluctuations in general. According to Keynes, it is fiscal policy rather than monetary policy, particularly under depressionary conditions with interest rate touching the floor level, which should be used as a major policy tool to guide and monitor the level of economic activity.

The developments during the seventies cast serious doubt to the further pursuance of expansionary fiscal policy. The Quantity theorists disapprove of a much narrower transmission mechanism as envisaged in the Keynesian framework. For Keynes, the emphasis is on interest elasticity of money demand and investment spending. The Monetarists, on the contrary, envisage a much broader and more direct impact on spending when individuals seek to dispose of, what they regard as excess money balances by incurring expenditure on purchases of securities, durable and semi-durable goods. Keynes, on the other hand, concentrates on a narrower range of marketable assets, bond and the interest rate on bond.

Some emerging issues may be mentioned here,

For Keynes, there is a complete ordering of markets in terms of their relative speeds of adjustment (Bhaduri 1986). The market for financial asset is affected first which adjusts faster, followed by the market for physical goods which adjusts only after the substitution between bond and money has adjusted to a change in the rate of interest on bonds. This renders the transmission mechanism sequential in time.

The way money demand function has been formulated by Friedman, leads to the problem of aggregation. The theory is based on conventional assumption of microeconomic rationality of each individual maximising income from his wealth holding. As Bhaduri (1986) has argued that individual demand function for money cannot be added up without taking into consideration changes in debit and credit position of individual agents. This is particularly so, when credit money itself is the debt obligation of the banking system. Friedman (1956) has also concurred saying that there is a possibility that the money demand may depend on the distribution of y and w amongst the individuals and not merely on their aggregate values.

The other important aspect of the Monetarist theory is the empirically testable version of the model. The testable version is similar to that of Keynes’s money demand function. This
is because, specification of the variables contained in the equation are empirically non-observables. If the expected forms, w and u are dropped and the equation (3.12) boils down to,

$$M_d = P.L\left(\frac{Y}{P}, i\right)$$  (3.13)

This empirically testable version is very similar to what, in fact, Keynes suggested. If the original version is difficult to test, the formulation remains a hypothetical one. Friedman’s formulation of money demand is necessarily a long period one as evident from the inclusion of permanent income. In the long run spanning the lifetime of an individual, lot of things are variable, including distribution of income and the technology. Technology today is changing the nature of commerce across the borders and it is likely to have some impact on the money demand as well. The money demand function formulated for such a long period may itself become unstable. Keynesian money demand function is a short run construct.

Davidson (1970) in his critique for Friedman’s formulation of the money demand function has brought to the fore the elements Friedman ignored in his money demand function. In Friedman’s framework, there is no uncertainty since expectations are realized. The essential characteristics of a monetary economy, the existence of market institutions, organization and constraints, like money contracts, the legal system, sticky money wage rate, carrying and transactions costs along with zero elasticities of production and substitution for money that a monetary economy function differently compared to the one described by the Walrasian general equilibrium which underlies Friedman’s theoretical construct.

The existence of the black economy infuses uncertainty into the system. The speculative activities can also go up in presence of the black economy. These aspects are likely to reinforce the tendencies Keynes (1936) emphasized in his formulation of the money demand function.

In response to narrowness of assets, it is of utmost importance to know how does the money supply increase. In a capitalist economy, where money is the debt obligation of the banking system, it is created only on demand. This is the basic aspect of credit creation. So it is difficult to argue for the existence of excess money holding and consequently their spending on a range of assets as argued by Friedman. This puts into question whether money...
supply is controllable. If not, then an effective way of controlling money supply is to control demand. This explains why fiscal deficit is targeted in the Fund stabilization package and its implications for the monetary nature of the model.

Credit is created in response to demand which leads eventually to an increase in money supply. The fact that inflation is determined by money supply alone disregards another basic fact that price is determined as a mark up over cost basis. The assumption that growth rate of output is exogenous to the system, ignores the role of credit in facilitating production. The contention that output is determined by supply side factors independent of demand goes against the Keynesian theory of income determination. Production takes place for the market and it is the size of the market, which determines the volume of production. In short, the assumption that the growth rate can be treated as constant and independent of money supply is, therefore, not tenable.

3.5 The monetary transmission mechanism

Highlighting the role of credit vis-a-vis money in the discussion of the transmission of monetary and real shocks is a comparatively recent development. Concerns about financial fragility, banking failures, debt default and loan rationing have redirected attention to the credit markets.

Bernanke and Blinder (1988) advocated for a symmetric treatment of money and credit in the explanation of aggregate demand and movements in GDP. Standard macroeconomic analysis, represented by the conventional IS-LM model can not recognise the operation of an independent credit market as it treats bank assets and bank liabilities asymmetrically, while money is assigned an important role in the determination of aggregate demand but bank loans, the assets of the banking system are clubbed together with other debt instruments in a bond market and relegated from the analysis by taking recourse to Walras’s law.3

3 The asset side of the banking system are totally neglected under the assumption that bond financing and bank loans are perfect substitutes. This requires the returns on bank loans and bonds are different only by stochastic disturbances. Bernanke and Blinder (1988) have treated loans, bonds and
It is argued that availability of credit directly impinges on economic activity, which may be a preferred option to either control of money or inflation rate.

Stiglitz (Stiglitz and Weiss 1981) in a number of papers seems to have contested this analysis. He assigns a central place in the transmission of monetary impulses to loan rationing. This assignment is supported with the observation that variation in the real rate of interest remains comparatively small over the course of the business cycle. Changes in real rates appear to be insufficient and inadequate as a conduit of monetary impulses. Loan rationing offers on the other hand, a powerful, if somewhat asymmetric, conduit since contractionary monetary impulses are more reliably transmitted than expansive impulses.

The impact of credit rationing on real investment expenditures depends crucially on the accessibility of rationed firms to alternative forms of credit. Trade credit provided between non-financial firms is important in USA. In India, non-bank financial companies (NBFCs) and the unorganised, informal credit markets are alternative sources of credit, though at a higher cost.

In view of the role of credit in the transmission mechanism, the orthodox treatment of money supply needs to be reexamined.

3.6 Post Keynesian theory of money supply

The mainstay of any standard macroeconomics textbook is the exogeneity of money supply. The exogeneity of money supply as argued by the monetarists and presented in the standard textbook, implies that the central bank can control the volume of money supply through its control over the high powered (or, reserve) money. In the standard IS-LM model, the movement of the LM curve is independent of the IS curve and it is controlled by the

money as different kinds of assets. The IS-LM analysis proceeds in one of two ways. Either money is a substitute only for financial assets, say ‘bonds’ or there is a general substitution over all assets, as Brunner and Metzler (1995) have argued. To a monetarist, this view of the transmission process is highly restrictive and mechanical. They argue that the analysis of the transmission process is incomplete without the money and credit markets and their interaction. Consequently there has been a tendency to discuss problems associated with the credit market outside the major macro economic paradigm.

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central bank. Post Keynesian economists have questioned this assumption by arguing that the money supply is endogenous to the system rather than being exogenous. Those who support and believe such endogeneity of money supply are branded as 'accommodationist' or 'horizontalist' (Moore 1985) and the other school, the orthodox one, is known as ‘verticalist’. This is because, in the former, the money supply curve can be plotted as a horizontal curve against interest rate along the vertical axis while for the latter, the curve can be plotted as a vertical line, the distance from the vertical axis indicating the level of money supply fixed by the central bank.

Post Keynesians focus on credit, rather than on money. Credit is generated within the system by the level of economic activity. The formulation of the credit function reflects changes in bank lending to industry, taken to be determined by the needs of the industrial sector for working capital. These needs are taken to be determined by the expected level of transactions, which is proxied by two alternative sets of variables, either changes in costs or changes in the expected level of demand for the output of the firm. On the basis of this and other assumptions, post Keynesians argue that attention ought to be paid to credit and its availability rather than on monetary aggregates. Money is essentially credit driven and demand determined. Money is not just the result of intervention by monetary authorities but is created as a byproduct of the loans provided by the banking system. Endogeneity of money supply, they argue, is not a logical necessity, but an institutional reality. It is Kaldor (1982) who set out the proposition very succinctly.

It is fiat money printed as the state’s liability, i.e., outside money, which illustrates the case of a truly exogenous money. In a world where only paper currency was used and printed by the monetary authorities, stock of money could be treated as exogenous.

3.7 Endogeneity of money and the monetarist doctrine

The monetarists argue that the central bank can target inflation by exercising its control over the volume of money supply. The money supply can be expressed as follows,

\[ M_s = mm.H \]  \hspace{1cm} (3.14)
Where ‘mm’ is the money multiplier, ‘H’ is the total stock of reserve money and $M_s$ is the total money supply. The money multiplier $mm$ equals $(1 + cd) / (cd + rd)$, where ‘cd’ is the ratio between currency and demand deposit of the public and ‘rd’ is the ratio of demand for reserve and deposits of the banking sector.

Monetary targeting, i.e., monitoring the level of high-powered money to monitor the level of money supply, can be expected to be effective only under the assumption of a stable money multiplier. Two critical assumptions need to be satisfied: one, banks and non-bank public maintain stable reserves and cash to deposit ratios and two, exogeneity of reserve money. The first condition, which requires the banking system to remain fully loaned up, is untenable because it is the demand for loans which determine primarily whether the banking system would remain fully loaned up, in the context of endogeneity of money supply. Banks will be accumulating reserves if they do not find any taker. But the profit maximising behaviour of the banks sooner or later will impel the banks to extend loans.

The concept of endogeneity is important because this alone reverses causality in the quantity theory where causality is argued by the monetarists to run from money supply to price level. Once we recognise that money supply is largely endogenous, the question is, what happens to the fundamental proposition of the monetarist doctrine. The policy recommendation of the monetarist depends crucially on controllability of money supply. With respect to the determination of price level, if we accept Kaldorian form of endogenous money supply, the price level is determined by mark up over cost basis. From the quantity theory of money, given $k$ and $y$, price level $P$ is determined once $M$ is known. But if money supply is determined by demand for credit, some other explanation is required for the determination of the price level. The foregoing discussion needs to be reviewed in the context of the black economy.

1. The size of the economy is larger than what is presumed because of the existence of the black economy. The demand for money or credit does not originate only from the realm of the white economy but also from a variety of non-recorded transactions, e.g., financial transactions related to the black economy.

The state of trade, which reflects the white economy activity is the most important determinant of credit. But because of black economic activities, the state of trade does not
reflect the true picture of the economy. Costs are inflated by the industry and the mechanism of price fixation is flawed. Profits are suppressed to evade tax on it. Output is underestimated. So the demand for credit is different than what would have been the case in absence of the black economy.

The monetarists' measure of the black economy on the basis of the currency/ money demanded to carry out the black transactions is based on the fact, indicate that there are transactions related to the black economy, which are missed out in the general conventional estimation of the money demand function. These transactions, which remain otherwise untraceable, are captured by linking it to a hypothesized determinant, say an indicator of the tax structure, of such transactions. The conventional empirical testing of exogeneity or endogeneity of money supply, therefore, remains partial.

Two issues emerge from this: first, the estimates based on white data are unreliable because of transactions related to the black economy are not fully captured, and second, there are sources of demand for credit, which lie outside the realm of white economic activities.

2. There are other sources of demand for loans that originate within the system but independent of nominal income (P, y). Demand for loans for speculative purposes and a host of other black transactions are carried out in cash. So the origin of demand for loans lies in activities not related to P, y (or, GDP) and therefore, money supply increases independent of P, y. This in turn, can cause price or output or some combination of these to increase. Howells (1996) argues that there may be some demand for loans and consequently a demand for deposits may be created to eventually cause Py. It may appear that the money supply causes P and/ or y to rise as the increase in money supply has been effected by some source other than those related to GDP.

3. The stability of the money multiplier implies that both cd and rd should remain stable. This requires that money should continue to remain confined to the circular flow of income. As soon as we accept that there are, in fact, lot of transfer activities related to the black economy which amount to withdrawal from and injection into the circular flow of income. The transactions of this type of transfers raise the demand for money with no commensurate rise in income. The stability of the money multiplier is likely to be affected, as
'cd' is subject to fluctuations. As people hold on to the cash balances and indulge in transfer payments, velocity of circulation is also likely to be affected.

4. There can be significant inflows and outflows of money through the parallel market as remittances to be sent to India are often short circuited through the 

hawala market. Similarly, smuggling generates demand for foreign exchange to be met illegally. Fake invoicing of trade transactions also lead to the generation of demand and supply of illegal foreign exchange. All these can affect the potential level of money supply.

3.8 Monetary targeting in India

Monetary targeting was adopted only in the mid. 1980s following the recommendations of the Chakravarty Committee recommendations. It was argued that relative stability in the money demand function, administered interest rate structure, limited capital flow across the border and absence of innovation in the financial market would ensure effective monetary targeting.

The stable cash to deposit ratio of the household sector is difficult to accept in the presence of the black economy. There may be leakages from the circular flow to the unorganised credit market, which does not operate under the fractional reserve system.

One method for quantifying the size of the black economy is the monetarist method, as mentioned earlier. Currency is argued to be the vehicle for all black economy transactions. On the basis of an estimation of currency demand, the size of the black economy can be estimated. (National Institute of Public Finance and Policy 1985; Bhattacharyya 1998). The underlying approach is, of course, the elastic responsiveness of currency to its demand. Financial transactions, portfolio balance variation of the household sector, black economy transactions other than the afore-mentioned ones, may render currency demand highly unstable. In case of leakage from the circular flow for some periods, the money multiplier becomes unstable.

But the monetisation of fiscal deficit till recently and increase in capital inflows could render the base money uncontrollable by the authority.
3.9 Sectoral balance and flow of funds

The next step in our argument is the introduction of banks and monetary categories in a simple framework as usually presented in the literature (Fitzgerald 1993). The presentation of such a framework will enable us to identify how the different macro relationships need to be reformulated in presence of the black economy.

We will make an attempt to establish the link between the monetary variables and the real variables. Our objective is to develop the accumulation balances of the economy and to lay out the black economy in its full financial form.

We assume that households hold only cash balances (as workers do not save by assumption and capitalists do their saving in their enterprises before distributing dividends) and do not receive any bank credits. In any case, deposit holding and credit taking by households could be included in our model without great difficulty.

To build up the flow of funds, annual changes in the financial balances are defined for each of the four sectors: the government sector, enterprise sector, households and the monetary sector. The government sector balances its fiscal deficit (D) by an increase in its net bank borrowing ($\Delta BC_g$), borrowing from the private sector ($\Delta B$, where B refers to the stock of debt) and by net borrowing from abroad ($\Delta F_g$).

\[ D = \Delta BC_g + \Delta B + \Delta F_g \]  \hspace{1cm} (3.15)

Second, changes in the financial balance sheet of the enterprise sector are made up of changes in deposits in the banks ($\Delta N$), funds lent to the government and their own fixed investments ($I_w$). These constitute the uses of the funds. The sources of funds for this sector are ‘retained’ or reinvested white profits ($s_wP_w$), net new credit from the banks ($\Delta BC_p$), funds from abroad ($\Delta F_p$) and loans obtained from the informal credit market, the source of which is assumed to be black funds ($L_b$). The accumulation balance for the enterprise sector is thus,

\[ s_wP_w + \Delta BC_p + \Delta F_p + L_b = \Delta N_w + B + I_w \]  \hspace{1cm} (3.16)

Third, households require cash balances to transact their consumption expenditure. The increased cash balances ($\Delta H$) needed by households is a proportion ($u_1$) of the increase in wages plus distributed profit income after tax. This implies that there is an element of
macroeconomic savings implicit in the demand for transactions cash balances by the household sector. In our single period model,

$$\Delta H_w = u_1 \Delta \{W + (1 - s_w)P_w - T\}$$ \hspace{1cm} (3.17)

Finally, we have the banking sector which includes the central bank. The uses of funds which is reflected in increased assets are made up of increased bank loans to the enterprise sector ($\Delta BC_p$) and to the government ($\Delta BC_g$). The sources of funds are increased liabilities in the form of deposits ($\Delta N$), and currency ($\Delta H$).

$$\Delta BC_p + \Delta BC_g = \Delta N + \Delta H$$ \hspace{1cm} (3.18)

Where, $\Delta N = \Delta N_w + \Delta N_b$.

A significant proportion of informal sector saving may be black money. Black investment is partly financed by black saving out of black profit ($s_bP_b$) and partly by loans obtained from the informal sector. One avenue of black investment is informal sector saving ($I^3_{pb}$), this is the amount, which boosts the sources of finances. This is one of the channels of black investment. White private sector investment also uses the funds available in the informal credit market ($L_b$). Black transactions also need to be carried out in currency. We assume that the demand for currency for black transactions is a linear function of black profit. The other manifestation of black saving is deposit holding in bank.

$$s_bP_b + B_{pb} + u_2 \Delta P_b = I'_{pb} + I^3_{pb} + \Delta N_b + L_b + \Delta H_b$$ \hspace{1cm} (3.19)

Since, the unorganised banking sector does not operate on the fractional reserve system,

$$B_{pb} = I^3_{pb} \text{ and } I'_{pb} \text{ refer to the other channels of black investment, excluding } I^3_{pb}.$$ 

These five flows of funds balances are summarised in the Table below. By definition, they add up too the accumulation balance for the economy as a whole, as domestic financial transactions among these five sectors cancel out once the sectors are aggregated.
Table 3.1: Sectoral Accumulation Balances

<table>
<thead>
<tr>
<th>Sector</th>
<th>Sources</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>$\Delta B C_g + \Delta F_g + \Delta B$</td>
<td>$D$</td>
</tr>
<tr>
<td>Enterprises White</td>
<td>$s_w P_w + L_b + \Delta B C_p + \Delta F_p$</td>
<td>$\Delta N_w + \Delta B + I_w$</td>
</tr>
<tr>
<td>Black</td>
<td>$s_b P_b + B_{pb} + u_2 \Delta P_b$</td>
<td>$I_{pb} + I'_pb + \Delta N_b + \Delta H_b + L_b$</td>
</tr>
<tr>
<td>Households</td>
<td>$u_1 \Delta {W + (1 - s_w) P_w - T}$</td>
<td>$\Delta H_w$</td>
</tr>
<tr>
<td>Banks</td>
<td>$\Delta N + \Delta H$</td>
<td>$\Delta B C_p + \Delta B C_g$</td>
</tr>
<tr>
<td>Economy</td>
<td>$u_1 \Delta {W + (1 - s_w) P_w - T} + u_2 \Delta P_b + s_w P_w + s_b P_b + \Delta F = I_w + I'_pb + D$</td>
<td></td>
</tr>
</tbody>
</table>

The definition of changes in money ($\Delta M$) covers increases in cash balances ($\Delta H$) and bank deposits ($\Delta N$):

$$\Delta M_s = \Delta H + \Delta N$$

(3.21)

From the asset side of the balance sheet of the banking system, the money supply is defined as the sum credit extended to the government and the private sector.

$$\Delta M_s = \Delta B C_g + \Delta B C_p$$

(3.22)

The equality of the supply of and demand for money must hold *ex post* in accounting terms.

The demand side for money can be derived by substituting the expression for $H$ and $N$ as follows from equations (3.18) to (3.21) we obtain,

$$u_1 \Delta \{W + (1 - s_w) P_w - T\} + (u_2 \Delta P_b + S_b - I'_b - L_b) + (L_b + S_w + \Delta B C_p + \Delta F_p - I_w - \Delta B) = \Delta M_d$$

(3.23)

This is a rather heterodox ‘demand for money’ expression not dependent on aggregate output as envisaged in the Monetarist theory. This shows sectoral liquidity requirements. Equality between money supply and money demand follows from the definition of sectoral balances for the economy as a whole. Equating money supply and
money demand,

\[ u_1 \Delta \{ W + (1 - s_w) P_w - T \} + (u_2 \Delta P_b + S_b - I_{pb}) + (S_w + \Delta F_p - I_w) = \Delta BC_g + \Delta B \] (3.24)

or, \[ u_1 \Delta \{ W + (1 - s_w) P_w - T \} + u_2 \Delta P_b + S_w + S_b + \Delta F = I_{pw} + I'_{pb} + D \] (3.25)

The way in which monetary equilibrium is achieved depends on the stance of the monetary policy. Monetary equilibrium is established as part of the macroeconomic process of adjustment to the deficit. Since deficit affects both money demand and money supply in the same way, to talk about monetary causality is not meaningful. The correlation between money and price as observed in the empirical studies is not due to the impact of money supply on price.

The above presentation shows how the usual understanding of the monetary sector needs to be reviewed in the presence of the black economy. The empirical literature as discussed below, does not recognise the influence of the black economy in India. We then proceed to empirically test various relationships amongst the monetary variables. In absence of incorporation of the black economy, the empirical analysis remains deficient.

3.10 Empirical studies on monetary aspects

Recently there have been attempts to consider transactions rather than income in empirical works related to the estimation of money demand function. Palley (1995) estimated money demand functions for (USA) M1 and M2 using consumption spending (rather than GDP) with proxy variables for volume of transactions in real estate and in financial assets. Results showed improvement compared to the case where GDP is the only explanatory variable. Howells (1996) has argued precisely the same for UK that why transactions instead of income might yield a better picture of the behaviour of the money demand. He has shown that while transactions velocity of money (V_T) is far above income velocity of money circulation (V_y) it exhibits a fluctuating tendency. V_y has been witnessing a downward tendency while V_T has remained more or less stable. This is also corroborated by a higher growth of transactions compared to income, i.e., a rising (PT/Py). Shukla (1997) has come to
a similar conclusion for India. He has shown that transaction velocity has been far above the income velocity with noticeable fluctuations in the recent years. If we take into consideration black as well as white income, transactions velocity exceeds the velocity based on the white data only. He argues that the structural composition of national income with a growing share of services sector contribute to such behavioural pattern. In India, Rangarajan (1998) argues that though several instances have been cited to the instability of money demand function, there is an overwhelming empirical evidence (Parikh 1994; Vasudevan 1975; Jadhav 1994; and Arif 1996) in favour of a stable money demand function in India. Biswas and Saunders (1998) also find a stable relationship between money supply and nominal income and existence of a feedback between the two in the short run.

Apte (1997) finds an interesting result with regard to the stability of M1 and M3 in India. He observes that a stable relationship between real money and real income and interest rate emerges only after adding the real stock prices in the demand function using the full sample of monthly data from January 1980 to July 1995. This means that empirical studies based on annual data cannot capture short-term fluctuations in the velocity of circulation. Because of the inclusion of stock prices, the velocity refers closely to the transaction velocity. With regard to M3, both with and without stock prices, money, index of industrial productivity (IIP) and call rate are related. The uni-directional causality runs from stock prices to M3 while M3 and IIP have bi-directional causality.

Below we undertake, simple tests to find out the long-term correspondence between money supply on the one hand and nominal income on the other. In the literature, several techniques have been applied to answer the same question. We prefer to adopt the most popular and widely referred textbook technique.

3.11 A review of literature on empirical studies on the role of credit

There have been several attempts to understand the role of credit in the macro economy. Kaldor (1982) and Moore (1988) are notable studies in the initial phase. It was followed by a study by Friedman (1983) for the U.S. economy. This was supported by Bernanke and Blinder (1988), Brunner and Metzler (1985). In India Koparkar (1998) has
examined the long run relationship among bank credit, money supply, foreign exchange reserves and industrial output using multi-period cointegration. He concludes that money supply is endogenously determined. This is in sharp contrast with the monetarist assumption that money supply is determined independent of aggregate output. Rath (1999) has empirically tested the validity of the three models of money supply determination as suggested by Palley (1995). The study finds evidence for accepting the mixed portfolio loan demand approach for India. Therefore, he argues that in India, money supply is partly endogenously determined, by a combination of policy stance of the monetary authority and private initiatives. Joshi and Bhattacharyya (1999) have studied the dynamics of money supply process in India. They conclude on the basis of their empirical observations that composite sectoral credit aggregates, in particular, government borrowing and commercial borrowing, could explain the behaviour of money stock variation in the Indian economy. Credit view, and the concept of endogenous money, at least notionally, they argue, have some relevance in case of India.

3.12 Empirical results

In the following section, we empirically study the monetary dynamics in India for the period 1971-97. The relationship among the real and the monetary variables is a widely researched area in India. In what follows, we restrict ourselves to a bivariate framework. We deal with two measures of money supply, M1 and M3, narrow and broad measure of money supply respectively, GDP at market prices, current and real (GDP and GDPC respectively),

3 Palley (1994) in fact distinguishes between three competing schools. The orthodox school is labeled as “pure portfolio approach”, the second one which corresponds to the Post Keynesian school is the or ‘pure loan demand’ or, ‘accommodationist’, and the third is “mixed portfolio loan demand approach”. The third corresponds to the Post Keynesian “Structuralist” view of endogenous money. The thrust in the argument of the last two schools derive from Kaldor’s seminal argument of the endogenous character of the money supply process. The last two category of models differ from the orthodox approach in emphasising the role of bank lending rather than working of the multiplier in the money supply process. On the other hand, the critical difference between the “pure loan demand” and “mixed portfolio loan” demand is the importance attached to private initiative of banks in accommodating increases in loan demand apart from the stance of the monetary authority, which is common to the latter two models.
price deflator (p), reserve money (rm), credit from the banking sector (Cr) and bank credit to the commercial sector (bcc).

In order to find out the nature of relationship, we follow the procedure as followed in the last chapter. The first step involves testing for stationarity of the variables so as to study the order of integration. We report below the ADF test statistics of the logarithm of the variables. The lag lengths are chosen such that the last lag is statistically significant. We give below the ADF test statistics for only trend at levels.

Table 3.2: Estimated ADF test statistics for Level and First Difference

<table>
<thead>
<tr>
<th>Variable</th>
<th>Level</th>
<th>First Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>With trend</td>
<td>Without trend</td>
</tr>
<tr>
<td>lm1</td>
<td>-1.53 (0)</td>
<td>-6.32***(0)</td>
</tr>
<tr>
<td>lm3</td>
<td>-4.34 **(0)</td>
<td>-5.20***(0)</td>
</tr>
<tr>
<td>lrmb</td>
<td>-3.19 (0)</td>
<td>-4.73***(0)</td>
</tr>
<tr>
<td>lgdp</td>
<td>-0.409 (2)</td>
<td>-4.60***(1)</td>
</tr>
<tr>
<td>lgdpC</td>
<td>-2.275(0)</td>
<td>-5.07***(1)</td>
</tr>
<tr>
<td>lp</td>
<td>-3.48*(1)</td>
<td>-4.28***(0)</td>
</tr>
<tr>
<td>lcr</td>
<td>-0.36 (0)</td>
<td>-2.70*(0)</td>
</tr>
<tr>
<td>lbcc</td>
<td>-0.60 (0)</td>
<td>-4.54***(0)</td>
</tr>
</tbody>
</table>

Note: Numbers inside the brackets denote the lag length.

* 10 % level of significance, ** 5 % level of significance, *** 1 % level of significance

From Table 3.2 above, we observe that all the variables under observation are integrated of order one, i.e., I(1). The deviation from the normal behaviour are the following: logarithm of M3, truly speaking is I(0) as the level itself shows that it is stationary with trend. With time trend lp is also I(0) at 10 percent level of significance. Given this, we propose the following cointegrating equations.

The first and the second equation test whether M1 and M3 bear any long-term relationship with the nominal GDP. This in effect studies the income velocity of circulation with regard to narrow and broad money. The third and the fourth propose to study the
neutrality of money, whether M1 and M3 affect real output and vice versa in the long run. Credit is argued to be related to nominal and real GDP better than the usual definition of money supply. We test this for the bank credit to commercial sector as the total credit includes credit extended to the government as well. Finally, we test the relationship between reserve money and broad measure of money supply, which would highlight the behaviour of the money multiplier.

We follow the Engle and Granger (Granger 1987; Enders 1994) two-step procedures to find out if they are cointegrated in the long run.

If \{y_t\} and \{z_t\} are I(1), the next step is to estimate by OLS the following long run equilibrium relationship.

\[ y_t = \beta_0 + \beta_t z_t + \varepsilon_t \]  

(3.26)

If \{y_t\} and \{z_t\} are cointegrated, the actual residual sequence from this equation \{\varepsilon_t\} estimated. We consider the autoregression of the residuals,

\[ \Delta \varepsilon_t = a_t \varepsilon_{t-1} + \varepsilon_t \]  

(3.27)

If the standard DF or ADF test suggest \{\varepsilon_t\} is stationary, we can argue that \{y_t\} and \{z_t\} are related to one another and therefore, are cointegrated.

Table 3.3: The ADF test applied to the Residuals of Hypothesised Relationships

<table>
<thead>
<tr>
<th>Variable Pair</th>
<th>Constant</th>
<th>Slope</th>
<th>ADF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (LM1, lGDP)</td>
<td>-2.052</td>
<td>1.025</td>
<td>-3.66**(2)</td>
</tr>
<tr>
<td>2. (LM3, lGDP)</td>
<td>-3.714</td>
<td>1.229</td>
<td>-2.07 (0)</td>
</tr>
<tr>
<td>3. (LM1, lGDPC)</td>
<td>-23.52</td>
<td>2.831</td>
<td>4.33***(0)</td>
</tr>
<tr>
<td>4. (LM3, lGDPC)</td>
<td>-29.34</td>
<td>3.38</td>
<td>-2.54 (0)</td>
</tr>
<tr>
<td>5. (ICr, lGDPC)</td>
<td>-3.32</td>
<td>1.206</td>
<td>-0.698 (0)</td>
</tr>
<tr>
<td>6. (ICr, lGDPC)</td>
<td>-28.39</td>
<td>3.315</td>
<td>-2.00 (0)</td>
</tr>
<tr>
<td>7. (lbcc, lGDPC)</td>
<td>-8.38</td>
<td>1.202</td>
<td>-0.949 (0)</td>
</tr>
<tr>
<td>8. (lbcc, lGDPC)</td>
<td>-28.77</td>
<td>3.300</td>
<td>-1.961 (0)</td>
</tr>
<tr>
<td>9. (LM1, lrm)</td>
<td>1.33</td>
<td>0.891</td>
<td>-1.251 (0)</td>
</tr>
<tr>
<td>10. (LM3, lrm)</td>
<td>0.323</td>
<td>1.072</td>
<td>-3.07 (0)</td>
</tr>
</tbody>
</table>

Note: Numbers inside the brackets denote the lag length.
Constant and slope have been found to be highly significant in all the cases.

The level of significance of ADF test statistics of residuals would indicate whether the two variables are cointegrated. Out of our proposed relationship, we can see that it is M1 which is related to both nominal value of GDP and real GDP. This indicates income velocity of circulation in regard to M1 is stable. Money is not neutral as far as M1 is concerned. Of these two cointegrating equations, we proceed to find out the direction of causality through ECM.

In the Chart below, we can see that the income velocity of money circulation for M3 has been gradually declining, while for M1 and currency, it is stationary with initial fluctuations have substantially tapered off.
Chart 3.1 Income Velocity of Circulation: M1, M3 and Currency

![Chart showing income velocity of circulation for M1, M3, and currency over the years 1971 to 1997.]


Table 3.4: Estimation of Error correction Model: M1 and GDP nominal

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Explanatory variable</th>
<th>Coefficient</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>DlM1</td>
<td>constant</td>
<td>0.134</td>
<td>0.0279</td>
</tr>
<tr>
<td></td>
<td>error (-1)</td>
<td>-0.471</td>
<td>0.084*</td>
</tr>
<tr>
<td></td>
<td>dIM1(-1)</td>
<td>-0.0001</td>
<td>0.999</td>
</tr>
<tr>
<td></td>
<td>dIGDP(-1)</td>
<td>-0.008</td>
<td>0.9822</td>
</tr>
<tr>
<td>DlGDP</td>
<td>constant</td>
<td>0.079</td>
<td>0.0051</td>
</tr>
<tr>
<td></td>
<td>error (-1)</td>
<td>0.176</td>
<td>0.141</td>
</tr>
<tr>
<td></td>
<td>dIM1(-1)</td>
<td>0.137</td>
<td>0.221</td>
</tr>
<tr>
<td></td>
<td>dIGDP(-1)</td>
<td>0.270</td>
<td>0.120</td>
</tr>
</tbody>
</table>

Note: Numbers inside the brackets denote the lag length.

* 10 % level of significance, ** 5 % level of significance, *** 1 % level of significance
Coefficient of only one error, when IM1 is the dependent variable, is significant. This implies M1 responds to the short-term deviation from equilibrium. M1 can be considered to be weakly endogeneous. This is understandable as demand for transactions generate need for M1 and the response of the monetary authority is accommodative in this regard. In the table below we report the estimated results with respect to M3.

The estimated result shows that IM1 and real GDP both respond to the short-term deviation and so there is a bi-directional relationship between the two. The lagged coefficients are not significant in most of the cases. So the relationship is weak.

**Table 3.5: Estimation of Error Correction Model: M1 and real GDP**

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Explanatory variable</th>
<th>Coefficient</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>dIM1</td>
<td>Constant</td>
<td>0.142</td>
<td>0.0188</td>
</tr>
<tr>
<td></td>
<td>error (-1)</td>
<td>-0.494</td>
<td>0.054*</td>
</tr>
<tr>
<td></td>
<td>dIM1(-1)</td>
<td>0.079</td>
<td>0.770</td>
</tr>
<tr>
<td></td>
<td>dIM1(-2)</td>
<td>0.134</td>
<td>0.563</td>
</tr>
<tr>
<td></td>
<td>dIGDPC(-1)</td>
<td>-0.182</td>
<td>0.735</td>
</tr>
<tr>
<td></td>
<td>dIGDPC(-2)</td>
<td>-0.483</td>
<td>0.330</td>
</tr>
<tr>
<td>DIGDPC</td>
<td>Constant</td>
<td>0.017</td>
<td>0.404</td>
</tr>
<tr>
<td></td>
<td>error (-1)</td>
<td>0.281</td>
<td>0.005**</td>
</tr>
<tr>
<td></td>
<td>dIM1(-1)</td>
<td>-0.162</td>
<td>0.116</td>
</tr>
<tr>
<td></td>
<td>dIM1(-2)</td>
<td>0.141</td>
<td>0.110</td>
</tr>
<tr>
<td></td>
<td>dIGDPC(-1)</td>
<td>0.308</td>
<td>0.131</td>
</tr>
<tr>
<td></td>
<td>dIGDPC(-2)</td>
<td>0.352</td>
<td>0.062</td>
</tr>
</tbody>
</table>

Note: Numbers inside the brackets denote the lag length.

* 10 % level of significance, ** 5 % level of significance, *** 1 % level of significance

**Conclusions**

Narrow money and nominal GDP are cointegrated implying a stable income velocity of money circulation with respect to M1. As far as the direction of causality is concerned, M1 can be said to be weakly endogenous as it responds to the last period equilibrium error.
Narrow money and real GDP are also cointegrated with bi-directional causality. So, at least M1 is not neutral. M3, the broader measure of money supply, is neither related with nominal GDP nor with real. So, the income velocity of circulation is not stable with respect to M3 and no inference regarding neutrality can be derived as they are not cointegrated. Total credit inclusive of bank credit to the government and bank credit to the commercial sector seem to bear no relationship with either nominal GDP or real GDP. The money multipliers for both narrow and broad money are unstable. This, along with (1) questions the ability by the monetary authority to control the level of money supply.

3.13 Conclusions

This chapter focused on the monetary aspects of an economy, how the evolution of the macro theory has dealt with money, in particular, demand for money and the overriding policy issues. The attempt has been to highlight the importance of the black economy, how its presence encompassing nearly all the realms of the economy, can mislead us in our pursuit for interpretation of the empirical results and understanding of the monetary aspects. The important concept of velocity of money circulation needs a fresh look. Not only the income velocity of circulation is under-estimated but the fluctuations being short term in nature, the annual data fail to capture it. Even effective monetary targeting, which is crucial to the success of the monetary policy, becomes difficult because the elements of the money multiplier are subject to instability, more so because of the black economy. The potential level of the money supply is also affected owing to the illegal cross border transactions. The sectoral balance we presented shows how the conventional scenario connecting real and the monetary variables, deserves reformulation. The empirical results indicate that the relationships fundamental to the successful conduct of the monetary policy, are mostly not satisfied in case of India. There is, therefore, a need to recognise the significance of the black economy in the discussion of the monetary dynamics of India.