7.1 Introduction

Macroeconomic policy analysis is a complex subject by nature. As the subject focus on dynamic characteristics, continuous enquiries are always necessary to understand the changes in the existing relationships. The decade of nineties was very special while considering the sweeping changes happened in the economic environment in many of the countries across the world. Especially, the cases of a large number of developing countries, which have undertaken liberalised policy framework, are quite interesting. Among them Indian economy deserves a special place for the achievements made by the country during the period.

Indian economy faced some serious challenges during the decade of nineties. However, policy reforms helped the country to overcome the challenges and the authorities identified the strength of monetary policy during the period. The conduct of monetary management has undergone significant changes in the 1990’s in terms of objectives, framework and instruments, reflecting broadly the progressive liberalisation of the economy. Moreover, crucial changes happened in the institutional set up can be identified in the case of fiscal-monetary relationship, pre-emption of resources through reserve requirement, structure of interest rate, innovation of financial products, development of capital markets and opening up of the economy. Fundamental changes happened in the policy frameworks have highly contributed to the commendable performance of the economy in terms of output growth, diversification and modernisation.
As mentioned above, to understand the policy dynamics under changed economic conditions needs continuous observations and rigorous scrutiny. While considering the enquiries towards the working of monetary policy, existing literature is amazingly rich. However, due to the dynamic nature, changing economic environment necessitate new inquiries under new scenario. Traditional concepts can get obsolete within no time as the changes currently taking place all over the world are amazingly vibrant in nature. Especially technological improvements bring out financial innovations within a short span of time. Correspondingly, changes are visible in several financial relationships and its impact on policy frameworks have to be addressed on a continuous basis.

7.2 Research Gap, Objectives of the Study

The transmission mechanism brings to light the dynamics of how the monetary policy works. Tracing the transmission mechanism includes, the identification of macroeconomic variables which respond to the policy changes, their inter linkages and the lag structure. The monetary impulses pass to real economic variables through a number of channels. The series of links between the monetary changes, changes in relative prices, changes in savings and investment, changes in output, employment and inflation can be called as the channels of monetary policy. In order to study the transmission mechanism, identifying the exact channels through which monetary policy works becomes crucial. It also helps to resolve the evolving complexity in explaining the transmission mechanism. Money supply channel, interest rate channel, exchange rate channel and credit channels etc are major channels generally used to explain the transmission process in the economy. Due to the inter linkages of macroeconomic variables, the channels are not mutually exclusive. But the relative importance of each channel differs among the economies, because it depends upon a number of factors like the structure of the economy, instruments of monetary policy used and
conditions prevailing in the economy, especially in the financial and asset markets.

The review of literature shows that most of the papers on Indian economy examine the existence of channels in an isolated fashion. Indicators relating to different channels are not integrated in one model. As a result relative importance of one channel against other has not been established in a conclusive manner. Clearly, information on relative importance of different channels has significant policy implications. Furthermore, a comparative study of the significance of different channels in the pre and post liberalisation era can throw light on the workings of the monetary policies and the effect of policy changes.

Another major area which is explored very little is the asymmetric impact of the monetary policy in the various factors of the economy. Because of the differences in the production relations monetary policy changes exerts impact on the various sectors of the economy differentially. Seasonal variation in demand for money and credit from different sectors is a cause for the varying or asymmetric impact of the policy changes. Moreover, differences in the profitability conditions across the sectors imply that investment activities after the interest rate changes will vary substantially across the sectors. The issue of asymmetric policy impact is more important in the Indian case because, with the progressive liberalisation of the financial sector, sector specific and program specific lending operations and interest rate structure is mostly dismantled in the system. Under the changed conditions the impact of monetary policy may vary significantly across various sectors of the economy. As a result it is necessary to study the asymmetric or varying impact of the monetary policy on various sectors of the Indian economy.

In order to fill these gaps, there is a need for further research in this direction and this has motivated the current research work. In concrete terms, there is a need to establish the significance of channels in monetary transmission
and determine the relative importance of one channel over other. In this connection it is necessary to study the lag structure of different related variables also it is useful to examine varying impacts of monetary policy on different sectors of the economy. This would help understand the different levels of influence exerted by different channels on specific sectors.

With this background the major objectives put forward for the present study are

1) To describe the monetary policy interventions by the RBI at different points of time since liberalisation. This would enable us to have an idea of the direction and thrust of the monetary policy changes in India.

2) To assess the relative significance of different monetary policy transmission channels in Indian economy.

3) To examine the sectoral impacts of monetary policy and differential influence of the channels.

4) To examine the impact of economic liberalization on the monetary policy transmission mechanism.

7.3 Methodology

A descriptive analysis of the macroeconomic conditions and policy framework in India provide the background for analysing the monetary policy transmission in the Indian economy. Moreover, a detailed review of existing literature provides guidelines for selecting the empirical methodology.

Based on a review of literature present study employs one of the most convenient and generally accepted methodologies to study the monetary policy transmission process. The Vector Auto Regression Model (VAR) introduced by Sims (1980) is the most convenient methodology to study dynamic relationship among a group of variables. Innovation accounting, which consists of impulse responses and error variance decompositions, is the major tool of investigation in this method. Advances over the period, especially associated with the
incorporation of co-integration relations and structural identification made this methodology more compatible for macroeconomic policy analysis. Moreover, data availability and other constraints make vector auto-regression models dearer compared to structural models. While considering the comparative advantages structural modelling, for the given situation, present study also employs vector auto-regression based models to analyze the transmission mechanism. By incorporating long-run equilibrium relationships among the variables, Vector Error Correction Models (VECM) models are largely employed in this study. Both Johanson-Juselius (1996) and Engle-Granger (1987) methods used under appropriate circumstances.

The present study also considers a comparative static framework for analysing the feasibility of monetarist model in Indian case. The choice is based on availability of the data and the peculiarities of the monetarist model as it use wealth adjustment process as the basis of monetary policy transmission.

7.4 Major Results

A review of major changes in the policy framework in the liberalised era shows that there are some fundamental changes in the ideology concerning macroeconomic policy making in India. Macroeconomic scenario during the early nineties uprooted the orthodoxy in macroeconomic thinking in India. Liberalisation, privatisation and globalisation have been accepted as the basic ideology of macroeconomic policy making. In this line, the roles of institutions were redefined, which in turn led to fundamental changes in the institutional settings and policy frameworks. Two prominent developments in the institutional settings can be identified as the new system of ways and means of advances and the liquidity adjustment facility. Similar to the change in the institutional settings there is some significant development happened in the monetary policy framework also. The new generation framework follows a multiple indicator approach and changes are more visible in its operational procedures. The new arrangement
of ‘ways and means of advances’ gave higher levels of autonomy for the central bank. With the growth of alternative financial markets and inception of the liquidity adjustment facility, the Reserve Bank has been trying to pursue its goals mainly through open market operations. The dependency over direct policy measures had been reduced considerably under the new framework. As a result, apart from CRR, the central bank is not relying upon other direct measures for its operation. Further growth of financial markets and higher levels of financial integrity will enable the Central Bank to succeed its goals through open markets operations.

Any attempt to explain the policy dynamics in an economy necessitates sound knowledge about the existing macroeconomic relationships in the economy. In order to understand the macroeconomic scenario most of the basic relationships in the economy has analysed in the third chapter. The results show that the nature of economic environment in India during the liberalised period is growth stimulating. On performance ground, service sector especially financial and other business services does a wonderful job. Manufacturing also responded positively to the liberalised measures. Large amounts of foreign investment inflow help the country in accumulating foreign exchange reserves. Indian financial system has proved over the periods that its fundamentals are very strong compared many other fast growing economies. Growth of financial markets and financial integration helped the economy to capitalise the environment. Inflationary conditions are mostly under control in the economy. Some structural changes happened in the economy during the period and it is visible in many macroeconomic relationships. In this regard, stability of money demand function has been questioned by several researchers. However, it is identified that the instability in the relationship is mainly associated with broader measures of money. Moreover empirical results show that instability is also associated with the choice of methodology. While regression based single equation models which
use broad money as the monetary variable mostly allow breaks in the relationship. However, time series models using high frequency data shows some types of instability associated only with interest rate equation. Still it is possible to find cointegration or long-run equilibrium relationships for money demand functions. Compared to the demand function, money supply function has changed drastically during the period. In this regard, we identify significant change in the composition of various sources of money in Indian economy during the liberalised period. The contributions from foreign exchange inflow associated with foreign institutional investment have increased substantially during the period. If we ignore the current slowdown associated with global recession the performance of the Indian economy has been phenomenal in the liberalised period.

The fifth chapter analyse the significance of channels in the economy. Following general to specific methodology alternative models are estimated and arrived in to a specific model. Results from the specific and supportive models give some conclusive evidences for the working of channels in Indian economy. The diagnostic test results show that the estimated model achieves stability conditions. Coefficient of determination is substantially high in most of the equations. Comparatively it was lower for interest rate equation. Major outputs from the estimated model are cointegrating vector, impulse responses and error variance decompositions. The estimation results show, significant impact of liberalization interest rate, exchange rate and asset prices.

The chain reactions show that all the four channels viz., money supply, interest rate, exchange rate and other asset price effect channels wok in Indian economy. Exchange rate mechanism with asset market prices and foreign capital inflow brings new dynamics in the economy. The results also suggest the working balance sheet channel in association with other asset price effect mechanism in the Indian economy.
Compared to money and interest rate, other variables like stock-asset prices, exchange rate and exports have more information regarding the output variation in the economy in the short-run. As a result in the short-run, exchange rate channel and other asset price effect channels are the most important channels in explaining the macroeconomic dynamics in the Indian economy. Cointegration analysis shows that the fundamental relationship among money, interest rate and output are very strong in the Indian economy. So interest rate channel and money supply channel are very important in explaining the long-run conditions in the Indian economy.

A comparative static analysis of wealth adjustment shows that in Indian case monetarist model can be used for explained policy dynamics. However, the interest rate reactions play a major role in explaining transmission mechanism in this model also.

Another major objective of the present study is to evaluate the varying or asymmetric impact of monetary policy on various sectors of the economy. In order to study the differential impact we use three empirical models. The alternative specifications are made based on the data availability.

The first model is estimated to assess the impact of monetary policy changes on investment from various sectors. The model helps to compare the relative changes in these activities across various sectors. Furthermore it also helps to understand the relative changes in each sector compared to the aggregate economy. The model consider eight sectors of the economy viz., 1) Agriculture & allied activities, 2) Mining & quarrying, 3) Manufacturing, 4) Electricity, gas & water supply, 5) Construction, 6) Trade, hotels, transport & communication, 7) Financing, insurance, real estate & business services, 8) Community, social & personal services.

Compared to the overall investment model, magnitude of most of the coefficient estimates is higher for the sectoral models. For agriculture, mining
and quarrying and construction models, interest rate coefficient estimates are not significant. It shows that, interest rate changes may not produce expected results in these sectors. Interestingly, interest rate coefficient estimate is positive for FIREBS, THTC and manufacturing. In this context, for the financial sector, an increase in the interest rate has to be identified as the indication of growing market demand and opportunity for business development. Results from sectoral models show that sectoral investments respond differently to monetary policy shocks.

The second set of models helps to explain the relative differences in the transmission process to the next level in which we try to differentiate, the impact of monetary policy on sub-sectoral level. We consider different sub-sectors under industry (industrial sector) for the purpose. We select the industry for the analysis, because it is the only sector in the Indian case for which sub-sectoral output data is available for long enough period. Asymmetric impact of monetary policy on the sub-sectors of the industry is analysed in this framework viz., electricity, mining and quarrying and manufacturing or not.

After looking into the impact of monetary policy on the sub-sectoral activities, we proceed further by looking into the differential impact of monetary policy on various product types. We examined, whether the monetary policy exerts similar impact different categories of goods viz., intermediate goods, consumer goods and capital goods or not.

The results from the VECM models show that monetary policy shocks produce asymmetric impact on different sectors of the economy and across the product categories. Compared to money shocks, interest rate shocks produce much contrasting responses in output across the sectors.

7.5 Conclusion and Policy Implications

Results from the present study give some useful information towards policy making. Initially it identify that there are some significant changes
in the economic relationships in the Indian economy. There is a significant change in the role played by many variables in explaining the macroeconomic dynamics in the Indian economy during the liberalized era. In the short-run variables like asset prices, export level, exchange rate and inflation have significant level of information regarding the output variations. Output level and asset prices indicate the variation in money supply. However, in the long-run money supply, interest rate and output level have crucial role in explaining the macroeconomic scenario.

Inflation can be targeted through controlling money supply and enhancing production. Interest rate can be used as a tool to control inflation as it has a strong influence on money supply. The Indirect route is very clear from the observations made in the study. For the purpose we can use the strong long run relationship identified among the variables. Monetary shocks create consistent responses in various economic activities. It takes around two years to visualise the total impact of the monetary policy shocks. Conventional cost of capital arguments may not suit for an open economy. Stock markets and foreign institutional investment became very important sources of money supply in the new environment. The relationship between stock prices and interest rate shock provides some crucial links in the policy dynamics. Because of new developments, net impact of interest rates is positive to the economy. It is not hindering internally decided investment activities. Moreover interest rate shock has significant impact on inflation through money but not directly.

The analysis under comparative static framework shows that monetarist model which use wealth adjustment process as the basis of transmission process can be used effectively in the Indian case.

The analysis of sectoral impact of monetary policy also conclusively suggests the importance of sector specific policies in the Indian economy. The results show that monetary shocks produce inconsistent responses in many sectors. Business cycles have significant influence in explaining the long term
investment behaviour in the economy. Observed trend cycles not same in all sectors. Policy shocks create varying responses in different sectoral activities. It is true for sub-sectoral and product category models. It can be observed that, more than in patterns, in magnitude wise the policy impact varies across the sectors. The results suggest that, sector specific and program specific policies are necessary to maintain balanced growth in the economy.