Chapter II

REVIEW OF LITERATURE

2.1 Introduction

Several studies are available on Monetary Policy Transmission (MPT) in the economic literature. A number of studies have covered both theoretical and empirical aspects of the topic under different environments. While considering the earliest attempts on the topic, the Quantity Theory of Money (QTM) holds a significant position in the economic literature. The QTM explain the relationship between changes in money stock and prices. According to Fisher’s equation (1911), a change money stock will lead to proportional increase price level. Following the quantity theory of money, Classical models maintained the neutrality of money as one of its basic assumptions.

The inception of the General theory by Keynes J.M (1936) brought out significant changes in the analytical frameworks of macroeconomic policies. According to the Keynesian theory, changes in money supply have an impact on output through interest rate changes. This indirect effect of changes in money stock on output through interest rates is known as Keynes effect.

The major difference among the policy frameworks under Classical and Keynesian traditions are basically related to the stability of money demand function. While Classical economists give more importance to the behavioral aspects of the money demand function, Keynesians perceive it as a statistical property. Following Classical tradition, Chicagoan economist like Knight (1941) perceived that money demand function is basically determined by psychological tendencies. On contrary, Hansen (1957) and Radcliffe Committee (1959) accepted the velocity of money demand as a statistical concept. The perceptual difference towards velocity of money demand from Classical and Keynesian traditions paved the way for alternative monetary policy frameworks in the economic literature.
As mentioned earlier, based quantity theory, Classical doctrine believe in the neutrality of money. However, some economists in the Classical tradition propounded that, real balance effect produces significant impact on output and prices. It is happening because, the real value of household wealth changes with the changes in price level. Although earlier versions of these explanations can be traced in Scitovszki (1941), Pigou (1943) and Haberler (1946) the most elaborated version is provided by Patinkin (1965).

Over the years traditional models of monetary policy transmissions has been improvised significantly under both Classical and Keynesian traditions. By incorporating large number of assets in the household’s finance portfolios, modern MPT models significantly improvised their explanatory power regarding the policy dynamics. In this regard monetarist’s models of MPT have achieved significant levels of improvement compared to all other models. Brunner and Meltzer (1972) proposed one of the best models of the MPT. In the Brunner and Meltzer model, a change in money supply brings out three types of effects viz., substitution effect, income effect and wind fall gains. With an increase in money stock, interest rates falls and price of financial assets rises. A fall in the opportunity cost (interest rate) stimulates consumption level and borrowings (substitution effect). Reduction in the future income in the form of interest rate payment will reduce the future level of consumption (income effect). Increase in asset prices could bring windfall gains and thus by higher level of consumption. Under monetarist models relative asset price changes have given greater importance. They generally incorporate wider range of assets compared to Keynesian models. There is a direct impact on nominal income due to a change in money supply.

Similar to money stock, it has been identified in the literature that credit changes also have a significant role behind general macroeconomic developments. The role of inside debt behind macroeconomic crisis was identified
in Fisher (1933) with special reference to the Great depression. Over indebtedness brings deflationary conditions in the economy. Over investment and over speculations aggravates the conditions and leads to economic depression. The final outcome of a debt liquidation process can be quite panic as the real value of nominal debt is not possible to predict exactly during the contract period. The debt-deflation hypothesis has developed further by Mizkin (1978) and formalized as an analytical framework by Bernanke(1983).

Several authors have identified the significant role played by bank credit in general economic activities over the years. The suspicion about the stability of money demand function and popularity of endogenous money supply arguments made them to think in favour of credit aggregates in the policy models. Comparing the velocities of monetary and credit aggregates Friedman (1981) suggested credit aggregate as better target in the monetary policy frameworks compared to monetary aggregates.

With the growing importance, several authors have extensively studied the credit market dynamics. Studies related to credit rationing helped in improving the MPT models in the later years. Hodgman(1960) examined the role of interest rate in credit rationing and brought out some important observations. Given a risk ratio requirement a banker will refuse to extend credit beyond some level regardless of the interest rate. Freimer and Gordon(1965) showed that bank do credit rationing as an optimal policy. From two types of analytical models they concluded that the extension of credit beyond the predetermined or customary rate of interest rate would lead to negotiation and lowering of the predetermined interest rate. Stiglitz and Weiss (1981) provided a theoretical justification for credit rationing. They observed that the chances for adverse selection are very high under imperfect information. Because of the existing asymmetries in information, even under equilibrium conditions credit rationing would be the
optimal policy any banking institution. The work by Stiglitz and Weiss (1981) provided the theoretical foundations for broad credit channel of MTP.

As the significant role of bank credit in general economic activities has been identified in the literature there was an attempt to coordinate credit and money market interactions in order to explain macroeconomic policy dynamics at a better level. Brunner and Meltzer (1988) made a significant improvement in the MPT frameworks by introducing bank credit as a new category of asset. The extended monetarist model proposes both Keynes effect and relative asset price effects in the transmission process. Introduction of credit channels improvised the analytical features of traditional MPT models substantially. Meltzer’s (1995) discussion about monetary policy transmission is mainly concentrated upon theoretical frameworks. However, he tried to put forward empirical findings to support his arguments. According to him a monetarist’s model that uses several relative prices is the best framework for analysis monetary policy transmission. Moreover, in his view, Keynesian models that use a single relative price (interest rate) cannot explain the full dynamics of monetary policy transmission process. Credit and interest rate mechanisms are part of monetarist model and asset price effect has more significant role in explaining the transmission process.

Mishkin (1995) has produced one of the best compilation all major channels of monetary policy transmission. Interest rate channel, exchange arbitrage channel, other asset price effect channel, bank lending channel and balance sheet channel are presented as the major channels of MPT. Availability of comprehensive theoretical models paved the way for large number of empirical studies on MPT in the 1990’s.

It has been observed that, the description of transmission mechanism of monetary policy has been elaborated with the introduction of additional assets, institutions and outcomes in the analytical frameworks. Structural segmentation in
the production process across various sectors of the economy necessitates multiple goods and labour markets in the macroeconomic analytical frameworks. Only a few number of studies tried to capture the impact of monetary policy at a segregate level. However some aspects of asymmetric impact of monetary policy on the economy are well discussed in the earlier literature itself. It was identified that monetary policy appears to influence the economy primarily through its impact on spending in particular sectors of the economy. Moreover spending is influenced through price, availability and distribution of credit. The legal and institutional factors have a decisive role in the distribution of credit among various sectors and influences the demand shifts in various sectors. In this regard Maisel (1968) examined the possibility of varying lags in distribution of credit and spending across the sectors. He found that changes in expectations also influence the variation in spending and formation of expectations can be highly influenced by policy changes. The role of expectations in generating asymmetric impacts has been discussed by Brownlee (1968) also. He discussed the importance of inflationary expectation specifically related to the shifts in investment demand. According to him, the divergent behaviour of expenditure between different class of investors for long-lived and short-lived assets can arise out of the differences in their inflationary expectations. Similarly, relative availability of credit, which is affected by institutional factors, can also influence the investors’ expectations. Moreover, changes in government’s demand can cause disturbances in the investors’ expectations. Similar to these discussions several studies that came out afterwards especially dealt with demand fluctuations related with credit availability and interest rate changes.

The above discussion gives a brief idea about the theoretical development that happened over the years in analysing the MPT mechanism. As mentioned earlier, availability of elaborated analytical frameworks paved the way for large
number of empirical studies on MPT mechanism. Some of them looked into the long-run equilibrium relationship existing among macroeconomic variables as part of their enquiry towards stability of money demand functions. As the channels are not mutually exclusive, segregating the studies based on channels are not practical. However, there is a distinction we can make based on their approaches as the studies on balance sheet channel mostly use a different framework. Moreover discussions could make use of characteristics of the economy. For the convenience, the studies are segregated as 1) studies on demand for money and related issues, 2) studies on traditional channels, 3) studies on credit channels 4) studies on sectoral impact of monetary policy. The next section provides the review of some of the important empirical studies. It will be followed by a summary.

2.2 Stability of the Demand for Money, Long-Run Equilibrium and Short-Run Dynamics.

Stability of money demand function is one of the issues that are widely addressed in the economic literature. Although many of them give serious concern towards the functional specification, few of them look into the possibility of Classical money supply channel based on the stability of money demand function. Many of the recent studies differ from the older ones mainly in their approaches towards the issues. With the development of advanced modelling techniques, several studies during 1990’s employed dynamic time series methods. On the other hand most of the earlier studies used static models. Most of the studies which use multivariate time series models produce evidences for the stable relationship between money and scale variables. A number of good surveys about earlier studies are available in Booman(1976), Vasudevan(1977), Laidler (1977) Feige and Pearse (1977), Judd and Scadding (1982), Jadhav(1994) and Sriram (2001). Some of the recent studies which have a common approach towards the
issues and have a scope beyond the stability issue are considered here for the
discussion.

Several studies reports that most of the economies experienced stable
money demand function in the earlier decades, especially before 1990’s. However, the results are largely sensitive to the choice of variables and estimation
technique used in these studies. In many cases, inclusion of additional variables is
necessary to establish long run equilibrium relationship between money and scale
variables. Mostly, the additional variables included in the models are the
measures of interest rate and inflation rates. Most of the studies use quarterly data
for estimation. Existence of long run equilibrium relationship (cointegration)
between monetary aggregates and scales variables are the major point enquiry in
these studies. Apart from identifying cointegration relationships, many of them try
to establish the short run dynamics (error correction) also. Many of them
established the cointegration by including other variables in the system. The
results are invariable similar across developed and developing economies. Major
findings from some of these studies are discussed here.

Haug and Lucas (1996) find large variation in the results according to the
method used and variable selected for testing cointegration in the Canadian
economy. The study gives evidences for long run equilibrium relationship among
narrow money, output and interest rates in real terms. Similarly, Lim (1993) finds
out cointegration between monetary aggregates and output for the Australian
economy. Interest rate and inflation rate are the additional variables used in the
VAR model to establish the equilibrium. The study find cointegration between
alternative monetary measures like currency, bank deposits and non bank deposits
and scale variable. Moreover, the results show that short run dynamics among
these variables can be explained by an error correction model. In the case of
broad money, output and interest rate. However, in the absence of interest rate it
is difficult to identify such equilibrium and the results are similar to many other studies. As there is no stable equilibrium existing between broad money, output and interest rate the study suggests any valid error correction expression for the VAR model for the Japanese economy.

In the case of United States also, some of the studies gives mixed results. Miller (1991) and Mehra (1993) identify stable money demand function in the United States using broad money and gross national product. However, Baba Hendry and Starr (1992) and McNown and Wallace (1992) are not able to find any cointegration relationship between broad money and gross national product. Their results show long run equilibrium between narrow money and gross national product but not with broad money. While Miller (1991) and Baba Hendry and Starr (1992) are able to identify strong error corrections in their models, McNown and Wallace (1992) are not able to establish such dynamics. So the results do not give conclusive evidence for how short run adjustments happening towards the equilibrium. The time period considered in these studies falls between 1959 and 1992 and there is no significant differences in the variables used in their systems.

According to the empirical evidences, most of the European countries experienced stable money demand function before the unification (EMU). Moreover, these economies exhibited strong error correction mechanism which drives the short run deviations towards the equilibrium. Bårdesen (1993) find stable long run relationship between money, interest rate, prices and real expenditure in the Norwegian Economy. Similar relationship is found in Germany, Italy, Norway and Greece also. Ericson and Sharma (1998) and Deutsche Bank (1995) give evidences for strong error correction mechanism working in Greek and German economy. With special reference to the demand from company sector, Chrystal (1994) is able to establish cointegration between monetary aggregates and output in the British economy. The cointegration is true
for various monetary aggregates. However, Muscatelli and Papi (1990) explain that, financial innovations have its own impact on money demand function in Italy. According to them, new generation financial instruments affected the stability of demand for broader monetary aggregates in Italy. Moreover, their results show that stable long run relationship between money and output is possible to establish only after including the learning curve variables in the model. Similarly, Chowdhury (1995) find any long run equilibrium relationship between monetary aggregates and output in Switzerland. The result suggests that variable like exchange rates are necessary to include in the system to introduce the external influences that are very strong in the case of open economies.

Monetary integration among European countries (Euro currency area) has brought out several empirical studies based on aggregate European data in the 1990’s. Monticelli and Papi (1996), Wesche (1997), Fagan and Henry (1998) and Faser and Winder (1998) study the changes in money demand function on the European data. These studies also brought out some methodological problems related with the aggregate data. The analysis of aggregated data models mostly employs invalid restrictions on the coefficients in order to produce segregate responses for different countries. Monticelli and Papi (1996), Pesaran et al. (1989) identify that omission of the country specific variables, misspecification of the functional form and parameters bring specification bias in the analytical model. The results suggest country wise analysis in order to complement the aggregate analyses.

Fase and Winder (1993) compare country wise money demand relations across European countries and find that there exists a north south divide among them. Their results show that interest rate elasticity of money demand is comparatively lower in southern countries. Money demand function in these countries also shows lower sensitivity towards inflation rate also. Moreover, they find differences in the stability of the money demand function among these
countries. According to their study money demand function is more stable in Germany compared other countries. They present a new approach to analyse the country specific differences in the transmission of monetary policy based on money demand relations.

Wesche (1997), analyse the performance of a common money demand function for different sets of European countries. The results show a stable aggregated money demand function for a group of countries including Germany. Further analysis show that stable monetary relations in the German economy contribute the overall stability to the group. She concludes that the aggregated European relation reflects the stability of German money demand. These analyses indicate the importance of country specific characteristics and policy models while framing a common policy for the Euro area.

Compared to advanced economies, studies on developing economies give diversified findings. While some of the studies give evidences for stable money demand function, findings from some other studies conflicts with these results. However, these results are not strictly comparable as their methodology and data characteristics vary substantially.

Results from Arize’s (1994) re-examination of stability of money demand function in the developing economies especially Asian counties and other studies available on the countries in the region conflicts considerably. Arize find stable money demand function and error correction mechanism in Singapore, Thailand, Korea and Pakistan. Results from Price and Insukindro (1994) also find long run equilibrium and error correction mechanism in Indonesian while using broader monetary aggregates in the money demand function. However, the relationship doesn’t exist for currency. Moreover, their study does not find any importance to short run interest rates in the error correction mechanism. Deckle and Pradhan (1997) and Hossain (1994) show different results while comparing with Arize’s (1994) and Price and Insukindro (1994). Hossain reports that the results from
alternative tests for cointegration are conflicting in nature for the money demand function in Pakistan. As the variables considered for different models are mostly similar, it is possible to assume that error in the model specification could be a major cause for conflicting results. Deckle and Pradhan (1997) differ from Arize (1994) in the case of Thai economy as they find valid relationship only in the case of nominal money. Similar to the results from Arize’s (1994) study on other countries, Sriram (1999) produce evidences for long run equilibrium relationship among money and industrial output, nominal exchange rate and expected inflation in Malaysia. The results provide error correction representation for the short run mechanism in the Malaysian economy.

Tseng et al (1994) reveal that monetary aggregates were highly sensitive to inflation in Chinese economy. They find that interest rate have significant influence on monetary aggregates especially in recent years. Hafer and Kutan (1994) also find the importance of inflation in the money demand function in Chinese economy. Their results show that cointegrating vectors are highly sensitive to the variable specification.

Eken and other’s (1995) find cointegration among money, output, and prices in the Lebanese economy. Bahmani Oskooee (1996) identifies that black market exchange rate is a better measure than the official rate. Most suitable money demand function in the Iranian economy includes variables like inflation rate, output, black market exchange rate and monetary aggregate at medium level. According to the results there is no valid specification for an error correction mechanism in the Iranian economy.

Differing from Asian experience, studies on African economies in common and many other individual studies on corresponding economies produce similar results. Fielding (1994) used same methodology in studying stability of money demand function in four African economies viz., Kenya, Nigeria, Côte d’Ivoire and Cameroon. Results from the study found cointegration among money,
output, interest rate and inflation rate and stable error correction mechanism in all
the four economies. Other than Nigerian economy, multiple cointegration is found
in all other economies. Although there is slight difference in the variables
included in the system, Adam (1992) finds multiple cointegration vectors Kenya.
Similar to the results of Fielding (1994) strong error correction mechanism is also
identified in the Kenyan economy. Teriba (1997) finds multiple cointegration and
strong error correction mechanism in the Nigerian economy. Although variables
included in the system are different, results corroborates with Fielding’s study
(1994). Like other African economies those are mentioned above, Treichel (1997)
find cointegration among money, output and interest rates and stable error
correction mechanism in Tunisian economy. Khamis and Leone (1999) find
cointegration among nominal money, price, real income interest rate in Morocco.
However, the study failed to provide error correction mechanism for the short run
dynamics in the Moroccan economy.

Similar to Asian and African economies, other developing economies
from other parts of the world also have money demand functions with similar
characteristics in the earlier decades. Choudhry (1995) find long run equilibrium
relationship among monetary aggregates, national income and inflation rate in
Argentina in the earlier decades. The results indicate stable error correction as the
short run dynamics. Asilis, Honohan and McNelis (1993) give details about the
money demand function in another South American economy, Bolivia. They find
some evidences for stable relationship between money and prices in Bolivia. The
study use monthly data for the period 1980:9 to 1988:12 and followed state space
technique to estimate the error correction as it has time varying coefficients. Long
run equilibrium relationship among the variables is stable relationship in the
economy.

Studies on money demand function produce some interesting results in
Indian case. Moosa (1992) find stable long run equilibrium relationship between
real money, interest rate and output. The relationships are more stable with narrow measures of money than broad money. Alternative methods are used to verify the cointegration relationship. However cointegration vector is not identified while using broad money. Similar to these results, Das and Mandal (2000), Ramachandran(1998) and Thomas(2000) report that money demand function is fairly stable in India. But Pradhan and Subrahmaniyam(2003) argue that regime shift occurred with the liberalisation process has a crucial impact on money demand function and it is not possible to assume stable money demand function in the reform period. Nagaraju (1998) argues that income elasticity of money demand vary in large dimension during the post independence period. Similarly, Ramachandran (1998) and Thomas (2000) report that money multiplier is not stable over a long period in the Indian economy. Their observation on monetary aggregates and instruments suggests that long run equilibrium relationship is not possible under the new circumstances.

A large number of studies report strong relationship between money and prices in India. Paul and Bhanumurthy (2000) find strong relationship between narrow money and prices. Subrahmaniyam and Sundararajan (2000), Battacharya and Mitra (1997) and Biswas and Saunders (1990) report that excess supply of money and exchange rate depreciation are the major causes for inflation in India. Paul and Pradhan (1982) argue that unexpected changes money supply is statistically significant in explaining inflation. Battacharya and Chakravarthty (1995) found little significance for a monetarist model of inflation in India.

Pradhan and Subrahmaniyam (2003) observe that monetary aggregates and prices are not exogenous in Indian case. Das and Mandal (2000) reports similar results for monetary aggregates but differ slightly in the cases of prices. They also report that the short term interest rate is comparatively exogenous in nature.
The relationship between output and inflation is not confirmed for Indian economy. Rangarajan and Arif (1990), Paul and Bhanumurthy(2000) report neutral relationship between output and prices especially in the post reform period. Singh and Kalirajan(2003) also find that output is neutral to prices in normal cases but excess inflation has a negative impact on output India.

2.3 Dynamics of Monetary Policy Transmission-Liquidity Effects and Relative Price Effects

The above-mentioned studies basically look in to the nature of money demand function, long run equilibrium relationship among macroeconomic variables and short run dynamics in various economies. These studies provide a basic idea about the existing economic environment in the respective economies. Based on the nature of the analytical framework used in these studies a number of issues related to the transmission mechanism can be addressed very easily. However, the discussions in these studies are mainly contained with some specific issues related to the monetary relationships only.

There are several studies available on developing and developed countries explicitly address the issue of monetary policy transmission. Many studies approached the issues in a general to specific approach. However, some issues cannot be addressed in a general framework. Similarly some of the basic dynamics of transmission mechanisms like liquidity effects, cost of capital effects, exchange rate effects, other price effects etc are combinedly observed only in few economies. However, the case is observed in both developed and developing economies. Some of these studies those explicitly look into the traditional channels of monetary policy transmission are mentioned here.

---

20 For example studies look in to credit dynamics mainly use cross-sectional data in order to capture firm characteristics and the empirical set up will not be providing much help in explaining other policy influences. Similarly finding corresponding measures to variables like asymmetric information, adverse selection, moral hazards will not be easy for a country model. Moreover inclusion of such variables needs special arrangements in the empirical set up.
Among the recent studies, very few identify liquidity effects as the key to policy dynamics in those economies. Although identified, most of them didn't try to distinguish it from the other impacts. Such identification has serious implication on the election of target variables in the monetary policy framework. Differing from other studies, Pagan and Robertson (1995) try to distinguish liquidity effect of monetary policy in the American economy during 1959 to 1993. They use VAR model to analyse the liquidity effects. Three VAR models are estimated for the sample periods viz., 1959:1-1993:2, 1974:1-1993:12 and 1982:12-1993:12. From the results they observe that the magnitude of the liquidity effect increased very sharply after the change of operating procedures of the Fed in October 1979. However the analysis identifies a watershed period in between from 1979 to 1982.

Carrasquilla Alberto (1998) identifies liquidity effect and relative price effects i.e., both interest and exchange rates in the Colombian economy for short durations. Estimation of simple VAR models using quarterly data for the period 1980 to 1996 shows that money supply and interest rate channel working in the economy. However, the basic dynamics, which could give better explanations to the transmission process, is the exchange rate channel. There is no conclusive evidence for the working of asset price effect channel as the impulse responses fail to produce clear information. The evidences gathered for the working of bank lending and balance sheet channels in Columbian economy from the general trends (in plotted data sets) cannot be accepted because the VAR estimates fail to produce any significant information about these mechanisms.

Van der Merwe E. J. (1998) explains in detail about the monetary policy frameworks employed in South Africa. The monetary policy in South Africa is basically framed on interest rate mechanism. Although monetary aggregates have some importance while considering the liquidity affects, interest rate channel is the prime propagation mechanism in the economy. The analysis is based on
general growth rates and graphs but not with any econometric model. The analysis lacks confirmative evidences, as he doesn’t test any hypotheses scientifically with data. However, the study gives a good description about the changes in monetary policy frameworks in South Africa.

Iljas Achjar (1998) identifies a reasonably stable money-income relation in Indonesian monetary policy framework works. Although monetary authority tries to incorporate interest rate relations to transfer the policy impulses, the policy framework still in use is constructed based upon monetary aggregates. The empirical results show that, broader aggregates do not follow the basic relations at present and there is a need to shift the policy framework from money base control to interest rate control. The arguments are based upon significant interest rate effects those are identified in the Indonesian economy. Results from Granger causality tests and vector auto regression model of MPT by using quarterly data from 1971-96 showed that monetary policy authority could depend upon interest rate channel in order to transfer the policy impulses.

Sirivedhin Tanya (1998) observes that opening of the Thailand economy allows the borrowers to shift the dependency towards foreign credit and it deteriorates the internal credit expansion effects. The importance credit channel in Thailand came down with the opportunities in direct financing. Moreover, the opening of the economy leads to strengthen the interest rate channel. As the domestic interest rate became strongly linked with the world interest rates, the developments indeed will make enough room for considerable exchange rate effects in the economy. Apart from these channels of monetary policy transmission, Thailand economy experiences considerable wealth effects towards the monetary policy changes. A VAR estimates with monthly data for the period 1980:1–1996:6 confirms the working of interest rate and wealth channels in the economy despite of any strong credit expansion effects.
Eyzaguirre Nicolás (1998) concludes that the primary channel of monetary policy transmission in Chile is based upon interest rate mechanism. His analysis based upon error correction models using quarterly data shows that policy impulses generally initiated from interest rates and will interact with aggregate demand relations and influences output changes through exchange rate relations. According to the results and other observations, Chilean economy is not experiencing strong asset price and credit effects. The error correction model estimates have some technical problems, as he estimates the models independently. Due to independent estimations, mutual interactions of the variables in the models are not possible capture properly and the interpretations based upon the results can change significantly in a combined model.

Gil Díaz Francisco (1998) agree with most of the recent empirical studies about Mexican monetary policy transmission mechanism which give importance to the exchange rate mechanisms in explaining the transmission process. According to him the authority frame the monetary policy framework based on interest rate control. Several authors in Mexico identify the close linkages between nominal exchange rate and output, prices and wages. Francisco’s study also comes out with similar conclusions. Regression results by using daily data for the period 7th September 1995 to 31st December 1996 show that short-term interest rates react to the signals sent by the central bank but not to transitory (unintended) liquidity shocks.

Kim Sungmin and Won-Tai Kim (1998) identify significant changes in the monetary relations in South Korea especially in the nineties. Monetary ratios like measures of velocity and multipliers became volatile in the Korean economy especially after the Southeast Asian crisis. It is identified that, short run interest rate and exchange rate interactions determine the financial conditions in the Korean economy. However, Granger’s causality test that employ to analyse the precedence of bank liquidity positions and short run market interest rates show
that bank liquidity conditions are prior to the short run market interest rates such as call rates and repo rates. They carry out the causality test using daily data for the period from January 1995 to October 1998. The results from a structural VAR model, which is used daily data from January 1991 to August 1997, suggest for a change in the operational target from call rate to some other rate like repo rate. The study identifies that interest rate and exchange rate channels have greater importance in the Korean economy.

Bank of Korea (1998) study about the monetary policy transmission in Korean economy gives special reference to other asset price effects than interest rate mechanism. In the light of financial deregulation and changing monetary relations (especially the instability in the money demand function), Bank of Korea presumes that credit channels have greater importance in the coming years. A VAR estimates using monthly Korean data for the period January 1987 to May 1994 show that bank-lending channel is working in Korean economy. Moreover, disaggregated analysis using regression equations confirms the significant role of bank lending channel especially during contractionary monetary policy in the economy. In general the study suggests that, monetary policy transmission mechanism in Korean economy involves bank lending and exchange rate channels apart from traditional interest rate channel.

Kuijs (2002) study monetary policy transmission in Slovakia using a VAR model. He observes some typical problems associated with Slovakia. In this regards the study show that banks are constrained by other factors than policy stance while considering the loan supply. Due to this reason interest rate effect is very minimal in credit deployment. More importantly, study suggests that exchange rate is the main determinant of inflation rate and interest rate have no direct effect. In general, this study gives any evidence for working of an interest rate channel in Slovakia.
De la Rocha Javier (1998) gives an overview of monetary policy transmission mechanism in Peru. It has been generally perceived in Peruvian economy, monetary impulses are transferred to the ultimate objectives through three basic channels viz., money supply, credit and exchange rate channels. The study doesn’t test relevant hypotheses. Similarly the study fails to provide evidences from other studies. The study make assumptions based on general perceptions and conventional wisdom about the policy formulations. The study gives any evidence to the working of channels in the Peruvian economy.

Morsink (2000) explore the monetary policy transmission in Japan with the help of a VAR model. His study suggests that exchange rate and interest rate channels are working in the economy. According to the results there is very less evidence for working of a supply channel. However, he find evidences for a strong bank lending channel working in the Japanese economy. The study results show banks loans have significant impact on consumer demand and business investment.

Taylor (1995) gives much importance to the open economy dynamics while addressing the issue of monetary policy transmission. Exchange rate effects on trade balance have greater importance in the globalize era. Growth perspective of international trade became a major agenda in the policy frameworks of several countries. Taylor’s explanation is based on Keynesian view with open economy dynamics. Interest rate changes have decisive role in the exchange rate determination and in this globalised world, exchange rates seriously influences the trade balances. Significant expansionary impact of exchange rate depreciations is quite evident in most of the counties. Another major issue addressed by the author is the shifts in the monetary policy transmission mechanism. A comparative analysis of the monetary policy transmission in the seventies and nineties for some of the countries viz., America, Germany and
Japan, using simulation models show that, there is some significant change happened in the transmission mechanism in the American economy.

Lettau, Ludvigson and Steindel (2000) scrutinize the empirical basis for the wealth channel in USA. Using a S-VAR model, they estimate the response to the policy shocks. From the estimates they conclude that the wealth channel is relatively weaker than what typically comes out of experiments with conventional large-scale structural models. In fact, their evidence suggests that the wealth channel in the 1990’s is weaker than it was in the 1960s and 1970s, despite the growing importance of equities in households’ portfolios. The reason for this phenomenon lies in the transitory nature of asset values’ response to funds rate shocks. Moreover consumption responds strongly only to more permanent changes in wealth. The findings suggest that rather than a causal link from monetary policy to consumption by way of asset prices; the apparent relationship between the variables may reflect the underlying inflationary pressure.

Cunningham (2002) finds that the marginal effects of the interest rate and exchange rate channels on output are fairly equal in UK. He observes that the exact pass-through through any channel depends on the economy’s cyclical position and it is higher in a boom and smaller in recessions. He finds that the average pass-through for exchange rate channel is 70% in UK.

Loayza (2002) give a very good survey of empirical studies on monetary policy transmission in Australia, Canada and the U K. He concludes that the interest rate and exchange rate channels are important in all of the mentioned countries. Asset price and credit channels are not important in any of the countries. Based on major results from other studies it is possible to understand that the role of expectations to be quite important in the UK and Canada.

Lopes L. Francisco (1998) describe the changing scenario in Brazil, where monetary policy is regaining its credibility in the recent years. Brazilian economy experience higher levels of inflation for a long period and under such
circumstances most of the monetary mechanisms remains idle. The analysis is mainly involves in giving theoretical explanations towards the impotency of policy actions during the high inflation regime and seeking theoretical plausibility for regaining the effectiveness of the policy in the changing scenario. According to the author, at present most of the channels can effectively use for transmitting the policy impulses in the Brazilian economy.

Al-Jasser Muhammad and Ahmed Banafe (1998) explain the impotency or irrelevance of monetary policy actions under a regulated economy. In the Kingdom of Saudi Arabia, credit deployment, interest and exchange rate relations are under the control monetary authority. In the Kingdom, in general, demand for money is interest inelastic, credit is not constrained, and exchange rates are fixed. These anomalies are not experienced in market economies where the standard monetary transmission mechanisms are working efficiently. Moreover, the study points out that, monetary policy is working as a subordinate to carry out the fiscal operations.

There are a few papers devoted to the study of the transmission related mechanism in Indian case. Vasudevan and Menon (1989) make one of the earliest attempts to model transmission channels. They estimate set of equations to identify the important variables in the transmission process. However the results fail to provide supporting evidence to the working of money supply or interest rate channels Indian economy. The results are inconclusive basically due to technical reasons. None of the equations provide stable results.

Ray, Joshi and Saggar (1998)) came out with evidences of working of the interest rate and exchange rate channels in the Indian economy especially after liberalization. Using a VAR model they show that there is a long run equilibrium exits among money, income, prices and exchange rate in India. They find that monetary shocks and exchange rate shocks are endogenous in the post-liberalized
era. More over the results suggest significant changes in the monetary relations between the pre and post liberalized periods.

Palanivel and Klein (1999) produce one of the best econometric models of Indian economy with special reference to monetary sector. The study identifies short run interest rate as a clean signaling variable of the money market conditions. The entire model contains 295 equations. They estimate the structural equations with ordinary least squares. The results from the study give substantial level of information about the working of Indian economy. Credit and Money supply process creates output expansion. However, money has to increase substantially to produce expansionary effects and the cost is uncontrollable inflation. Changes in interest rates, reserve ratios produce similar impact on output. Increase in interest rate or reserve ratios reduces inflation. In general, the study support interest rate, exchange rate, money supply and credit channels in Indian economy.

Mukhopadhya (1999) find evidence for working of credit channel in Indian economy. In similar manner Singh and Mitra (1999) tried to incorporate channels of monetary transmission in their macroeconomic model for explaining the results. However, Pradhan(2002) study the transmission channels in Indian economy in detail. He uses path analysis and VAR models to study the transmission channels. He reports that all channels work well in Indian economy and money supply, interest rate and credit channels are relatively strong in Indian case. As he estimate separate models for each channel, the comparative analysis have no validity.

Singh and Kalirajan (2003) study monetary policy transmission in India using a augmented vector auto regression model. The study shows that inflation has an adverse impact on output. The negative impact of money supply on output
is explained through the dynamics of inflation. However the results do not support traditional explanations to the transmission mechanism.

The above mentioned studies show that interest rate effects are prominent in most of the economies irrespective of its stages of development. Although exchange rate channel is more prominent in open economies, exchange rate effects are observed as natural extension of interest rate channel in many economies.

**2.4 Monetary Policy Transmission - Credit Dynamics**

Several scholars observed the role of credit in general economic activities in many countries. Although channels are not mutually exclusive in nature, these studies are mainly concerned about the factors which mainly affect bank lending. While some of the studies addressed the issue at aggregate level by looking at the impact of policy changes on bank lending, others addressed issues as the principal-agent problem in the light of information asymmetry and moral hazards. As mentioned in first chapter, these behavioural dynamics related to credit deployment is mainly explained through balance sheet channel. As it is necessary, these studies use firm level data to explain the credit-balance sheet dynamics. Some of the studies they looked into credit dynamics are discussed here.

Bernanke and Gertler (1995) reveal the importance of ‘cost of capital’ arguments in explaining the monetary policy transmission in the American economy. Their simple VAR model of monetary policy transmission mechanism shows that credit channel is working well in the economy. But their analysis using the data sets for the period 1965 to 1994 in various frequencies failed to separate bank-lending channel from balance sheet channel. According to them, bank-lending channel has no more relevance in recent years, as there are well-developed financial markets and active players other than banks in the advanced economies like America.
Lown and Morgan (2000) examine the role of bank lending in the transmission mechanism and provide evidence for the working of the bank-lending channel in the USA. Using a VAR approach, they found that lending standards have important predictive power on both loan volume and economic output. Two models are estimated over the disjoint period for which the data on standards are available: 1967:1-1983:4 and 1990:2-2000:3. They estimate two models viz., Classical model and an augmented model. Augmented model has standard of the customer as variable to distinguish the customers. The results show that link between monetary policy shocks and lending standards weakened over the period. They found that innovations to the federal funds rate are not particularly important in explaining lending standards. When lending standards are added to the VAR model, they appear to “substitute” for monetary policy shocks in predicting real economic activity. The lending standards have retained their predictive power in the 1990’s.

Van den Heuvel (2000) examines the role of bank capital and capital requirements in the transmission mechanism. The study proposes working of a bank capital channel of monetary policy in USA. This channel is related to the bank-lending channel and it involves policy-induced changes in bank loan supply. Instead of viewing bank reserves as a binding constraint, it emphasises the role of banks’ capital structure in shaping the response to the changes. Because of poorly capitalised banks are less likely to lend than well-capitalised institutions, the macroeconomic impact of policy’s effects through the bank capital channel will depend on both the distribution and the level of bank capital ratios. Bank capital requirements may therefore interact with monetary policy in several ways. The maturity distribution of banks’ assets can affect the transmission of monetary policy. The major notion of the study is that bank capital requirements can play a significant role in amplifying the effects of monetary policy, or of business cycles more generally, deserves to be taken very seriously.
Hernando et al. (2001) investigate the presence bank-lending channel in Spain using the bank level data. The equilibrium models are estimated and the results suggest that monetary policy produce any asymmetric impact based on size or capitalization structure of the banks. Restrictive policy doesn’t constrain banks in fulfilling their loan demand. As the liquidity positions of banks are very strong, policy constraints make less impact on bank loan activities. The results suggest that there is no significant bank lending channels existing in Spain.

Farinha et al. (2001) study use micro level bank data to identify the working of bank lending channel in Portugal. The study uses modified ordinary least squares for estimation. The results suggest a significant bank-lending channel in Portugal. The channel is working significantly through less capitalised banks.

Pandit B.L et al (2006) study monetary policy transmission channels in Indian economy with special reference to credit channels. S-VAR results show that interest rate is a very good policy instrument in Indian case. They use panel data model for analyzing the existence of credit channels. The results provide evidences for a bank-lending channel in Indian economy. The study suggests that public sector banks response quickly to the policy changes.

2.4.1 Balance Sheet Channels -Information Asymmetry and Moral hazards

Several studies explored relationship between credit expansion in the economy and balance sheet of firms under the framework of a principal-agent problem. They explored the role of information asymmetry and moral hazards in explaining the credit expansion in the economy. Compared to the studies mentioned above which use time series data at aggregate level, these studies use firm level data to explore behavioural aspects of the credit dynamics. Some of those studies are mentioned below.

Brissimis et al. (2001) examine monetary policy transmission in Greece with special reference to credit channels. A set of equations is estimated using the
panel data from 1995 to 1999. Analysis of bank level data show that monetary policy changes significantly influences the banking activities. The amount of loan supply by banks in Greece is directly related to the nature of the monetary policy.

Butzen et al. (2001) investigate the working of interest rate and credit channels in Belgium. Using micro level firm data for the period 1985-1998 they estimate Autoregressive Distributed Lag (ADL) models. They identify a significant difference among small and large firms while considering the determinants of investments. The results show that cash flow is very important in investment decisions of small firms. However, value added growth is the important variable for large firms. Large firms get help from associate institutions and groups. Small firms lack these facilities and feel more sensitive to changes in financial variables. The study also shows difference among industrial and service firms. User cost is insignificant determinant of investment for small and large service firms. However user cost, cash flow and value added growth, affects industrial firms' investment. Due to these differences among the firms, results seem to be mixed in nature.

Gaiotti, Generale (2001) analyse credit channels and give special reference to the asymmetric impact of monetary policy on Italian firms. Using firm data for the periods 1984-1999 he estimated a variety of models. The basic results show that financial variables and user cost affect investment decisions. While considering the determinants of investment, there exist significant differences among large and small firms. The impact of financial variables is stronger for small firms and firms with large share of intangible assets. Most of the monetary policy effect works through user cost. Intangible assets are hard to evaluate and cannot be used as collaterals. The results suggest that the impact of monetary policy on Italian firms is asymmetric based on their size differences.

Haan (2001) studies working of balance sheet channels in Netherlands using bank level data. He uses ADL models to analyse the data. The result shows
that credit channel is important only for unsecured bank loans. The restrictive monetary policy has larger impact on smaller, less liquid and less capitalized banks. Household loans are less affected by monetary policy changes compared to firms. Credit rationing is visible in the markets. Market segmentation is also important for the working of credit channel as it depends also on the maturity of outstanding bank debt. In general the results suggest working of credit channels in Netherlands.

Kalckreuth (2001) study the monetary policy transmission in Germany with special reference to finance constraints and investment spending of the firms. He uses ADL models to analyse the data. The results show presence of strong interest rate mechanisms and credit channels in German economy. Small firms are very sensitive to the changes in financial variables. This difference between small and large firms brings asymmetry in the policy impact. The study observes strong and long-term association between firms and financial intermediaries.

Lünneemann and Mathä (2001) study monetary policy transmission in Luxemburg using firm level data. The use ADL models and equilibrium models to analyse the data. They find that user cost and capital position are the major determinants of investment for firms. New firms are very sensitive to changes in user cost, cash flows and sales growth. Larger firms are less sensitive to these variables compared to the small ones. Service firms looks for sales growth for their expansion. Results show both bank lending and balance sheet channels works in Luxemburg. Moreover, difference in the investment determinants among the firms based on their size and product type suggests asymmetry in the policy impact.

It is possible to observe that most of the economies experience all types of channels. Individually, these studies provide evidences for traditional channels and credit channels. However, the results from many studies are contradictory in nature.
2.5 Monetary Policy Transmission under Structural Changes.

The studies mentioned above discuss the importance of various channels in different economies. While comparing the major concerns a few studies number of studies are available which slightly differ from the above mentioned studies. These studies examine the changes in monetary policy transmission process in the light of the structural transformations. These studies mainly examine the transformations in the transmission process over the period due to organisational or structural changes in the economy. Major studies in this category examine the changes in the transmission process related to the monetary unification of the European counties (EURO).

Boivin and Giannoni (2002) show that, the economy’s response to monetary policy in the United States of America has declined over the period. They carry out their empirical analysis using reduced form and structural vector autoregressions. According to previous results and policy documents the entire sample is subdivided in to three viz., 1963:1-1979:3, the second to 1980:1-1997:4, and the third to 1984:1-1997:4. They estimated separate vector autoregressions for three sub periods. Their results show that policy shocks have changed in two important ways: first, they are smaller in the 1980s and 1990s than in the earlier period; second, their dynamic response on output is milder in the later sample period.

English (2000) discuss the impact of consolidations in the financial industry on the implementation and transmission of monetary policy in USA. His discussion is mainly based on the G-10 task force report on consolidation in the financial sector (better known as the Ferguson report). The study suggests that financial consolidation has minimal effects on the implementation of policy and the transmission mechanism.

Monticelli and Tristani (1999) consider monetary transmission in a small system of three variables and compare some of their empirical results based on
aggregated data with the cross-country study by Gerlach and Smets (1995). The studies are based on same set of variables and identification schemes. The comparison of the results from the two studies brought out only mixed results.

There are two studies, which consider the transmission of monetary policy on an aggregate euro area using the S-VECM approach. The first study by Vlaar and Schuberth (1999), use a six variable system that include wealth, real money, real output, inflation rate, long-term and short-term interest rates. The results show that all the variables are capable to produce significant shocks in the euro area economy. Interest rate is found to be a significant policy variable. It is concluded that controlling money, as a policy variable is very difficult at aggregate level in the Euro area.

The results from Coenen and Vega (1999) also reveal that controlling money supply in the short-term is problematic in the Euro area. However, their opinions differ for the long horizons. They argue that controlling money stock is quite possible in the long run because interest rate shocks dampen the inflationary pressure for enough long periods. They consider a five variable system similar to Vlaar and Schuberth (1999) however; wealth is excluded from their model. They found three stable long-run relationships and the results show that in the long run real money balances are not affected by a monetary policy shock.

Angeloni et al. (2001) study monetary policy transmission in Euro area. They use structural and VAR models to study the transmission mechanism. The study contains both time series and panel data models. The study has specific mention on most of the EU countries viz., Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, Netherlands, Portugal and Spain. Based upon the results from the study it is possible to classify the countries to three groups. In the first group, countries experience strong interest rate mechanism and other finance variables are not much important. These countries particularly experience weak credit channels. Countries like Austria, Belgium,
Finland, Luxemburg and Spain fall in this group. In the second group of counties interest rate mechanism works at a slower pace. Finance variables play very important role in these counties in determining aggregate demand. Credit channels are important in these countries. Belgium, France and Italy belong to this group. In some other countries, evidences show that interest mechanism is working well. However, credit channels also very significantly in these countries. Germany, Netherlands and Portugal are these countries where multiple channels are working efficiently.

Reserve Bank of India (RBI) provides a number of studies on the monetary policy transmission in India for different time periods. Among them RBI (2001) is particularly important as it looks in to the impact of liberalization on monetary policy transmission. With the help of S-VAR models RBI (2001) examine the difference in the transmission method before and after the liberalization period. A comparison between pre-reform (1981:04 to 1990:06) and post reform (1994:04 to 2002:12) VAR estimates show that the impact of monetary policy shocks on output has declined in the post reform period. However, the impact of interest rate shocks on inflation is still visible in the economy. The study provides evidence for working of a bank lending channel in the Indian economy.

2.6 Asymmetric Impact of Monetary Policy

Studies on monetary policy transmission generally look at the impact on macroeconomic aggregates like national output, inflation level etc. However, a stream of articles looks in to the impact of monetary policy at segregate level. In this regard, variations in sector wise output, price level of certain goods, responses of intermediate and final goods etc are considered as target variables. Few of such studies are reported below.

Brady(1970) and Claurette (1973) identify the significant impact of monetary policy on residential construction and mortgage activities compared to
other sectoral activities. Brandy asserts that sluggish movement of interest rate in administrative structure compared to conventional market rates is the major cause of differential impacts of monetary policy. Claurette also mention the significance of consequent changes in demand for funds by different business activities.

Albon and Valentine (1977) observe that a sector's demand for advances is determined subject to the availability of over draft rights. He finds that demand for advances in agriculture sector is different from other sectors. He also mentions that interest rates have significant effect on advances in manufacturing, transport, storage and communication, financing, building and construction and personal sectors. Similarly he asserts that credit-rationing variables are important only in few sectors.

Bernanke and Gertler (1995) summarized four basic facts about the response of the economy to monetary policy shocks. viz., 1) although an anticipated tightening in monetary policy typically has only transitory effects on interest rates, a monetary tightening is followed by sustained declines in real GDP and price level, 2) final demand absorbs the initial impact of a monetary tightening, falling relatively quickly after a change in policy. Production follows final demand downward, but only with a lag, implying that inventory stocks rise in the short run. Ultimately, however, inventories decline, and inventory disinvestment accounts for a large portion of the decline in gross domestic product, 3) the earliest and sharpest declines in final demand occur in residential investment, which spending on consumer goods (including both durables and non durables) close behind, 4) fixed business investment eventually declines in response to a monetary tightening, but is fall lags behind those of housing and consumer durables and, indeed, behind much of the decline in production and interest rates.

Aoki, Proudman and Vlieghe (2000) consider the effect of financial market imperfections on housing investment and consumption. They analyse the
role of wealth in monetary transmission in the context of a broad credit channel. Specifically, they use a variant of the financial accelerator model developed by Bernanke et al (1999), calibrated to United Kingdom (UK) data, to assess the impact of monetary policy on the real economy through its effect on housing prices. They provide a VAR based analysis to identify the effect of monetary policy on housing prices, housing investment, and consumption. Their model indicates that policy-induced changes in house prices have in fact played a significant role in the transmission of monetary policy in the UK. They also found that recent financial innovations, such as easier refinancing terms and increased consumer access to unsecured credit, might have altered the transmission mechanism via housing prices. Easier access to housing collateral in particular has increased the sensitivity of consumption to house prices and policy shocks. However, better access to credit cards has weakened the link. Overall, they conclude that monetary policy shocks now have smaller effects on housing investment and housing prices in the UK, but slightly larger effects on consumption.

McConnell and Perez-Quiros (2000) analyze the possible role of inventories, which have historically been a major contributor to macroeconomic volatility in USA. They test the hypothesis that better inventory management can smoothen the propagation of demand shocks. They observe that inventory management can be improved with the help of information technology. Specifically, the technology allows the firms to better anticipate sales fluctuations. So production can respond more quickly to sales fluctuations. They use simulations in a variant of the simple log-linear accelerationist framework to study the responses from different variables. They document increased stability of both inflation and output in the economy since 1984. The argument is that inventory investment, has played a key role in reducing volatility. It is particularly
significant in the durable goods sector. They observe that technological factors play the primary role on the output side. According to them monetary policy have to get the credit for effectively stabilizing inflation.

McCarthy and Peach (2000) focus on the housing market dynamics, using a structural model of housing investment in USA. They examine how regulatory changes and other innovations in housing finance affect the transmission of policy shocks to housing investment. They find that interest rates play a significant role in this regard. The dismantling of regulation Q and the shift from thrift-based intermediation to a more market-oriented system of housing finance enhanced the role of interest rates.\(^{21}\) Perhaps as a consequence of these changes, mortgage interest rates respond more quickly to monetary policy than they did prior to 1986. Residential investment, on the other hand, responds more slowly, and fluctuates more or less concurrently with the overall level of economic activity. An important implication suggestion is that the housing sector is no longer a leading indicator of monetary transmission. Results from the structural model suggest that monetary policy is now transmitted to housing sector through pricing channels, rather than through quantitative financing restrictions, as was typical during the New Deal financing system era.\(^{22}\)

Estrella (2000) examine the impact of asset securitisation on the transmission mechanisms of monetary policy in USA. He studies the effect of a change in the real interest rate on the output gap using a variant of investment-saving equation of Rudebusch and Svensson (1999). The Result show that the sensitivity of both real output and housing investment to the real Federal funds rate declined significantly in the 1990’s compared to 1980’s. During the same period, the degree of asset securitisation has increased substantially. They address

---

\(^{21}\) Regulation Q is a limit on put on the banks in United States in paying interest rates.

\(^{22}\) New Deal refers to the economic policy actions taken during 1933 to 1936 in order to fight against the “Great Depression” in United States.
the question of whether the decline in the interest elasticity of aggregate demand and the decline in the level of mortgage rate is caused by monetary policy by constructing a S-VAR model of the relationship between the federal funds rate and a mortgage interest rate. The analysis suggests that securitisation has largely affected the “non-interest rate” transmission mechanisms such as the bank lending or credit channels of monetary policy in the United States. Moreover the cyclical effects of monetary policy have been influenced by the secular growth in securitization in recent decades.

Studies conducted by Ganley and Salmon (1997), Hayo and Ublenbrock (2000), Dedola and Lippi (2000) show that, the demand for durable products such as investment goods is known to be much more affected by a rise in the interest rate through the usual cost of capital channel than the demand for non-durables such as food. Moreover, Ganley and Salmon identify that the size and timing of sectoral output responses towards a policy shock varies substantially across the sectors. In this regard largest and absolute responses are visible in construction and distribution sectors and smallest in agriculture sector.

Dedola and Lippi (2000) observe significant cross-industry heterogeneity of policy effects while considering a particular country. However, the distributional effect off monetary policy is similar for major OECD countries. The patterns of responses are systematically related to industry output durability, investment-intensity, measures of firm’s borrowing capacity, size and interest payment burden.

Bernanke and Gertler, Hayo and Ublenbrock and Farès and Srour (2001) made specific observations about the response lags in different sectors. In this regard Hayo and Ublenbrock find a wide difference in the response lags, in the case of industrial output.

Farès and Srour (2001) find contraction in the demand for durables are higher and faster than that of semi-durables as a response towards a monetary
shock. Effect of shock on non-durables is insignificant. Non-residential constructions respond sluggishly towards monetary policy shocks. There are similarities in the response of residential construction and machineries and equipments. In production side, manufacturing sector responds most strongly towards a monetary policy shock. However, quickest reaction is from the construction sector.

Raddatz and Rigobon (2003) make detailed observation about the interest rate sensitiveness towards a policy shock. High interest rate sensitivity sectors will experience larger cyclical fluctuations than low sensitivity ones. Their results also suggest that the sectoral transfers are potentially significant. Monetary policy achieves stabilization only by inducing relatively large expansions and contractions on high interest rate sensitivity sectors.

Differing from other studies, Chrystal (1984) mainly discusses the impact of changes in money on sectoral activities. He finds that the link between money growth and output changes varies significantly across different sectors of the economy.

Gert Peersman and Frank Smets (2005) look into the asymmetrical responses during booms and recessions. According to Gert Peersman and Frank Smets both in recession and booms average policy multiplier is significantly negative. Degree of asymmetry in booms versus recession is very significant. The overall output affect of the common monetary policy shock do not differ significantly from the average effect across the countries. The durability of the output produced by the sector is an important determinant of its sensitivity towards monetary policy changes.

Boivin and Mihov (2007) find that macroeconomic shocks explain only a small fraction of sectoral inflation dynamics. However, the persistence of sectoral inflation is driven by macro economic factors. They observe that the disaggregated prices respond quickly to sector-specific shocks, and their
responses to aggregate shocks are similar on impact and larger thereafter. They find that, degree of market power is a good explanatory variable for producer price variations.

Most of the above-mentioned studies identified some common factors that lead to the asymmetric impact of monetary policy shocks on various sectors of the economy. Existence of segmented credit markets and interest rate structure, significant variation in the interest rate sensitiveness of sectoral investments, differences in the availability of institutional credit for different economic activities and institutions etc are the basic determinant factors of asymmetric responses. Large level variations in sectoral responses to monetary policy shocks are visible in these studies.

2.7 Summary

Monetary policy transmission is a well surveyed topic in the economic literature. Several studies have covered both theoretical and empirical aspects of the transmission mechanism. Earlier studies give importance to identify the presence of liquidity effects, interest rate effects, other relative price effects and exchange rate effects in the economies to explain the transmission process. The importance of bank credit also has observed in some of these studies to explain the policy dynamics. In the later years, many studies tried to explore the relationship between credit expansion and balance sheet changes to explain the transmission process. Empirical studies on the topic give mixed results while comparing the importance of different channels. However, most of the economies experience working of multiple channels. There are some changes happened in the transmission mechanism in some economies due to the structural changes. Few studies give importance these transformations and most of them analysed the impact of unification of European countries on transmission process in the Euro area. Most recently some studies try to explore the asymmetric impact of
monetary policy on various sectors of the economies and they identified some common factors which lead to the asymmetry.