MONETARY TRANSMISSION MECHANISM IN A DEVELOPING ECONOMY: A REVIEW OF LITERATURE

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ABSTRACT

This paper reviews the literature on how monetary transmission mechanism has grown over time. The main channels of monetary policy transmission include the Neo-Classical channels that links the short run interest rates, other asset price channels which focus on long run interest rates, equity prices, exchange rate, and the ultimate effect on business and household demand. These channels have been popular from early policy-oriented models. On the other hand, the Non-Neo-Classical channels such as channels based on credit to the private sector have remained outside the core models of monetary transmission mechanism. In concurrence with the evolution of the theory and practice in monetary transmission mechanism, there have been observed a notable change in the policy behavior over time. Furthermore, in a developing economy of Pakistan, there is need to modify the set of monetary policy instrument, the external sector of Pakistan and, the coordination of fiscal policy to conduct a successful monetary policy for Pakistan.

Keywords: Monetary transmission mechanism; Neo-Classical Channels, Non-Neo-Classical Channels

INTRODUCTION

This paper reports the macroeconomic thoughts and empirical assessment on monetary transmission mechanism in Pakistan and around the globe. The paper is presented based on classification and modelling the channels of monetary transmission mechanism which includes the new classical channels (which assume the perfection of the financial markets) and the non-neoclassical channels (which assume the imperfection in the financial market) which is also known as the credit view of MTM. The classical channels establish the relationship between short run policy rates, that is the short run interest rates, exchange rates, long run interest rates, equity prices (that is other assets prices) and its effects on the

household as well as the business demand (the early literature on monetary transmission mechanism). On the other hand, the non-neoclassical channels discuss the channels of monetary transmission mechanism which are based on credit provision and regulatory system. Literature identifies both internal and external factors that affect the effectiveness of the monetary policy in small open and developing economies like Pakistan. There exists a lot of literature on modeling the monetary transmission mechanism both in developed and developing countries as well. Literature relevant to monetary transmission mechanism in Pakistan has been reported separately. The detail of all such relevant literature is reported below.

CHANNELS OF MONETARY TRANSMISSION MECHANISM

The significance of the monetary transmission mechanism has increased interest of the policy makers half a century ago, giving birth to large debates in this regard. Specialists in this area have increased the interest of people in two ways. Firstly, the necessity of understanding the way monetary policy affects the real economy; secondly, to choose the appropriate monetary policy instruments and the right time that is most suitable to achieve the macroeconomic goals.

The study of monetary transmission mechanism gained popularity after the global financial crisis in the real estates of the United States in summer 2007 after the monetary policy lost the capacity to affect the real and financial sectors. The main question raised at that time was whether a monetary policy worked during financial crisis. If yes, what were the factors that influence the monetary transmission mechanism during financial crisis? And what are the factors with which we could assess the efficiency of monetary transmission mechanism during crisis? To answer these questions, more effort is required to analyze the monetary policy transmission in a more critical way.

MONETARY POLICY AND REAL ECONOMY

There are two types of policies that affect real economy: fiscal policy and monetary policy. Monetary policy affects real economy by impulse response as being the prime base of monetary policy. Monetary transmission mechanism is defined by different economists where there is a high degree of uniformity between their definitions. (Taylor, 2000) defined the monetary transmission mechanism as the monetary policy action through which the central bank of the country affects real GDP and inflation.

Literature identifies two types of approaches to assess the monetary policy functioning that is the monetary approach, which is also known as the money view in which the interest rate has direct impact on the investment and the second one is exchange rate and credit approach, according to which there are intermediaries that play the role in the monetary transmission mechanism to affect production and prices (Cecchetti, 1995).

There are two main theories regarding the design of monetary transmission mechanism: Monetarist and Keynesian theory. Keynes is of the view that there is a direct impact of the

interest rate on the firm balance sheet. But unlike the Keynesian view, Monetarists are of the view that interest rate has both direct and indirect impact on aggregate expenditures of the economy.

To understand the functionality of the monetary transmission mechanism, recent literature mainly focuses on two important segments: translation of monetary policy action on the financial variables and the transmission of the financial variables to the real sector. The functioning of monetary policy mainly depends on the financial sector, especially banks, degree of openness of the economy, the balance sheet position of the firms and financial intermediaries in the economy (Adrian & Shin, 2010; Loayza & Schmidt-hebbel, 2002; Sukmana & Kassim, 2010). From another viewpoint, the functionality of the monetary transmission mechanism has two essential elements: the first one is the analysis of the monetary policy action and the second one is the respective identification of channels through which monetary policy action translates into the real economy (Endut et al., 2013; Forni & Gambetti, 2010).

For a successful conduct of monetary policy, it is mandatory to understand the magnitude and sense of measures taken. The monetary policy makers understand the way the monetary policy affects the real economy through different channels. For example (Taylor, 1995), cited the work of Belke & Polleit (2009) as regards the identification of the monetary transmission mechanism, in which four principal channels including interest rate channel, the asset price channel, and exchange rate channel credit channel were identified.

NEOCLASSICAL CHANNELS OF MONETARY TRANSMISSION MECHANISM

The traditional channels of transmission mechanism are also known as the neoclassical monetary transmission mechanism. These channels include the investment, trade and consumption channels that are incorporated in the standard model of neoclassical monetary policy economist. Interest rate channel was formally discussed by (Dale, 1963; Tobin, 1969) in their macroeconomic models. In the new classical channels of monetary transmission mechanism, short run interest rate has direct impact on the consumption, investment, and international trade in the economy. The short run interest rate shock affects the user cost of capital which in turn affects the investment decisions in the economy. This channel is closely related to Tobin q channel of monetary transmission mechanism. Similarly, the consumption is affected by the wealth effect and intertemporal substitution effect. The international trade channel operates through the exchange rate movements in the economy. The consumption model was presented by Bromberg and Modigliani (1954), Ando and Modigliani (1963), and Friedman (1957). International goods and money market equilibrium models were, in addition, introduced by Mundell 1963 and Fliming 1962.

INTEREST RATE CHANNEL

This is the traditional channel of transmission mechanism. This channel has been embedded in the macro-economic models to highlight the implications of interest rate on macro economy. Interest rate affects investment decisions, business decisions, and household investment decisions regarding residential in consumer durables spending. The monetary policy authority uses the short run interest rate as monetary policy instrument. The short run interest rates are linked with the long run interest rates (expectation hypothesis and the term structure of interest rates).

Investment decisions regarding businesses and household expenditures can also be described in terms of James Tobin q-approach. For business decisions (Tobin, 1969) defines q as the ratio between Market value of the firm and the replacement cost of the capital. (Hayashi, 1982) further linked the Tobin q approach with the user cost of capital approach. The q theory dominates the efforts made by the micro based modeling and DSGE models. The link between the q theory and the user cost of capital is established in the dynamic cost adjustment approach which is more convenient to be analytically expressed in such models. Moreover, the q theory adds a degree of richness as it establishes the link between the stock prices and investment spending. The q theory, therefore, makes way for a new channel of monetary transmission mechanism where interest rate shock translates the pressure to stock prices. When monetary policy is easy, interest rate is lowered; the demand for stocks increases and the stock prices go up, thereby leading to increase in investment spending and the aggregate demand in the economy.

The user cost channel has been followed by the macro econometric models by developed economies such as the US model for policy analysis (Brayton & Mauskopf, 1985) and the more recent model that is FRBUS model (federal reserve bank model) used by the federal reserve board (Reifschneider et al., 1999). It is also used as a standard feature in the macroeconomic models by the developed countries' central banks such as ECB (European Central Bank) and Bank of England in their macroeconomic policy assessment (Fagan, Henry, & Mestre, 2005)(Harrison et al., 2005). The interest rate channel in the form q has also been used by the central banks in the US, Europe and Canada in their macro-economic analysis (Christoffel et al., 2008; Edge et al., 2007, 2008; Murchison & Rennison, 2006).

To assess the outcomes of the interest rate channel in short run and long run, different studies have been conducted in many developed countries. Short-term response of the investment to the interest rate shock was analyzed by (Smets, 1995b) as a comparison between central banks and drawn true results. However, the long-term response of the investment was found controversial.

CHANNELS BASED ON CONSUMPTION

There are two channels that are associated with consumption. Consumption covers a significant part of the aggregate demand which is supposed to be influenced by the monetary policy shock. Consumption in the economy is influenced by shock to the national wealth which is also known as wealth effect of monetary policy and the intertemporal substitution of consumption which has been pointed out by the Euler equation.

The idea of the wealth effect was formally introduced by (Modigliani, Modigliani, & 1954,) and was then modified by (Ando, & 1963,) in the form of life cycle hypothesis. According to life cycle hypothesis, consumption and saving depend on lifetime assets. In case of expansionary monetary policy, lower interest rate raises the prices of assets and then wealth. Alternatively, lower interest rates lead to lower the discount rate allied to income stream and services flows linked with homes, stock and other assets drive up their prices. The raise in wealth then influences the consumption and aggregate demand.

The monetary transmission mechanism via wealth has been assessed by the Federal Reserve Bank in the United States. The macro econometric model used to assess the implication of wealth effect in the monetary transmission mechanism in US established that the long run marginal propensity to consume coming out of wealth was from 3 to 4 cents per dollar from housing as well as stock wealth (Fair, 2004). (Catte et al., 2004) conducted a study in the OECD countries to quantify the long run marginal propensity to consume from financial wealth and they reported that the average long run marginal propensity to consume in all OECD countries is .035 which is not very different from their findings for the United States which is 0.03. Further, it was established that the wealth effect in the monetary transmission mechanism appears in the short run with a smaller effect. Moreover, the wealth effect plays an important role in modelling monetary transmission mechanism but a secondary role in direct interest rate channel of investment in most modeling efforts (Smets, 1995a).

The intertemporal substitution channel has also been assessed by many economists via DSGE models. The effect of the inter temporal substitution of consumption has also been observed in the short run with a smaller effect, mainly when habit persistence was incorporated (Christoffel et al., 2008; Edge et al., 2007; Smets & Wouters, 2007).

INTERNATIONAL TRADE CHANNEL

The international channels of monetary transmission mechanism consist of exchange rate channel. The interest rate shock of monetary policy affects the return on domestic assets which in turn influences the value of domestic assets in terms of foreign assets and the value of domestic currency in terms of foreign currency. The variations in the exchange rate affect prices of imports and exports and hence the aggregate demand. The significance of this channel in the monetary transmission mechanism depends on two factors: the sensitivity of the exchange rate to the interest rate and the degree of openness. (Boivin et al., 2010a). Empirically (Smets & Wouters, 1999), analyzed the exchange rate channel of monetary policy in Germany. It was observed that the policy rate had accelerated the pass-through effect and the response of the various components of GDP was different.

NON-NEO-CLASSICAL CHANNELS (THE CREDIT VIEW)

Those channels of monetary transmission mechanism which appear due to imperfections in the credit market except those associated with the nominal wage and price rigidities are called non-neo-classical channels. These channels are classified based on either government intervention in the credit market or imperfections like asymmetric information or market segmentation or restrictions on efficient market functioning in the private market. Since these channels are being linked with credit market, so these are also known as the credit view of monetary transmission mechanism. The detail of these channels is given below.

EFFECTS OF GOVERNMENT INTERVENTION IN THE CREDIT MARKET

To achieve certain policy goals such as encouragement of certain investments like housing etc., the government often interferes with the free functioning credit market. This practice has been observed in the United States to encourage home ownership. Till 1980s, the US government had set up a system in which the thrift institutions mainly the loan and saving association issued residential mortgages to the residents. These institutions advanced long-term fixed rate mortgage loans where funds were being generated from the local time deposits (McCarthy & Peach, 2002). The government of US further encouraged these thrift institutions by helping them attract more deposits and advancing more loans to the locals. The government had regulated ceilings on deposit rates under the regulation Q to pay 0.25% more than the commercial banks pay to the depositors. The regulation that the thrift institutions would advance long-term mortgage loan and the higher interest rate on deposits made the government intervention in the credit market an important channel of monetary transmission mechanism. But when the government adopted a tight monetary policy and the short-term interest was raised, it was difficult to survive for the thrift intuitions because the higher short-term interest rate increased the cost for funds and low-income stream coming from the long-term fixed rate mortgage income. The thrift institutions were unable to advance mortgages, and thus this curtailed the credit supply.

Even sometimes the short-term interest rate offered by the commercial banks resulting from the policy shock exceeds the ceiling rate offered by the thrift institution. Such situations may cause the depositions to withdraw their deposits from thrift intuitions and invest it somewhere else for higher earnings. Such situation is known as disintermediation. This channel was active in the set of channels of monetary transmission mechanism in 1980 pre models e.g., (Brayton & Mauskopf, 1985). The effect of this channel on the economy was not long lasting. Furthermore, the Q regulation was gradually eliminated and was completely abandoned since 1986. Thus, the disintermediation made the government intervention channel less important.

CHANNELS BASED ON BANKS

There are two channels of monetary transmission mechanism which are based on banks. These channels play a special role in the transmission process of monetary policy because the commercial banks loans are not perfect substitutes for the other institutions loans. Bank base channels include bank lending channel and balance sheet channels. Both of these channels are reviewed in detail below.

THE BANK LENDING CHANNEL

The bank channel plays an important role in the monetary transmission mechanism. The reason is that commercial banks play an important role in solving the problem of asymmetric information in the credit market. Because of the special role of commercial banks, there are always certain borrowers in the credit market who would never have had loans unless they borrowed from commercial banks. If there is no perfect substitute of commercial banks credit in the credit market, the commercial banks play their role in the monetary transmission mechanism as during expansionary monetary policy the central banks increase the reserves, deposits, and quantity of commercial bank loans available. The availability of credit in the commercial banks fulfils the need of many investors, which in turn influences the investment and spending level in the economy (Boivin et al., 2010a).

Another important implication of the bank lending channel is that small firms depend mostly on lending from commercial banks as opposed to large firms where they get financial resources from the bonds and shares markets directly. The bank lending channels have been investigated in many developing and developed countries and found active (Agha, Ahmed, Mubarik, Bulletin, & 2005, ; Gertler & Gilchrist, 1993; Hussain, 2005; Kashyap, Policy, & 1995, 1995; Peek & Rosengren, 1995). There are also certain studies which create doubts about the bank lending channels (Ramey, 1993; Romer & Romer, 1989). Moreover, there are studies which suggest that the bank lending channel is important in the set of monetary transmission channels but the effects of this channel is quite small (Lown & Morgan, 2002). (Iacoviello & Minetti, 2008) study suggests that the bank lending channel is active for household in those countries where the mortgage fiancé is mostly dependent on commercial banks. Despite enormous literature on the empirical investigation of the bank lending channel, the evidence across studies is diverse. There is lack of literature on this channel which investigates this channel at the macroeconomic level. We cannot deny the significance of this channel for some firms, households, or even certain episodes.

Another channel identified by the literature is bank capital channel. According to this channel, the balance sheet of the commercial banks and other financial intermediaries has important implications for banks' lending capacity. Decline in asset prices may lead to losses; loan portfolios thereby decline in credit quality by banks. The reason is that the borrower loses their ability to pay back their loans, which in turn reduces the value of bank assets and then bank capital. This was evident during the global financial crises of 2007 and onward. The decline in bank capital leads to reduction in bank credit as external financing could become costly for commercial banks. The effective way to minimize banking costs is to increase the capital to assets ratio thereby shrinking their assets base and reduce lending. In

such a case, it would be too difficult for the most bank dependent borrowers to get credit from banks. Thereby their investment spending will get affected, affecting aggregate demand in the economy (Boivin et al., 2010b). Expansionary monetary policy improves the bank balance sheet in two ways: principally, during expansionary monetary policy, a reduction in the short-term interest rate increases bank's profit margin, so the balance sheet of the commercial banks improves over time. Secondly, a fall in the short-term interest rate raises the bank asset prices, which in turn enhances the bank capital and lending capacity, so the aggregate demand increases by credit creation process. The bank capital channel and the bank lending channel have not yet been built in the macroeconomic models, or even in DSGE models for macroeconomic analysis in the developed economies. These channels played a very important role in the monetary transmission mechanism during the early nineties, and lost the attention of the policy makers when the bank balance sheets deteriorated (Reifschneider et al., 1999). The recent research documenting the monetary transmission mechanism, particularly after the global financial crises 2007, reports that these channels play a very important role in the monetary transmission mechanism (Mishkin, 2008; Wessel, 2010). These channels are now being built in the mainstream macro econometric models used in monetary policy analysis (Angeloni & Faia, 2009; Gerali et al., 2010; Meh & Moran, 2010).

THE BALANCE SHEET CHANNEL

This channel of monetary transmission mechanism also emanates from asymmetric information like the case of the bank lending channel in the credit market. A fall in the agent's net worth increases the issues of moral hazards and adverse selection in the credit market. In such situations, the lenders are usually reluctant to lend money to borrowers. Banks either charge higher mark up or curtail their advances... Thus, commercial banks limit volume of credit, by this means, curtailing the investment spending and aggregate demand in the economy. A widely adopted and convenient model used in such situations is the financial accelerator model in which the problems associated with moral hazards and adverse selection in debt financing are augmented by lower net worth thereby increasing the external finance premium (Bernanke, Gertler, & Gilchrist, 1999).

Monetary policy affects the firm's balance sheet in many ways. Firstly, contractionary policy lowers the assets' price in general and equity prices which curtails the balance sheet of the firm. This in turn creates the problems of moral hazards and adverse selection thereby curtailing the lending, spending and output in the economy. Secondly, due to contractionary monetary policy, the interest rate rises which affects the cash flows. When interest rate increases due policy shock, the cost of funds for the firm on deposits rises as well and so the firm has fewer options for internal funds. The firm must raise external funds where the problem of adverse selection and moral hazards is already there besides the external finance premium. Such issues curtail lending, spending and the aggregate demand in the economy as well. What is interesting in the cash flow channel of monetary policy is the behavior of the nominal interest rate which affects the cash flows of the firms in the short run, unlike the role of the real interest rate in the neo-classical channel of interest rate. Moreover, the short run interest rate grabs special importance because the firm's short-term debts are more responsive

to the fluctuations in the short-term interest rate. The balance sheet channel has been investigated by a number of ways in an attempt to conduct optimal monetary policy (Curdia & Woodford, 2010; Fuerst et al., 2009).

The types of balance sheets have also important implications for the households as well. For example, an increase in the prices of homes improves the value of the collaterals of the homeowner which make ease for him to get credit. Similarly, increase in value of the other assets of the household reduce the cost and amount of borrowing from the external sources thereby increasing the spending and aggregate output level (Benito et al., 2006; Hatzius, 2006). There is also certain literature which models the financial accelerator approach in the framework of housing and household expenditures (Iacoviello, 2005).

MONETARY TRANSMISSION MECHANISM AT SECTORAL LEVEL

Until 1980, the monetary policy transmission mechanism was popular at the aggregate level. Monetary policy was conducted via different monetary policy tools such as policy rates bank credit, money aggregates and exchange rate etc. to bring policy induced changes to achieve the macroeconomic objectives of the economy. The objective of the monetary policy is to get higher economic growth without inflation. The weak predictive power of the macro econometric models induced the economists to analyze micro aspects of the monetary policy transmission of the economy. Since then, many studies have been conducted to disaggregate the monetary policy transmission mechanism around the globe.

Initially (Bernanke & Gertler, 1995), found inadequacy in the analysis of macroeconomic transmission mechanism. They were of the view that monetary transmission mechanism, at the aggregate level, is a black box and it is difficult to predict the right path of the Macro Economic variables as a response to the monetary policy actions in the economy. Thus, for better understanding, contemporary literature has explored the new paradigm of monetary transmission mechanism that is the monetary transmission mechanism at sectoral level. Monetary transmission mechanism at sectoral level helps in having better understanding of the monetary policy shocks that affect the different components of aggregate demand of the economy such as consumption, investment, government expenditure, industrial sector, agriculture sector, mining sector and international trade etc. Likewise, many studies have been conducted to analyze the asymmetric information, moral hazard, market imperfections (Stiglitz & Weiss, 1981), bank lending channel and the balance sheet channels (Bernanke & Gertler, 2001)(Kashyap, Stein, & Wilcox, 1993)(Kashyap et al., 1995).

There are also some studies in the literature that report the monetary transmission mechanism in different production sectors with heterogeneous characteristics such as labor intensity, capital intensity financial structure, technologies, openness, trade, wage contracts and even the product prices (Ahmed, 1987; Guiso, Kashyap, Panetta, & Terlizzese, 1999; Hayo &Uhlenbrock, 1999; Kandil, 2018; Kretzmer, 1989). According to the literature, the disaggregated analysis of monetary transmission mechanism aids in identifying utmost

important factors and sectors where the money transmission mechanism translates differently. The discussion of the disaggregation of the monetary transmission mechanism added many dimensions and methodologies to the literature of monetary policy implications.

For example, there so many studies such as (Ahmed, 1987; Craig, 1981; Enders, 1984) that focus on the neutrality of money hypothesis. They test whether anticipated or unanticipated money growth causes growth across countries and industries. In their studies, they concluded that the disaggregation of monetary policy transmission mechanism is better for having a good understanding of aggregate demand ensuing from the monetary policy shock. Furthermore, it is stated that the disaggregation of the monetary transmission mechanism at sectorial level differs across countries, time, and industry and at different sectors of the economy(Ball et al., 1988; Barro, 1978a, 1978b; Barro, 1980, ; Craig, 1981; Duca, 1987; Dutkowsky, 1987; Edwards, 1988; Lilien, 2016; Schultze, 1984).

These studies are of the opinion that if different sectors of the economy are overlooked, then the aggregate analysis of the monetary policy transmission cannot capture the important aspects of the economy. For example, the shift of employment from one sector to another sector may lead the economy up or downturn. Models which identify international factors as well as sectorial differences are good enough themselves to predict the effects of monetary and exchange rate policies on different components of the demand both at aggregate and sectorial level(Lilien, 2016). (Schultze, 1984) established that demand shocks of the economy affect different variables not only at home but also create jitters in other countries. Even in the home country, the response of the variables is different across different time periods. Similarly (Ball et al., 1988) found that shock to the nominal GDP affects both real output and domestic prices differently in different countries.

In more recent literature (Gertler & Gilchrist, 1994), made a comparison between small and large firms in the United States for the manufacturing sector to a monetary policy shock. (Bernanke & Gertler, 1995) applied vector auto regression model to analyze the different components of the aggregate spending such as consumption of durable commodities and nondurable commodities, business fixed investments and residential investments. To analyze the responses of the industrial sector output and prices, (Haimowitz, 1996) carried out a study in the United States taking the annual data of 450 industries of standard classification of the manufacturing sector. The objective of the study was to analyze the responses of the industries having different characteristics to the monetary policy shock. It was observed that industries of durable commodities exhibited substantial response to the monetary policy shock, whereas the response of the price was found marginal than the industries of non-durable commodities. Moreover, it was observed that output and prices of those industries producing goods for the producers responded relatively substantially to the monetary policy shock as compared to the industries producing goods for the consumer. High concentration industries exhibited higher response of output and low response in prices. Industries having high inventory to sale ratio responded slightly in their prices and output to the monetary policy shock.

There are studies which explain the degree of response of different sectors of the economy to the monetary policy shock. For example (Berument and Nergiz Dincer, 2008), identify different channels through which the monetary policy action affects different sectors of the economy differently. There are two main factors: dependence on bank credit (Bernanke and Blinder, 1988) and the ease with which a firm can adjust its balance sheet (Kashyap & Stein, 1994). These factors lead to variate the degree of response of different sectors of the economy to monetary policy shocks (Kashyap et al., 1995).

Foremost reasons can be the production strategies and the pattern of input and output demand and different levels of capital intensity in different sectors. All these reasons suggest that utilization of the bank credit is different across sectors. Moreover, banks' flexibility in the adjustment of their balance sheet determines the volume of the credit availability in each sector; firms arrange their working capital using bank credit differently in different sectors. A sector that utilizes less portion of the bank credit is responsive to the interest rate shocks relative to those that utilize a large portion of the bank credit. The employment of different factors of production is also important in this regard. The degree of intensity of the different factors of production differs across countries. Therefore, the response of different sectors in different countries is different to the interest rate shock, depending on whether the technology is labor intensive or capital intensive. Similarly, the combinations of factors of production, as well as raw material hired domestically, which are imported from abroad are different in different sectors. Thus, change in interest rate leads to different variations in output in different sectors that employ domestic and imported factor inputs as per their demand. Thus, any variations in the exchange rate led to variations in the price of inputs and so the cost of production which leads to vary the level of output in different sectors of the country.

MONETARY TRANSMISSION MECHANISM IN PAKISTAN

There is plenty of literature that explores the monetary policy implications in South Asia in general and in Pakistan in particular. For example, (Ahmed, 2002) carried out a study in the selected SAARC countries namely Pakistan, Bangladesh and India to analyze the causal relationship between money, prices, interest rate and real output. For empirical results, quarterly data has been analyzed covering the period from 1960s to 1998 (small percentage difference across countries). After carrying out bivariate and Tri-variate Granger causality test, it was concluded that short run interest rate is a better monetary policy instrument in the case of Pakistan and Bangladesh, whereas money supply appeared to be good policy instrument in the case of India. In Pakistan, the causal link between money and prices was formally investigated by (Jones & Khilji, 1988). They used monthly data covering the period from 1973-1985 taking two proxies each for money (M1 & M2) and prices (CPI & WPI). The results from running bidirectional Granger causality established unidirectional causality running from money to prices. The same study was carried out by (Bengali et al., 1999) using quarterly data from 1972-1990. Their results showed bidirectional causality between money (M1 & M2) and prices (CPI). To establish the relationship between money income and output in Pakistan, (Husain & Abbas, 2000) applied bivariate and trivariate analysis on annual data for the period 1949 to 1998. Cointegration analysis was used to establish causal link between

these variables. The results show that there is a long run relationship between money output and prices. Moreover, a bidirectional causality is established between money and prices. Furthermore, (Masih & Masih, 1997) investigated the causality between money and prices. For establishing bivariate, trivariate and multi variate causality, quarterly data has been used in the Johansen (1991) cointegration analysis. The variables used in the analysis, consumer price index, industrial production index, spot exchange rate and money supply (M1 & M2) were used in the multivariate analysis. Their results from the impulse response function and forecast error variance decomposition concluded that monetary policy was ineffective in case of Pakistan. To reexamine the causal relationship between money supply and inflation in Pakistan, (Husain & Mahmood, 1998) carried out a study in Pakistan. Besides two proxies of prices that are CPI and WPI, three definitions of money supply namely M0, M1 and M2 were taken for cointegration analysis. Monthly data from July 1981 to June 1998 was taken for empirical analysis. The results revealed that beside long run relationship, unidirectional causality was found from money to prices supporting the Monetarist view. These results are different from the previous results where bidirectional causality was established. To examine the short run and long relationship between macroeconomic variables in Pakistan, (Mehmood, 2005) carried out a study in Pakistan. The variables considered for this study included money supply (M2), short-term interest rate (Call money Rate), consumer price index and real GDP at a factor cost. For empirical analysis, annual data covering the period 1993-2003 was utilized and Johansen (1991) cointegration analysis was applied. Results of the study suggested that money growth caused GDP without feedback. Furthermore, it was concluded that the reduction in money growth leads to reduce output growth rather than inflation. The interest rate was found independent of the level of output, money growth and inflation.

To empirically investigate the monetary policy function in Pakistan, (Malik, 2007) carried out a study in Pakistan. To estimate the loss function of the central bank of Pakistan, five objectives were set, and vector auto regression followed by variance decomposition established that the variables included in the central bank loss functions were found countercyclical to the monetary policy in Pakistan. The response of the interest rate to foreign exchange reserves and government borrowing were found negative. Moreover, the important determinants that explained the forecast error of interest rate were the interest rate own lags inflation and government borrowing. To quantify the performance of the monetary policy in Pakistan, (Malik & Ahmed, 2010) tested Taylor's rule for potential improvement in the monetary in Pakistan. For empirical analysis, quarterly data from 1991-2006 was used to estimate the multivariate time series regression. The results showed that the State Bank monetary policy fully deviated from Taylor rule and could be improved by adopting Taylor rule to achieve macroeconomic credibility in the case of Pakistan.

After the global financial crises, the monetary policy was perceived ineffective; hence, special attention was paid to the assessment of fiscal policy to overcome recessionary situation in the economy (Mangla & Hyder, 2017). At present, sufficient literature is available that highlights the significance of the fiscal and monetary coordination and cooperation for the achieving the macroeconomic credibility. Several studies have concluded

positive role of the fiscal and monetary product mix for optimal macroeconomic conditions. In this respect, this segment of literature reports the work that has been carried out in the case of Pakistan.

To test the effectiveness of the monetary and fiscal policy, (Fatima & Iqbal, 2003) carried out a study in Pakistan, India, Thailand, Indonesia and Malaysia. To analyze the long run relationship between variables, Johansen cointegration technique has been used. The results confirmed that the degree of effectiveness of fiscal and monetary policies differ across countries. In the case of Thailand, bidirectional causality was found between economic growth monetary and fiscal policy. In the case of Indonesia, unidirectional causality was observed between fiscal policy and economic growth and between monetary policy and economic growth. The results are similar to that of Indonesia in case of Malaysia. (Hussain & Siddiqi, 2012) investigated the fundamental relationship between monetary and fiscal policy in case of Pakistan. For empirical analysis, cointegration analysis followed by ARDL model was used. Monetary and fiscal policies both were found effective tools to enhance the output level, whereas political and social institutions were found poor to influence output level in the economy. It is further recommended that efficiency in terms of per capita growth could be increased by enhancing the efficiency of economic, political, and social institutions.

There are many studies in the literature which have explored the monetary policy in an open economy framework in the case of Pakistan. For example, (Khan & Ahmed, 2011) analyzed the monetary transmission mechanism of Pakistan. Besides domestic shocks of monetary policy, the external channel such as global food and world oil price shocks were also analyzed. For empirical analysis, monthly data for the period January 1990 to July 2011 was used. And Structural vector auto regression model was used to assess domestic and foreign shocks in the economy. It was observed that the world oil price has negatively affected the industrial production, appreciated exchange rate, interest rate, and raised inflation rate in the economy. From the generalized impulse response function, it was observed that exchange rate was affected by either oil price shock or food price shocks in the economy. It was concluded that foreign shocks, namely world oil price and food price shocks, have an important contribution in explaining industrial production, inflation, exchange rate and interest rate. The most affected variable by the foreign shocks appeared to be exchange rate in case of Pakistan. (Haider & Khan, 2008) estimated a dynamic stochastic general equilibrium model in an open economy framework to investigate whether this model presents realistic behavior and structure of the economy of Pakistan. For this purpose, quarterly data covering the period 1984:01-2007:04 has been used. From the empirical results it was concluded that inflation in Pakistan did not reduce consumption significantly. To control inflation, the State Bank of Pakistan raised policy rate. In both case of domestic as well as imported inflation, the exchange rate appreciates. Tight monetary policy controls both types of inflation but appreciates exchange rate. Pass through effect of exchange rate to the domestic price level is very low. (Nizamani et al., 2016a) investigated the monetary transmission in an open economy framework for Pakistan. Unlike previous literature, this study considers the world commodity prices and traded weighted variables of interest rate and output in the external sector of Pakistan. For empirical analysis, quarterly data covering the period from 1992:01-

2014:04 has been used. To assess the internal as well the external shocks to the economy of Pakistan, the data has been analyzed by structural vector auto regression model. In the empirical analysis it is observed that the effectiveness of monetary policy in Pakistan is limited in scope in terms of its ability to stabilize key macroeconomic variables. Moreover, the interest rate channel in the monetary transmission mechanism is found active in the short run. However, the credit channel is effective both in the short as well as the long run. It is further recommended that the State Bank of Pakistan should rely on interest rate channel to control inflation and use the credit channel to enhance economic growth.

RESEARCH GAP

The literature has left important questions for further research. The non-neoclassical channels of monetary policy enabled us to understand the role of fluctuations in macro economy. The literature on the role of such channels in developing economies is not very encouraging. There is lack of empirical evidence that considers the implications of non-neo classical channels analyzing the fluctuations in macro economies of developing countries like Pakistan.

There is a lack of literature that has investigated the effectiveness of monetary policy comprehensively. (Agha et al., 2005) investigated the relative importance of the various channels of monetary policy in Pakistan. (Hussain, 2009) also made the same attempt, but both the studies were conducted in the close economy framework. Similarly, the studies (Malik, 2006; Malik & Khawaja, 2006) have also been conducted in the close economy framework for the monetary policy assessment in Pakistan. For disaggregated analysis of monetary policy analysis, (Tasneem Alam & Waheed, 2006) carried out a study at the sectoral level to identify the most sensitive sector to the monetary policy shocks in a closed economy framework in Pakistan. Moreover, these studies have used only direct instruments: the short run instrument for conducting monetary ignoring the indirect instrument that is the cash reserve ratio/required reserve ratio which is mandatory for conducting monetary policy in developing countries (Primus, 2016).

Some of the studies (Khan & Ahmed, 2011; Nizamani, Karim, Zaidi, & Khalid, 2016b)(Haider & Khan, 2008) have analyzed the monetary transmission mechanism in an open economy framework but the issue is that these studies have not included Chinese economy (which is the major trade partner of Pakistan as PAK-CHINA trade volume was raised from US$4 billion to US$ 15.6 billion during fiscal year 2019 under China-Pakistan free trade agreement (CPFTA) in the external sector of Pakistan which mis-specifies the structural vector auto regression model and may lead to overstating of the foreign shocks of the United States to the economy of Pakistan (Dungey & Vehbi, 2011; Dungey & Fry, 2003a; McKibbin & Dungey, 2014).

Besides the external shocks, the fiscal policy has also important implications internally for the conduct of effective monetary policy. The existing literature reports the cooperation and

coordination of both fiscal and monetary policy in a closed economy framework (Fatima & Iqbal, 2003), (Jawaid et al., 2010, 2011) and (Mahmood & Sial, 2011). The question arises as to what the implications of would be both the monetary and fiscal policy for each other if the monetary policy in Pakistan behaves in an open economy framework. Hence, for accurate assessment and to approach an optimal policy mix, it is mandatory to analyze the behavior of both the fiscal and monetary policy in an open economy framework for the economy of Pakistan.

This study, therefore, is an attempt to enhance the effectiveness of monetary policy of Pakistan by testing the additional (indirect) monetary policy instrument, that is cash reserve ration/required reserve ratio besides the short run interest rate as suggested by (Primus, 2016). Moreover, the external sector shocks would be modified by introducing China, besides the US, to overcome the problem of overstatement of the foreign shocks as suggested by (Mardi Dungey & Fry, 2003; McKibbin & Dungey, 2014). Monetary and fiscal policy cooperation is tested empirically to optimize the macro policy mix for the economy of Pakistan.

CONCLUDING REMARKS

From the literature reviewed in this paper, the following findings are ostensible. Firstly, the neo classical channels of monetary transmission mechanism focus on the direct influence of interest rate on investment decisions, intertemporal substitution effect on consumption and wealth. Moreover, the international trade effect through exchange rate variations appeared to be the core channels of monetary transmission mechanism which have not varied over time significantly.

Secondly, the non-neo classical channels that are mostly apparent in the general equilibrium models present the potential implications of credit by banks and non-bank financial institutions both for borrowers and lenders. These implications are different across sectors. Moreover, the bank capital and balance sheet have important influence on lending. However, asymmetric information and moral hazards stand in the way of credit supply by banks and other financial institutions. Moreover, the external finance premia appeared to be the dominant force that drives policy shocks relative to internal forces.

Most of the studies conducted to assess the monetary transmission mechanism in Pakistan report local shocks only (Agha et al., 2005; Hussain, 2009; Malik, , 2006; Malik & Ahmed, 2010). To analyze sectoral effects of the monetary policy in Pakistan, a single study (Alam, & 2006,) has been reported so far. To analyze the foreign shocks on the economy of Pakistan, (Khan & Ahmed, 2011; Nizamani et al., 2016a) made efforts. All of the above-mentioned studies have used short-term interest rate as a monetary policy instrument. As regards the studies conducted in an open economy framework, taking only US in the external sector of Pakistan, there is literature which establishes the link between the cooperation and coordination between monetary and fiscal policy and their implications for each other

framework (Fatima & Iqbal, 2003)(Jawaid et al., 2010, 2011), (Mahmood & Sial, 2011). These studies consider the coordination/interaction in close economy framework.

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