

EFFECTS OF MONETARY POLICY ON BANK LENDING IN NEPAL

Neelam Timsina Dhungana

Director, Nepal Rastra Bank, Research Department, Central Office, Baluwatar, Kathmandu, Nepal. (Currently, Ph.D. Scholar, Mewar University, Rajasthan, India)

ABSTRACT: *Bank lending and monetary transmission mechanism are closely interlinked phenomena. Banks cannot be efficient in their performance without analyzing the impact of monetary policy actions. On the other hand, central bank cannot take appropriate policy actions without having appropriate knowledge of bank lending behavior. This study attempts to find out the impact of monetary policy actions such as cash reserve ratio, open market operations and bank rate on bank lending. In the study, panel data of 24 commercial banks during the period of 1996 to 2015 were collected and analyzed using descriptive statistics, correlation and regression analysis. This analysis shows that open market operations and cash reserve ratio have negative impact but bank rate has positive impact on bank lending. Therefore, the central bank of Nepal should rely mostly on open market operations and cash reserve ratio for monetary operation. Further, the study recommends that central bank should hold cash reserve ratio constant as a cushion for the borrowers from fluctuating lending rates by commercial banks. However, since excessive borrowing will have inflationary effect in the economy, the study recommends that central bank commit commercial banks to open market operations to control short term interest rate and money supply in the economy.*

KEYWORDS: Monetary Policy, Central Bank, Bank Lending, Commercial Bank

JEL Classification: E52, E58, G20, G21

INTRODUCTION

Central bank formulates and implements monetary policy to affect quantity and costs of credit and thereby to affect the real economic activities like economic growth, inflation and financial stability. It can be described as the art of controlling the path and progress of credit facilities in the expectation of price stability and economic growth (Chowdhury, Hoffman & Schabert, 2003). Monetary policy refers to the actions of the central bank to regulate the money supply through prudential monetary policy instruments such as the OMOs, bank rate, required reserves, moral suasion, direct credit control, and direct regulation of interest rate (Loayza, & Schmidt-hebbel, 2002). Monetary policy generally has final objective of price stability, balance of payment stability, financial stability to support growth. It has various direct and indirect instruments, such as cash reserve ratio (CRR), open market operations (OMOs), bank rate, selective credit, moral suasion etc for achieving such objectives. However, there is no direct and immediate impact of monetary policy instruments on final objectives. There is a black box, through which monetary authority tries to attain the final objectives by applying various instruments (Bernanke and Gertler, 1995). This is called transmission mechanism of monetary policy. It can be thought as encompassing the various ways in which monetary policy shocks propagate through the economy (Kuttner and Mosser 2002). It refers to conduits through which changes in money supply affect the real variables of the economy. Monetary policy instruments

affect economic activity and inflation through several channels, which are collectively known as the monetary transmission mechanism. Though there are interest rate, exchange rate, wealth and credit (bank lending) channel mentioned in the literature, this study focuses only on credit (bank lending) channel.

According to bank lending channel theory, bank lending behavior plays an important role in monetary policy transmission mechanism (Bernanke and Gertler, 1995). This channel explains how the monetary policy actions directly affect the banks' balance-sheet with the variations in loan supply and, thereby, the output. Policy actions affect the reserve positions of banks. A central bank sale auction would reduce bank reserves leading to contraction of bank lending. This would affect aggregate spending. Small firms which do not have other than bank source of funds may face difficulties in obtaining funds, forcing them contract their activities. On the other hand, an increase in money supply would augment their loan creating capacity, leading to a rise in investment and income. When monetary policy becomes restrictive, banks have to cut back on new lending because the decrease in reserves, and hence in deposits, is not fully substitutable by other financing possibilities, e.g. borrowing on the interbank market, issuing bonds, equity or certificates of deposits (CDs), due to credit market frictions on the depositors' side (Stein, 1998). In the borrowers' case, on the other hand, it is also the situation that a decrease in bank lending is usually not perfectly substitutable with funding from financial markets (Kashyap et al, 1993). It means that, if firms and households mainly dependent on bank finance for funding their activities, a decline can be observed in economic activity as a result of restrictive monetary policy actions. This transmission channel essentially stresses the credit view of monetary policy (Bernanke and Blinder, 1988, 1992). As it explains the behavior of the credit market from supply side, it is usually called 'bank lending channel'.

Monetary policy transmission channels differ across the countries. In the developing economies like Nepal, the financial markets, financial instruments, equity and assets market are in underdeveloped situation. Moreover, the informal sector has significant level of dominance. Nepal has very low integration with the international financial markets. In such situations, interest rate channel and the asset price channel are weak in Nepal (Khatiwada, 2005). The structure of the Nepalese economy may not have drastically changed over the last twenty five years time period. But there are subtle changes underway due to economic and financial sector liberalization. The composition of GDP has changed with service sector developing as almost the principal sector, trade-GDP ratio has increased, foreign exchange system has been liberalized (Khatiwada, 2005). With continuing reforms, the Nepalese financial sector has experienced change in terms of its spread, depth, and competitiveness. The speedy financial innovation and globalization are also influencing the Nepalese macroeconomic situation and financial structure. With the resulting change in the monetary policy environment, it is crucial to understand the working of and the importance of the monetary policy transmission channels, particularly the bank credit channel, given the fixed exchange rate and weaknesses in the stock market constraining the operation of the other transmission channels (Budha, 2013).

In an open and small economy, fixed exchange rate regime is more suitable to control prices and thereby help create stable economic environment to promote economic growth. Therefore, Nepal is adopting fixed exchange rate regime and peg with Indian Currency. In this situation, exchange rate channel may be weak in Nepal. As other channels do not seem strong and banks are dominant means of transmitting the monetary policy actions, bank lending channel is likely to be more relevant in Nepal.

Many studies regarding monetary policy and banks' lending behavior have been carried out in developed countries. However, most of those studies do not have any significance to Nepalese context and cannot be applied. In Nepal also, various research studies with regard to monetary policy and transmission mechanism have been done. Khatriwada (2005) argued that the credit availability channel is likely to be the most direct and powerful channel of transmitting monetary impulses in Nepal. Budha (2013) found that banks play a role in Nepal's monetary transmission mechanism. He documented that bank lending decreases after a monetary tightening. Bank size is found to have significant impact on loan supply in Nepal. However we could not find the proper assessment of relationship between monetary policy instruments and bank lending behavior on the basis of bank wise recent secondary data in those studies. This gap encouraged the researcher to conduct the study on monetary policy and bank lending behavior.

This study attempts to identify whether the monetary measures taken by the central bank have been influencing the bank lending. Thus the study acts as a tool for the central bank and government to take appropriate monetary and financial policy decision to achieve price and financial stability as well. Understanding the channels of monetary transmission would help monetary policymakers to judge which financial market disturbances call for changes in monetary policy and which do not. It would also assist them in the choice of intermediate targets for policy (Romer and Romer, 1990). This study is of importance for Nepalese commercial banks also. The study will provide required information to the management of banks, which will help them to take corrective actions and decisions at time, when plans, policies are to be made and while making important lending decisions. Banks cannot be efficient in their performance without analyzing the impact of various determinants including monetary policy actions.

The empirical relationship bank lending and monetary policy measures is highly significant for the management, regulators, depositors and other stakeholder of banks as well as for central bank and the researcher in this topic. In addition, this study not only benefits the banking sector but it is of equal significance for other non-financial corporate sector of Nepal.

Objectives of the study

The main objective of this study is to analyze the impact of monetary policy actions on bank lending behavior in Nepal. The specific objectives are as under:

- (a) Evaluate the impact of open market operations on banks' lending behavior.
- (b) Assess the effects of cash reserve requirement on banks' lending behavior.
- (c) Find out the extent to which bank rate affects the lending behavior of commercial banks in Nepal.

Theoretical Framework

The role of commercial banks is crucial in monetary transmission process because monetary policy actions are taken to influence the bank lending behavior. Central bank formulates and implements the monetary policy with the help of commercial banks as the important counterparts. Central bank does not have direct relationship with the real economy. Commercial banks do have direct relationship with the real economy via its deposit and lending behavior. On the other hand, they have direct relationship with the central bank also. In this

way, in monetary transmission process, there are three kinds of relationship. First monetary policy action (its main and ultimate objective is to affect the inflation and economic growth), second banks' lending behavior (monetary policy action has immediate impact on reserves of commercial banks, which in turn affects their lending capacity) and third real economic variables such as economic growth and stability (expansion or contraction of banks' reserves as well as their lending capacity ultimately affect the inflation and economic growth).

According to bank lending theory, role of bank is crucial in transmitting monetary impulses in the real economy. Bernanke's (1983) work provides empirical support on the existence of the bank lending channel of monetary policy transmission. He examines how monetary policy transmission can account for the decline in U.S. output between 1930 and 1933. He found that a significant amount of the decline in output cannot be solely explained by the monetary mechanism. This unlocks the possibility of a shift in loan supply along with a shift in loan demand. An another work by Bernanke and Harold (1991) that included a sample of 24 countries found the same results; during periods of large panics, the decline in output cannot be exclusively described by traditional factors such as exchange rates, interest rates, or fiscal policy. Additional evidence is provided by Bernanke (1986) employing VAR models. The resulting estimates suggest that lending shocks do seem to have a significant effect on aggregate demand.

Another study by Bernanke and Blinder (1992) shows that increases in the Federal Funds Rate (FFR) lead banks to slowly downsize by cutting off loans. Thus, as loans decline, the economy slows. Since this result can be explained through the traditional interest rate channel, that is a tight monetary policy would depress economic activity and bank lending even if there is no sign of a lending channel so an identification problem arises: is it a decline in loan demand or loan supply that drives the results?. To correct for this identification problem, Kashyap, Stein, and Wilcox (1993) analyzed the relative fluctuations in bank loans and commercial paper issuance by companies as an alternative for loans. They reflect that at the same time a monetary contraction is reducing bank lending, it is increasing commercial paper volume. This provides evidence that what has taken place is an inward change in supply of loan, as prescribed by lending view, rather than just an inward shift in loan demand. In this strand of the literature it has been shown that small banks are affected more severely compared to large banks when monetary policy tightens. Several studies supported these findings. Kashyap and Stein (1994) found that within the loan categories, larger banks usually concentrate more heavily on commercial loans, while smaller banks tend to concentrate on agriculture, real estate, and consumer lending.

There is some evidence that commercial lending responds more sluggishly to monetary shocks than other forms of lending (Gertler and Gilchrist (1994)). It sheds some light on the fact that demand for loan in small banks is more procyclical than loan demand at large banks. In addition, large banks usually lend to large firms whose loan demand is less cyclical than that of smaller firms. In another work by Kashyap and Stein (1993), they surveyed the period between 1977 and 1991 and observed that despite the rapid growth of non-bank financing loans and commercial paper, traditional commercial banks still are the most important source of finance, representing over 68% of the combined total in 1991. Oliner and Rudebusch (1996) challenged the credibility of this conclusion by arguing that it may be that during recessions, small firms are affected badly, and hence have sharply reduced demand for credit, while large firms increase their demand for credit. Given that the majority of commercial paper volume comes from the largest firms, this is indeed what Bernanke and Gertler (1995) called the

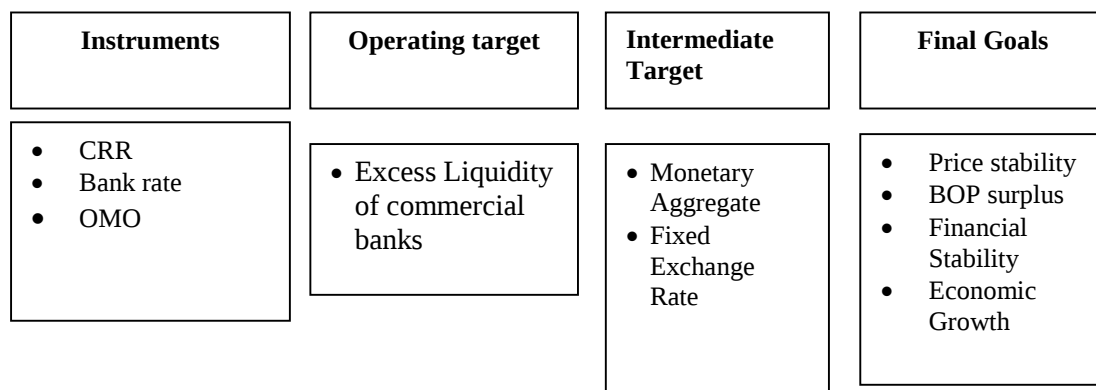
balance sheet channel. All these studies deliver strong evidences for the subsistence of the lending channel that assesses the impact of monetary policy action on bank lending behavior and thereby on economic growth and stability.

OVERVIEW OF MONETARY POLICY FRAMEWORK AND BANKING SYSTEM IN NEPAL

Overview of Nepalese monetary policy framework

Monetary policy is a macroeconomic policy, conducted by the monetary authority to influence the quantity and the cost of fund in the economy. Monetary policy refers to the actions of the central bank to regulate the money supply which could be through discretionary monetary policy instruments such as the open market operation(OMO), discount rate, reserve requirement, moral suasion, direct control of banking system credit, and direct regulation of interest rate (Lazy, and Schmidt-hebbel, 2002). Monetary policy framework provides a clear way of conducting monetary policy. Monetary policy framework has objectives, intermediate targets, operating targets and policy instruments. Nepalese monetary policy has multiple objectives of price stability, external stability and financial stability to support growth. To attain those final objectives, it uses various instruments like cash reserve ratio (CRR), bank rate and open market operations. As there is no direct link between monetary instruments and final objectives, Nepal Rastra Bank (NRB) has been setting broad money as intermediate target and excess liquidity and private sector credit of commercial banks as operating target. The excess liquidity of the banking sector is estimated by the NRB based on the Liquidity Monitoring and Forecasting Framework (LMFF).

Figure 1.1: Monetary policy framework in Nepal



The (adjustable) exchange rate peg is the nominal anchor of monetary policy and it is used to achieve price stability. To support the peg, monetary cum credit aggregate-based sub intermediate targets are set (Thapa, 2004). Thus, the annual growth rate of broad monetary aggregate (M2) has been used as an intermediate target of the monetary policy. Nepal Rastra Bank is the central authority of formulating and implementing the monetary policy in Nepal. It was established in April 1956 under the Nepal Rastra Bank Act, 1955. It has been exercising the monetary policy since mid-1960s (Budha 2013). In the early period, the monetary policy

primarily adopted the direct tools such as credit ceilings, directed credit programs, interest rate administration and credit control regulations. Before 1980s, NRB has adopted the direct monetary policy stance (Sigdel, 2006). Nepal started the process of economic reforms in the mid-1990s. The major reforms at that period included shift in NRB's monetary policy stance from direct to indirect, interest rate deregulation, elimination of credit ceilings and introduction of open market operation (OMO) as an indirect monetary policy instrument. As a result of on-going reform measures in the Nepalese financial system, the monetary policy surroundings, structure and working procedures have also taken new momentum since the 1990s. NRB started to announce and make public the monetary policy first time in 2002. Before this, NRB used to change its monetary instruments to influence the money supply as and when required as there was no formal monetary policy as such in the documented form. In 2002, new NRB Act came into existence. After the new NRB act in 2002, NRB has been attempting to achieve the multiple objectives simultaneously. According to this Act, the main objectives of Nepalese monetary policy are maintaining price stability, financial stability, and external sector stability and maintaining the adequate liquidity for achieving higher economic growth.

In recent years, open market operation has been an important instrument of monetary policy even though NRB also relies on standing liquidity facility, bank rate and reserve requirements. The bank rate is playing no significant role in determining banks' funding costs. This is because the commercial banks did not seem to take central bank credit remarkably except the period between 2010 and 2011 during which Nepalese economy experienced the liquidity crunch.

Overview of the banking system in Nepal

In the Nepalese context, the government has initiated open economic policies since the mid 1980s. The Nepalese financial system has undergone rapid structural changes in the last three decades. The history of Nepalese banking is not very old as the first ever bank, Nepal Bank Limited was established in 1937 to provide commercial credit. With the establishment of the Nepal Rastra Bank as the central bank of Nepal in 1956, the Nepalese financial system gained momentum. Industrial Development Bank was established in 1957 as the first development bank, which was converted into Nepal Industrial Development Corporation in 1959 to provide industrial credit. Within a decade of establishment of Nepal Rastra Bank, a number of financial institutions came into operation. Rastriya Banijya Bank, the second commercial bank fully owned by the government was established in 1966. Agricultural Development Bank came into operation in 1968 with the objective of providing long and medium term credit facilities to agriculture sector. There were only two commercial banks and two development banks until 1983. The pace of financial liberalization really initiated in the mid 1980s, when the government allowed the entry of commercial banks in joint venture with foreign bank. When the need to modernize banking services through the transfer of technology and managerial ability, Nepal Arab Bank Limited was established in 1984 as the first joint venture bank in Nepal, which was afterward pursued by the establishment of Nepal Investment Bank Limited and Standard Chartered Bank Nepal Limited and other commercial banks in private sector as well as in joint venture with foreign sector.

The process of financial liberalization achieved impetus in 1987-88, when Nepal entered in to a three-year structural Adjustment Program (SAP) with the International Monetary Fund. The number of commercial banks and financial institutions continued to increase with the pace of liberalization. There were 30 commercial banks ('A' class financial institutions), 76 development banks ('B' class financial institutions) and 48 finance companies ('C' class

financial institutions) and 39 micro finance development banks as of mid-July 2015. With the increase in number of financial institutions, outreach, breadth and depth have also grown. From this remarkable increase in number of commercial banks and financial institutions, Nepalese economy including agriculture, commerce and industry is benefitted through large credit facilities.

Before the initiation of Structural Adjustment Program (SAP) in the country in 1987, the lending practices of banks were strictly regulated under the close surveillance of the central bank. The SAP period introduced some relaxation of the stringent rules guiding banking practices especially in the form of interest rate deregulation, phase wise removal of priority sector directed lending, entry freedom of foreign joint venture bank etc. However, to bring the banks in prudential trek, the need for appropriate regulation and supervision could not be ignored. The Bank and Financial Institution Act (BAFIA) 2006 and Nepal Rastra Bank directives require banks to report some borrowing indicators such as big lending, sectoral, security wise and product wise lending, to the Central Bank of Nepal. Other credit related compliances such as loan to value ratio, single obligor limit, credit to deposit ratio etc are required. Nepalese banks are not the exception to other countries' commercial banks. They also need to know the determinants of their lending behavior to efficiently manage their loan and advances. Of them, monetary policy actions are the most important. Moreover, for the central bank as monetary authority the study on the relationship of monetary transmission mechanism and bank lending behavior will be of immense help to take appropriate policy actions. Further, policy makers, government, academicians and other stakeholders are expected to benefit from the study.

LITERATURE REVIEW

As the main objective of the study is to assess the effects of monetary policy actions on bank lending behavior, the researcher reviewed a number of literatures in this regard. Using a panel of Austrian bank data Schnatter and Kaufman (2006) show that the lending decisions of the smallest banks are more sensitive to interest rate changes, and that for all banks, sensitivity changes over time. Amidu (2006) noted that for monetary policy to operate through a lending channel, there must be bank dependent borrowers on the one hand. On the other hand, monetary policy must also directly affect banks' willingness to lend. Amidu (2006) performed a regression to estimate the effect of monetary policy actions on bank lending by employing the following model:

$$Lendit = \beta_0 + \beta_1 Gdp_{it} + \beta_2 Irat_{it} + \beta_3 M_{supt} + \beta_4 infl_{it} + \beta_5 Size_{it} + \beta_6 Liqq_{it} + \epsilon_{it}$$

He found that banks lending behaviors are affected significantly by the country's economic activities and changes in money supply. Moreover, the central bank's prime rate and inflation rate negatively but statistically insignificantly affect banks lending. With the firm level characteristics, the study reveals that bank size and liquidity significantly affect bank's capability to flow credit when demanded. To determine whether monetary policy affects bank lending, some studies have assessed how commercial banks modify their portfolios in periods of monetary tightening, while other studies have observed the changes in the price and non-price terms of credit (Romer & Romer, 2000; Bernanke & Blinder, 2002; Gertler & Gilchrist, 2003). Accordingly, a number of studies have examined how banks adjust loans, securities, and deposit and non deposit liabilities to variations in monetary policy. Kashyap and Stein (2000), among 19 others, suggest that the effects of monetary policy on lending behavior is

powerful for banks with less liquid balance sheets. In response to a contraction of policy, bank transactions / core deposits fall immediately, then total bank loans decline, but only after a lag of two / three quarters. Subsequently, banks are able to maintain lending in the form of a decline in core deposit by selling securities and issuing managed liabilities such as time deposits and Eurodollar borrowings (Bernanke and Blinder, 2002; Gertler and Gilchrist, 2003). Finally, the eventual decline in bank credit is roughly contemporary with a decrease in economic activity as measured by industrial production (Romer and Romer, 2000). Morris and Sellen (2005) noted that bank lending declines when policy is tightened, the time lags appear quite long. Further, the contemporary reduction in loans and output is consistent with a reduction in lending as it causes output to fall. However, there is conflicting evidence on effects of monetary policy tightening and lending from banks. Gertler and Gilchrist (2003) conducted a study that specifically looked at how bank business lending responds to policy contraction. Their study shows that business lending does not decline when policy is tightened. They reached at a conclusion that the entire reduction in total lending comes from a reduction in consumer and real estate loans. Moreover, they affixed, when the analysis is squeezed further to loan to manufacturing firms, bank lending actually shows a significant rise in reaction to tighter policy. Really, for manufacturing firms, most of the increased lending appears to go to large companies; while loan to small firms are largely unaffected by policy tightening.

In contrast to Gertler and Gilchrist (2003) study, Kashyap and Stein (2000) find evidence that business lending may respond to a contraction in monetary policy. They found that when policy is contracted, loans at small banks fall, while loans at large banks are uninfluenced. The diverse responses of small banks may indicate they have less access to alternative funding sources than big banks and so are less capable to ignore the loss of core deposits when policy is tightened. Since small banks lend mainly to smaller firms, their finding is similar with the view that monetary policy may work, in part, through a credit channel.

Santis and Sucico (2013) presented the following model by the contributions by Kashyap and Stein (1995, 2000), Kishan and Opiela (2000), Ehrmann et al. (2003), Altunbas et al. (2009) and Gambacorta and Marques-Ibanez (2011), among many others.

$$\begin{aligned} \Delta Li; t = & \alpha_0 + \alpha_1 \Delta Li; t_1 + \sum_{j=0}^1 a_{2j} MPt_{-j} + \sum_{j=0}^1 a_{3j} \Delta NGDP t_j + a_4 ROEi; t_1 + a_5 LLPi; t_1 \\ & + \sum_{t=0}^{1n} a_{6j} wit - 1 \Delta NGDP t_j + a_7 zi; t_1 + \sum_{j=0}^1 a_{8j} zi; t_{-1} MPt_j \\ & + \sum_{j=0}^1 a_{9j} zi; t_{-1} 1 \Delta NGDP t_j + u_i; \end{aligned}$$

where $\Delta Li, t$ is the first difference of the logarithm of loans of bank i in period t to

private non-banks in deviation from the average loan growth for that bank. The variable MPt refers to the monetary policy shock, $\Delta NGDPt$ stands for the log difference of nominal GDP (in deviation from the average GDP growth), $ROEi, t$ is the return on equity of bank i , $LLPi, t$ describes loan loss provisions to asset ratio of bank i , $wi, t = [ROEi, t, LLPi, t]$ and zi, t represents vector of bank characteristics such as size, liquidity and capital. Wi, t and zi, t

are standardized values for each bank. The term ui, t represents the source(s) of unobserved

heterogeneity across banks.

From the above model specification equation they found that negative coefficients on the monetary policy shock (i.e. $a_2 < 0$) but insignificant coefficients on its interaction with bank-specific variables would indicate that the transmission of monetary policy on lending activities is homogeneous across banks. Positive coefficients on the interaction terms between the MP variable and the bank characteristics (i.e. $a_8 > 0$) would indicate that the effects of monetary policy vary with the size, liquidity and capital of individual banks.

To study the relationship between monetary policies and the lending behaviors of commercial banks, Kimani (2013) used the following regression model to estimate the effects of monetary policy actions on bank lending behavior using primary data:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where: Y = Bank Lending; β_0 = Constant Term; $\beta_1, \beta_2, \beta_3$ and β_4 = Beta coefficients; X_1 = CBR; X_2 = Cash Reserve Ratio; X_3 = Open Market operations; X_4 = Uncertainty; ε = Error term

She established that CBR, cash reserve ratio, open market operation and uncertainty caused by monetary policy changes influences lending behavior of commercial banks in Kenya.

Kashyap and Stein (1995) presented empirical evidence for a bank lending channel in the USA. They group balance sheet data of individual banks into various relative size classes and estimate the effects of changes in the Federal Funds rate on aggregate lending in each class. Although all classes react negatively to a change in the Federal Funds rate, the extent of their response differs between them. While the largest banks contract their lending by 1.2 percent as a result of one percentage point increase in the Federal Funds rate, the contraction of the smaller banks' classes lies between 2 percent and 3 percent. Moreover, all responses were statistically significant. In Kashyap and Stein (2000), the authors further show that the balance sheet strength (measured by the ratio of liquid assets to total assets) is particularly influential for the lending reaction of the small banks' size classes, whereby low liquidity ratios reinforce the effect of monetary policy on bank lending.

Based on the Malaysian data, Kassim and Majid (2008) explore the causal-effect linkage between bank lending and monetary policy variable using two major tests ; first, the autoregressive distributed lag (ARDL) model which is employed to access the long-run relationship among the variables and second, the vector error correction model (VECM) which is applied to explore the short- and long-run dynamics between the variables. The consequences of the study reflect that both bank loan and deposit play a crucial role in the monetary transmission process in the Malaysian case.

Ashcraft (2006) by employing the following model, assessed the relationship between monetary transmission and bank lending.

$$\Delta \ln(\text{loans})_t = (\alpha_0 + \alpha_1 \Delta \ln(\text{loans})_{t-1} + \beta_1 M_t + \beta_2 X_t + \beta_3 X_t - I * M_t + \sum N_t)$$

In the equation, annual loan growth is regressed against a set of macro variables M, a set of lagged bank characteristics X_{t-1} , interactions of the macroeconomic and bank characteristics, and a entire set of time effect N_t . He concluded that while small firms might see bank loan as special, they are not considered special enough for the credit channel to be an important part of how monetary policy works. Using bank level data, Haan (2001) found that effects of

monetary tightening on unsecured lending are highly negative for smaller, poorly liquid and inadequately capitalized banks, in line with the lending channel theory.

Effects of CRR on bank lending

The required reserve ratio is used as a tool in monetary policy, influencing the country's borrowing and rates of interest by altering the quantity of funds available for banks to make loans with. Western central banks seldom change the required reserve ratio because it may cause immediate liquidity problems for banks with low excess reserve; they generally like to adopt OMOs (buying and selling government-issued bonds) to implement their monetary policy (Chodechai, 2004). In banking, excess reserves are bank reserves in excess of the reserve requirement fixed by a central bank. Those are the reserves of cash quite more than the required amounts. Holding excess reserves has an opportunity cost if higher risk adjusted interest amount can be received by keeping the funds elsewhere; the advantage of holding some funds in surplus reserves is that it may provide better liquidity and therefore more smooth operation of payment system. According to the lending view, a contraction in reserves leads banks to reduce loan supply, thereby raising the cost of capital to bank-dependent borrowers (Kashyap, 1996).

Usman (2005), commenting on the factors that affect commercial banks' lending behavior said that, the sound and viable functioning of commercial banks is adversely influenced by the selection of certain policy tools for the regulation of banking operations. Instruments include a strictly administered interest rate composition, directed credit, unpaid reserve requirements and stabilizing liquidity management measures such as the stabilization securities of the past. Ituwe (1983) also asserted that a bank's capability to provide further advances is checked by the accessible cash in its vault.

Effects of OMOs on bank lending

Open market operations (OMOs) performed by the central bank also affects the bank lending behavior. OMO is an activity of central bank to buy or sell government bonds and treasury bills in the open market. At the heart of the lending view, the Federal Reserve can, merely by performing OMOs, shift banks' loan supply schedules (Kashyap, 1996). Central bank uses them as the primary means of implementing monetary policy. The main objective of OMOs is to manage the short term interest rate and the supply of reserve money in an economy, and thereby indirectly manage the total supply of money. This involves meeting the demand of reserve money at the target interest rate by purchasing and selling government bonds, or other financial instruments. Monetary targets, such as monetary aggregates, inflation, interest rates, or exchange rates, are taken in to consideration while performing OMOs. Banking liquidity is taken as operating target of monetary policy. Federal Reserve has used OMOs to adjust the supply of reserve balance in order to maintain the federal funds rate around the target federal funds rate. In the widest sense of the term open-market operations can be defined as sales (purchases) of securities by the authorities made in order to change the quantity of cash in the system (Zawadzki, 1965). Generally increase in sale of more government securities by the central bank leads to a decline in loanable fund and lending capacity of the commercial banks. It also puts pressure on interest rate. However in some countries, OMOs have different implications. King (1956) calls open-market operations a powerful adjunct of the bank rate policy. According to him, open-market sales cannot directly cause a decrease in the volume of credit because they cannot reduce the total liquidity of the banks-they merely cause a change in the structure of liquid assets, and even that is only a momentary change. The role of open-

market operations is to bring pressure on interest rates which, in turn, 'reduces the total supply of liquid assets to the banks or makes them desire a higher liquid ratio. Zawadzki (1965) concludes that open-market operations are still an important instrument of monetary control. Successful use of this instrument depends on the willingness of the authorities to allow or to engineer changes in interest rates which would induce the public to buy (or sell) gilt-edged securities and treasury bills. Given reasonable confidence in the essential stability of the long-term rate of interest, the temporary changes in it required for the success of open-market operations need not, perhaps, be as large as to cause severe dislocations and to disrupt the course of economic life.

Effects of bank rate on bank lending

Bank rate is a rate at which central bank rediscounts commercial bank first class bill of exchange and government securities. It is also called rediscount rate. Bank rate is another monetary policy instrument. It is the certain rate at which the central bank grants credit to the commercial banks. It can also be considered as a policy rate to show monetary policy stance. It is related to the central bank's function of lender of last resort. If central bank increases bank rate, it means the tighter monetary policy stance. In this situation, commercial banks have to borrow at a higher rate if they require. It increases the rate of interest at which commercial banks lend money to their customers. Consequently, demand for loan declines. Therefore, it squeezes the credit creation which leads to monetary contraction.

A decrease in central bank rate reduces agency costs or may cause banks to relax their lending standards, increasing credit risk and thus nonperforming loan (Dell, Ariccia & Marquez, 2006; and Matsuyama, 2007). However, the bank rate is playing no significant role in determining banks' funding costs in Nepal (Budha 2013). But, Kimani (2013) found positive relationship between bank rate and bank lending.

RESEARCH METHODOLOGY

Introduction

It presents an outline for research methodology which consists of research design, sampling technique, nature of data to be used in the study, models, measurement and analysis.

Research design

A research design is the arrangement of conditions for collection and scrutiny of data in a way that aims to join relevance to the research purpose with economy in procedure (Kothari and Garg, 2014). The study employed a descriptive as well as empirical research design. It also employs casual comparative research design in the sense that regression analysis was performed to estimate the relationship between the bank lending and other explanatory variables on the basis of secondary data. It establishes the cause and effect relationship between monetary policy actions and bank lending. Hence this study also employs causal comparative research design.

Type and sources of data

The study is carried out in the area of commercial banks in Nepal and based on secondary sources of data. The main sources of secondary data are Banking and Financial Statistics,

Quarterly Economic Bulletin, Monetary Policies and NRB Directives published by Nepal Rastra Bank, and the annual report and website of 24 commercial banks (which are selected in the study) operating in Nepal. Population of this study includes 30 commercial banks of Nepal listed in Nepal Stock Exchange (NEPSE) limited to the end of 2015. This study uses data of 24 commercial banks with 369 observations from 1996/97 to 2015/16. For the selection of sample, stratified sampling technique is used. The data has been analyzed in descriptive, correlation and linear regression method. The statistical tool used for the study is SPSS.

Models

This study has estimated regression model to analyze the relationship between monetary variables and bank lending. Here, in the case, OMOs, CRR and BR are the independent variable and bank lending is the dependent variable. It is represented as follows:

$$\text{Lending}_{it} = \beta_0 + \beta_1 \text{OMO}_t + \beta_2 \text{CRR}_t + \beta_3 \text{BR}_t + e_{it} \dots \dots \dots (i)$$

Analysis of Data

This section provides the systematic presentation and analysis of secondary data to deal with various issues associated with monetary policy instruments and bank lending in Nepal. The presentation and analysis of data have been carried out in three sub-sections. The first sub-section presents the descriptive part of analysis while the second sub-section presents analysis of correlation of the variables selected in the models. The last section of this chapter presents the analysis of the model estimated.

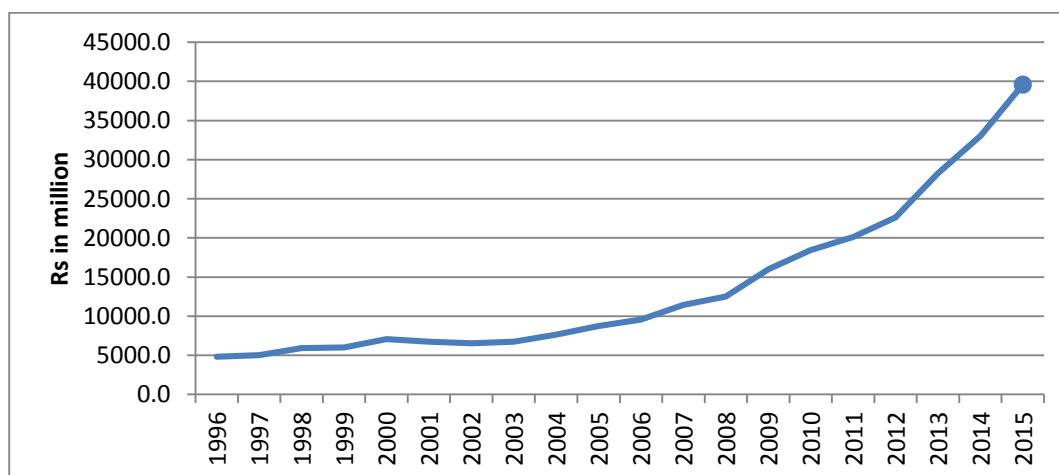
Structure and pattern of selected variables in Nepalese commercial banks

Structure and pattern of lending in selected Nepalese commercial banks

Lending is key to bank business and it is the major source of profit. It is also important because, monetary instruments are being implemented by affecting bank lending. Therefore, the analysis of bank lending is of crucial importance.

Figure 5.1: Pattern of lending of commercial banks from year 1996 to 2015

(The figure shows the pattern of total lending for all sample banks from 1996 to 2015. The figure has been drawn on the basis of the mean periodic lending).



Source: Appendix 2 and Author's calculation

Figure indicates that total lending curve is in increasing trends until 2015/16. Moreover, average assets has been increased from Rs. 4827 million in 1996/97 to Rs. 39605 billion in 2015/16.

Trend and pattern of monetary variables (CRR, OMOs, BR) in Nepal

The major objective of the study is to analyze the impact of CRR, OMOs, BR on bank lending, then it is crucial to watch the trend and pattern of such monetary variables. Table 5.1 presents the situation of CRR, OMOs and BR during the period of 1996 to 2015.

Table 5.1: Trend and pattern of CRR, OMOs and BR in Nepal

	CRR		OMOs		Bank Rate	
	Percent	Growth (%)	Percent	Growth (%)	Percent	Growth (%)
1996	12.0		10.2		9.0	
1997	12.0	0.0	3.5	-65.6	9.0	0.0
1998	12.0	0.0	2.3	-33.8	7.5	-16.7
1999	12.0	0.0	4.7	100.0	7.5	0.0
2000	8.0	-33.3	5.0	6.4	7.5	0.0
2001	8.0	0.0	4.7	-5.0	5.5	-26.7
2002	8.0	0.0	3.5	-26.1	5.5	0.0
2003	7.0	-12.5	2.9	-15.8	5.5	0.0
2004	7.0	0.0	2.5	-16.0	5.5	0.0
2005	6.0	-14.3	2.8	15.4	6.0	9.1
2006	6.0	0.0	2.4	-14.8	6.3	4.2
2007	5.0	-16.7	4.2	74.4	6.3	0.0
2008	5.0	0.0	5.8	38.2	6.5	4.0
2009	5.5	10.0	6.5	11.5	6.5	0.0
2010	5.5	0.0	7.4	14.0	6.5	0.0
2011	5.5	0.0	1.3	-82.3	7.0	7.7
2012	5.0	-9.1	1.7	32.8	7.0	0.0
2013	6.0	20.0	0.1	-92.5	8.0	14.3
2014	5.0	-16.7	0.4	230.8	8.0	0.0
2015	6.0	20.0	0.7	58.1	7.0	-12.5
Mean	7.3	-2.8	3.6	12.1	6.9	-0.9
Std Dev	2.6	12.6	2.5	72.6	1.1	9.2

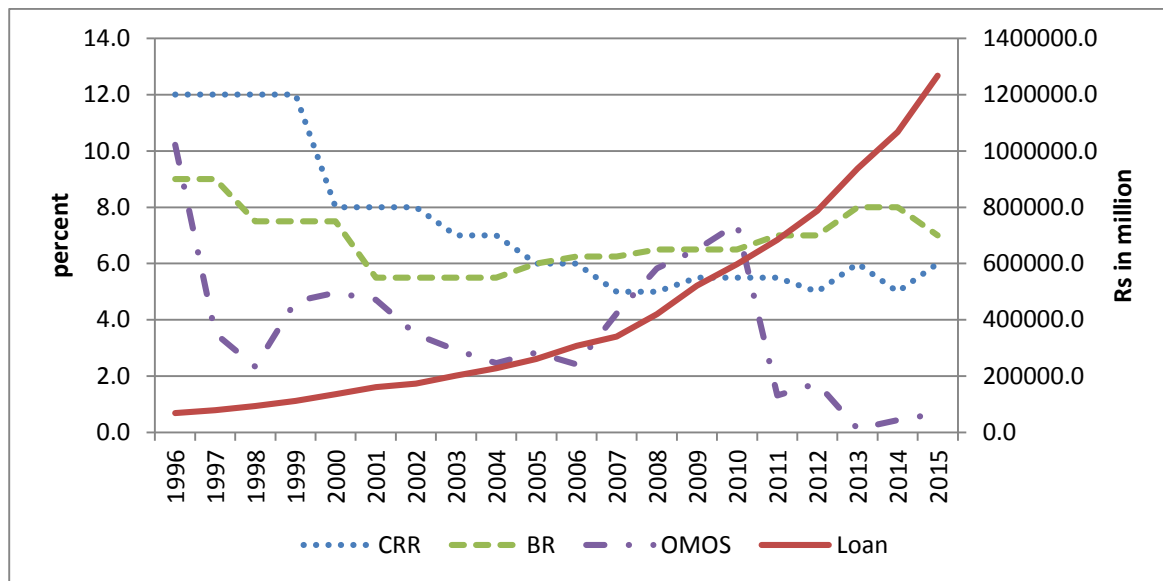
Source: Monetary policy documents, Quarterly Economic Bulletin and unpublished data of NRB

Table 5.1 shows that NRB determined CRR at 12 percent in 1996 which remained constant up to 1999. It declined to 8 percent in 2000, to 7 percent in 2003, to 6 percent in 2005. Then after, central bank was decreasing or increasing CRR according the situation of private sector credit and liquidity in the economy. In 2015 CRR was 6 percent for commercial bank. The average CRR during the study period was 7.3 percent. As our study period was from 1996 to 2015, formal monetary policy and formal OMOs on regular basis were not in practice up to 2004/05. Only from 2004/05, formal and regular OMOs in the form of outright sale, outright purchase, repo, reverse repo started. Before that NRB used to adopt such monetary instrument and monetary policy on case by case basis as and when necessary. However, any type of OMOs and monetary policy measures affect treasury bill (TB) rate as all these outright sale, outright purchase, repo, reverse repo are being performed using treasury bills under the holdings of the NRB. Therefore 91 day TB rate was taken as the proxy of OMOs in the study. Such OMOs rate was 10.2 percent in 1996, but caught declining trend and became 0.7 percent in 2015. NRB performs OMOs according to the situation of banking sector liquidity. If there is high excess liquidity, it mops up liquidity from the market using outright sale and reverse repo auction and if there is low excess liquidity, it injects liquidity to the market. This process of NRB affects the liquidity and thereby bank lending.

Table 5.1 shows that bank rate was 9 percent in 1996 which remained 7 percent in 2015. As it is policy rate and it was not changed by the NRB frequently. Mean bank rate was 6.9 percent in the study period. This rate is effective, only when commercial banks are taking loan from the NRB. Interest rate was 10.3 percent in 1996, which declined to 3.9 percent in 2015. Average interest rate during the study period was 6.1 percent. 1 year saving deposit interest rate was taken as proxy of interest rate in the study as lending interest rates are of several types and also the data were not available for the study purpose.

Relationship between bank lending and monetary variables

Figure 5.2 shows the negative relationship between monetary variables such as CRR, OMOs and BR and bank specific variable bank lending. It indicates that as central bank increases CRR, OMOs and BR, bank loanable fund declines resulting a decline in bank lending. Here in the figure, bank lending curve is in increasing trend where as CRR and OMOs curves are fluctuating over the years with downward slope. Bank rate did not change very frequently in Nepal over the study period and seems slightly flat compared to CRR and OMOs.

Figure 5.2: Relationship between bank lending and monetary variables

Source: Author's calculation

Descriptive statistics

The descriptive statistics of different variables selected under the study are shown in table 5.3

Table 5.2: Descriptive statistics for the selected variables under the study

Table 5.2 shows descriptive statistics - mean, standard deviation, minimum and maximum values variables associated with 24 sample banks for the period 1996/97 to 2015/16.

Descriptive statistics					
Variables	N	Minimum	Maximum	Mean	Std. Deviation
CRR (percent)	369	5	12	6.72	2.18
Bank Rate (percent)	369	6	9	6.81	.94
OMOs (percent)	369	0.13	10	3.41	2.43
Lending (Rs in millions)		49	75774	15994.10	14446.71

The average CRR adopted by NRB during the study period was noticed to be 6.72 percent with a minimum CRR of 5 percent and maximum CRR of 12 percent. The bank rate varied from minimum of 6 percent to maximum of 9 percent with an average of 6.81 percent. The OMOs had a minimum value of 0.13 percent and maximum value of 10 percent, with a mean of 3.41 percent. Total lending of sample banks ranged from Rs 49 million to Rs75774 million having an average of Rs 15994.10 million.

Correlation analysis

This section of the study presents the results and discussions of the correlation analysis. The correlation analysis has been carried out to investigate the direction and magnitude of the relationship of monetary variables and bank lending.

Having indicated the descriptive statistics, the Pearson correlation coefficients have been computed and the results are presented in the table 5.4

Table 5.3: Pearson's correlation matrix for the dependent and independent variables during the period 1996/97 to 2015/16.

This table reveals the Pearson correlation coefficients between different dependent and independent variables [CRR, OMOs, BR and Lending]. The correlation coefficients are based on the data from 369 observations for the period 1996/97 to 2015/16.

Variables	Lending	CRR	BR	OMOs
Lending	1			
CRR	-0.368**	1		
BR	0.305**	0.343**	1	
OMOs	-0.270**	0.370**	0.112*	1

Source: Author's calculation

Note:

***. Correlation is significant at the 0.01 level (2 tailed).*

**. Correlation is significant at the 0.05 level (2-tailed).*

The table 5.3 shows that there is a negative relation between CRR and bank lending which indicates that higher the CRR, lower would be the bank lending. This finding is consistent with the finding that a bank's ability to grant further advances is checked by the available cash in its vault (Ituwe, 1983). It is also consistent with the findings of Kimani (2013). This points out that CRR is one of the determinants of bank lending behavior. The table shows that bank rate is positively correlated with bank lending, which is not in line with theory. It means that bank rate is not very important tool to affect the bank lending behavior. This finding is consistent with the finding of Budha (2013). Table 5.3 also shows that there is negative relation between OMOs and bank lending which indicates that higher the OMOs, lower would be the bank lending. This finding is consistent with the findings that Federal Reserve can, simply by conducting open-market operations, shift banks' loan supply schedules (Kashyap, 1996). This finding is also consistent with the findings of Kimani (2013), Budha (2013) who asserted that OMOs has great effect on bank lending behavior. This shows that OMOs is also an important determinant of bank lending behavior. However, positive relationship between bank rate and bank lending found from the correlation analysis is not consistent with the findings of Bernanke and Blinder (1992). Never the less these all findings make clear that monetary policy action has important implication on bank lending. This is consistent with the findings of Ghosh (2008) and Julkefly (2010). This is also consistent with the findings of Kashyap, Stein, and Wilcox (1993) that a monetary contraction is reducing bank lending.

Regression analysis

In order to test the statistical significance and robustness of the results, regression models have been used. The regression analysis has been conducted to investigate whether or not the lending of the banks are affected by monetary policy actions.

Table 5.4: Regression of OMOs, CRR and BR on bank lending

The results are based on panel data of 24 commercial banks with 369 observations for the period of 1996 to 2015 by using linear regression model. Log of bank lending is the dependent variable while, CRR, OMOs, BR are the independent variables. The model is: $\ln lending_{it} = \beta_0 + \beta_1 OMO_t + \beta_2 CRR_t + \beta_3 BR_t + error$.

Models	Intercept				Adj R ²	SEE	F	DW
		OMO _s	CRR	BR				
1	4.24 (97.83) **	-0.07 (-7.20) **			0.12	0.47	51.78	0.69
2	4.85 (69.07) **		-0.13 (-12.94) **		0.31	0.41	167.37	0.86
3	3.41 (18.75) **			0.08 (3.20) **	0.02	0.49	10.24	0.64
4	3.83 (26.62) **		-0.15 (-15.58) **	0.17 (7.99) **	0.41	0.38	129.96	1.04
5	4.87 (70.02) **	-0.03 (-3.27) **	-0.12 (-0.50) **		0.33	0.41	91.24	0.88
6	3.56 (20.93) **	-0.07 (-7.73) **		0.10 (4.17) **	0.16	0.46	35.77	0.73
7	3.85 (27.15) **	-0.03 (-3.49) **	-0.13 (13.21) **	0.16 (8.08) **	0.43	0.38	93.35	1.06

Note:

1. Figures in parentheses are t-values.
2. The asterisk (**), (*) sign indicates that results are significant at 0.01 and 0.05 level of significance respectively.
3. Dependent variable is log of bank lending (loglending)

In table 5.4, the regression of monetary variables on bank lending reveals that beta coefficients for CRR and OMOs are negative but for bank rate, it is positive. Analyzing the explanatory variable individually, it is found that that higher the CRR, lower would be the bank lending

though adj. R- squared and DW were quite low. Such negative relation of CRR with bank lending is in line with theory. This finding is consistent with the finding that a bank's ability to grant further advances is checked by the available cash in its vault (Ituwe, 1983). It is also consistent with the findings of Olusanya et al (2012) and Kimani (2013). From this it is clear that CRR is one of the determinants of bank lending behavior. Similarly, table 5.4 shows that OMOs has negative impact on bank lending which indicates that higher the OMOs, lower would be the bank lending. This is in line with theory. This finding is consistent with the findings that Federal Reserve can, simply by conducting open-market operations, shift banks' loan supply schedules (Kashyap, 1996). This finding is also consistent with the findings of Kimani (2013), Budha (2013) who asserted that OMOs has great effect on bank lending behavior. This shows that OMOs is also an important determinant of bank lending behavior. From table 5.4, it is shown that bank rate has positive impact on bank lending, which is not in line with theory. In Nepal, bank rate is taken as policy rate and it is effective, only when commercial banks take loan from central bank. If not so, it is not much effective. Therefore, it is not surprising that the result in case of BR is not in line with theory. This positive relationship between bank rate and bank lending found from the regression analysis is not consistent with the findings of Bernanke and Blinder (1992), but it is consistent with the findings of Budha (2013). Never the less these all findings make clear that monetary policy action has important implication on bank lending. This is consistent with the findings of Ghosh (2008) and Julkefly (2010). This is also consistent with the findings of Kashyap, Stein, and Wilcox (1993) that a monetary contraction is reducing bank lending. When we analyze the impact of all monetary variables such as CRR, OMOs and BR then the result is quite strong. The findings revealed that 43 percent of the variation in bank lending was explained by the regression equation involving explanatory variables CRR, BR and OMOs. Besides that, the model is significant as indicated by F value at 93.35 and DW at 1.06. All beta coefficients were significant at 0.01 percent level of significance.

CONCLUSION

From monetary transmission point of view, the role of banks' loan and advances is crucial because monetary policy operates through banking lending behavior, especially in developing countries like Nepal. Banks cannot be efficient in their performance without analyzing the impact of monetary policy actions because of the central bank's authority to perform on interest rate, policy rate, OMOs, credit policy, macro prudential measures and regulatory and supervisory aspects for achieving economic and financial stability. On the other hand central bank and policy makers cannot take appropriate policy actions without having appropriate knowledge about bank lending behavior as monetary, financial, credit policies are implemented through banking sector. Understanding the channels of monetary transmission would help monetary policymakers decide which financial market disturbances warrant changes in monetary policy and which do not. It would also assist them in the choice of intermediate targets for policy (Romer and Romer, 1990).

The main objective of this study is to analyze the impact of monetary policy actions on bank lending behavior in Nepal. The specific objectives are to a) evaluate the impact of open market operations on banks' lending behavior, b) assess the effects of cash reserve requirement on banks' lending behavior and c) find out the extent to which bank rate affects the lending behavior of commercial banks in Nepal. The major conclusion of this study is that the monetary

policy actions have effects on bank lending. This finding is consistent with the findings of Kimani (2013).

Correlation analysis shows that there is a negative relation between CRR and OMOs, and bank lending which indicates that higher the CRR and OMOs, lower would be the bank lending. However, bank rate is positively correlated with bank lending, which is not in line with theory.

Regression analysis shows that OMOs, CRR tend to influence the bank lending in negative manner. However, bank rate has positive impact on lending, which is not in line with theory. The findings revealed that 36 percent of the variation in bank lending was explained by the regression equation involving explanatory variables CRR, BR and OMOs. Besides that, the model is significant as indicated by F value at 65.07 and DW at 1.17. All beta coefficients were significant at 0.01 percent level of significance..

This indicates that the role of bank lending is crucial in monetary transmission mechanism and there exists bank lending channel of monetary policy in Nepal. This finding is consistent with the finding of Budha (2013).

The study observed negative relationship between OMO, CRR and bank lending. Hence the central bank willing to increase the efficiency of monetary management, should focus more on OMOs and CRR as monetary instrument. Further, NRB should rely more on OMOs for monetary management in the short run rather than change in CRR and bank rate. Further, the study recommends that central bank should hold cash reserve ratio constant as a cushion for the borrowers from fluctuating lending rates by commercial banks. However, since excessive borrowing will have inflationary effect in the economy, the study recommends that central bank commit commercial banks to open market operations to control short term interest rate and money supply in the economy. NRB should have adequate government securities under its holding to perform OMOs efficiently. As increase in CRR and OMOs have negative impact on bank lending, commercial banks should be very compliant and careful on central banks such monetary actions while taking lending decision.

REFERENCES

- Altunbas, Y., Gambacorta, L. and Marques-Ibanez, D. (2009). Bank Risk and Monetary Policy. *Working Paper Series*, No. 1075, European Central Bank.
- Amidu, M. (2006). The link between Monetary Policy and Banks Lending Behavior: The Ghanaian Case, *Banks and Bank Systems*, 1 (1), 38-48.
- Ashcraft, A. B., (2006). New evidence on the lending channel. *Journal of Money, Credit, and Banking*, 38, 751-776.
- Bernanke, B. S. & M. Gertler. (1995). Inside the Black Box: The Credit Channel of Monetary Policy Transmission. *Journal of Economic Perspectives*, 9 (4).
- Bernanke, B.S. and Blinder, A. S. (1995) Credit, Money, and Aggregate Demand, *American Economic Review*, May, pp. 435-439.
- Bernanke, B. S., and Blinder, A. S. (2002). The Federal Funds Rate and the Channels of Monetary Transmission, *American Economic Review*, September, 901-21.
- Boughrara, A. & S. Ghazouani. (2010). Is there a Bank Lending Channel of Monetary Policy in selected MENA Countries? A comparative study. *Middle East Development Journal*, 2 (2).

- Brooks, P. K. (2007). Does the Bank Lending Channel of Monetary Policy Work in Turkey? *IMF Working Paper*, 7 (272).
- Brousseau, V. a. (2001). Monetary policy and fears of instability. *European Central Banks Working Paper* .
- Budha, B. B. (2013). The Bank Lending Channel of Monetary Policy in Nepal: Evidence from Bank Level Data. *NRB Economic Review*, 25 (2).
- Chodechai, S. (2004), *Determinants of Bank Lending in Thailand: An Empirical Examination for the years 1992 – 1996*, Unpublished Thesis.
- Chowdhury, I., Hoffman, M., and Schabert, A., (2003). Inflation Dynamics and the Cost channel of Monetary Transmission. *European Economic Review* 50(2006) 995–1016.
- Ehrmann, Gambacorta, Martinez-Pages, Sevestre and Worms. (2001). Financial Systems and the role of banks in monetary policy transmission in the euro area,. *European Central Bank Working Paper No. 105*.
- Ehrmann, M. (2000). Firm size and monetary policy transmission: evidence from Ewert, 6. (2000). *Analysis of Credit Marketing theory, a larger perspective* (1st edition ed.). Unity Press limited.
- Gambacorta, L & D. Marques-Ibanez. (2011). The Bank Lending Channel: Lessons from the Crisis. *BIS Working Papers* (345).
- Gambacorta, L. (2001). Bank-Specific Characteristics and Monetary Policy Transmission: The Case Italy. No.103, European Central Bank, Germany. *ECB Working Paper* (103).
- Gambacorta, L. (2003). The Italian banking system and monetary policy transmission: Evidence from bank-level data. In Angeloni, I., Kashyap, A., & Mojon, B., editors, *Monetary Transmission in the Euro Area: A Study by the Eurosystem Monetary Transmission Network*, pages 323–334. Cambridge University Press, Cambridge.
- Gertler, M. (1998). Financial Structure and Aggregate Economic Activity, *Journal of Money, Credit and Banking*, August.
- Gertler, M., and Gilchrist, S. (2003). The Role of Credit Market Imperfections in the Monetary Transmission Mechanism: Arguments and Evidence, *Scandinavian Journal of Economics*, 95(1), 43-64.
- Ghimire, T. (2004). Monetary Policy in Nepal, *Economic Collection, NRB Employee Union, Nepal*.
- Ghosh, S. (2008). Capital Requirements, Bank Behavior and Monetary Policy. A theoretical Analysis with an Empirical Application to India. *Indian Economic Review*, Vol. 43, No. 2.
- Igan, D. and Pinheiro. (2011, December). Credit Growth and Bank Soundness: Fast and Furious? *IMF Working Paper* 11/278
- Ituwe, C.E. (2003). *Elements of Practical Banking*, Ibadan: University Press.
- Kassim, S.H. and M. S. A. Majid (2008). Role of Bank Lending in The Monetary Transmission Process of a Developing Economy: Evidence From Malaysia. *Journal of Savings and Development*, Vol. 32, No. 4 (2008), 301-319.
- Kashyap, Anil K., Owen A. Lamont, and Jeremy C. Stein, (1994). Credit conditions and the cyclical behavior of inventories. *Quarterly Journal of Economics*, 109, 565–92.
- Kashyap, A. K. & C. J. Stein. . (1995). The Impact of Monetary Policy on Bank Balance Sheets. *Carnegie Rochester Conference Series on Public Policy*.
- Kashyap, A. K. & C. J. Stein. (2000). What Do a Million Observations on Banks Say About the Transmission of Monetary Policy? *American Economic Review* , 90 (3), 407-428.
- Kashyap, Anil K., Jeremy C. Stein, and David W. Wilcox, (2006). Monetary policy and credit conditions: Evidence from the composition of external finance: Reply. *American Economic Review*, 86, 310–14.

- Kimani, J. (2013). Assessment of Effects of Monetary Policy on Lending Behavior of Commercial Banks in Kenya. *A Research Project to Business Kenyatta University*.
- Kothari, C.R. and Gaurav Garg (2014). *Research Methodology Methods and Techniques*. New Age International Publishers, New Delhi.
- Kuttner, K. and P. Mosser (2002). The Monetary Transmission Mechanism: Some Answers and Further Questions. *U.S: FRBNY Economic Policy Review*.
- Khatriwada, Y. R. (2005). Some Aspect of Monetary Policy in Nepal. New Delhi: South Asian Publisher Pvt.Ltd.
- Khatriwada, Y. R. (2005). Monetary Policy. *Fifty Years of Nepal Rastra Bank, Part III*.
- Kishan, R. and T. Opiela. (2000). Bank Size, Bank Capital, and the Bank Lending Channel. *Journal of Money, Credit and Banking*, Vol. 32, No. 1, 121-141.
- Loayaza, N. and Schmidt, K. (2002). Monetary Policy: Rules and Transmission Mechanism. *Working Paper*, Central Bank of Chile.
- Loupas, C. F. (2001). Monetary Policy and Bank Lending in France. *ECB Working Paper (101)*.
- Lazy, N. and Schmidt-hebbel K., (2002). Monetary Policy Functions and Transmission Mechanisms: An Overview. Central Bank of Chile. Accessed from: <http://ideas.repec.org/h/chb/bcchsb/v04c01pp001-020.html> on 20th Dec, 2012.
- Madura, J. (2003). Analysis and Evaluation of the Eurex Repo Market Model. Unpublished MBA thesis s Institution / College Leopard-Franzens University, Innsbruck (Banking and Finance) Markus
- Matsuyama, K., (2007). Credit traps and credit cycles. *American Economic Review*, 97, 503-516.
- Olusanya, Olumuyiwa, S., Oluwatosin, O.A. and Chukwuemeka, O.E. (2012). Determinants of Lending Behavior of Commercial Banks: Evidences of Nigeria, A Cointegration Analysis. *IOSR Journal of Humanities and Social Sciences*, 5 (5), 71-80.
- Romer, C. D., and Romer D. H. (2000). New Evidence on the Monetary Transmission Mechanism. *Brookings Papers on Economic Activity*, 1, 149-213.
- Roberto A. De Santis and Paolo Surico (2013). Bank Lending and Monetary Transmission in the Euro Area. *Working Paper Series No 1568*, European Central Bank.
- Schnatter, S.F. and Sylvia Kaufmann (2006). How Do Changes in Monetary Policy Affect Bank Lending? An Analysis Of Austrian Bank Data, *Journal of Applied Econometrics* 21: 275-305.
- Sigdel, B. D. (2006). Effectiveness of Monetary Policies and Strategies: A Case of Nepal. *The Economic Journal of Nepal* 29(1). Central Department of Economics, Tribhuvan University, Nepal.
- Stein, J. C. (1998). An Adverse-Selection Model of Bank Asset and Liability Management with Implication for the Transmission of Monetary Policy, *RAND Journal of Economics*, 29 (3).
- Usman, S. (1999). Bank Regulation and Supervision in Nigeria. *The Nigerian Banker*, 7-9
- Zawadzki K. K. F. (1965). Economics of Inflationary Processes. *Oxford Economic Papers, New Series*, Vol. 17, No. 1, 100-110.
- Zulkefly A.K., Wan A., Saini W. N. and Bakri A.K. (2010). Bank Lending Channel of Monetary Policy: Dynamic Panel Data Study of Malaysia. *Munich Personal RePEc Archive*.

APPENDIX

Pattern of lending of commercial banks from year 1996 to 2015

(This table shows the total lending (in million Rs.) of 24 sample banks associated with 369 observations. The mean value measures the average lending of individual sample banks and all sample banks for particular year and standard deviation measures the variability in lending.)

Bank	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Mean	Std Dev
NBL	14856	18069	19472	22395	22864	21729	20756	19078	19108	17456	12180	13378	15481	19261	25074	26638	29551	37844	41191	53241	23481	9933
RBB	18405	18922	22405	26340	29141	28081	28184	27970	26514	28614	26864	25215	27354	31464	35617	36792	40346	48981	60792	75774	33189	13750
NABIL	4306	4625	5295	5812	7324	8173	7072	7997	8635	11078	13021	15657	21515	27817	32903	38766	42732	47523	55830	66996	21654	18818
NIBL	1703	1729	1678	1422	2071	2386	2693	5873	7174	10295	13007	17482	27146	36250	40690	41665	42510	47369	53093	67033	21163	20667
SCBNL	3131	3582	4171	4693	4957	5839	5676	6029	6662	8214	8905	10538	13355	13119	15932	17698	18376	23126	26317	27986	11415	7587
HBL	2891	3382	4276	5372	7423	8837	9674	10894	13082	13245	15516	17672	19985	25292	28977	31657	34283	39649	44400	53124	19481	14393
NSBI	1177	1721	2415	2930	3560	4091	4529	4761	5491	6619	8060	9847	12575	15465	17887	21657	26404	29147	35061	39667	12653	11535
NBBL	676	1200	1958	3259	4612	7022	7969	8363	9996	8740	9011	8303	8420	8508	8860	9944	10673	12920	18825	25440	8735	5585
EBL	49	322	868	1355	2270	2964	3970	5031	6117	7914	10124	14059	18814	24366	28130	31535	36376	44008	47956	54884	17056	17242
BOK	1075	1336	1282	1812	2995	4275	4840	4913	6050	6167	7525	9664	12693	14895	16847	17248	18064	21806	26974	31795	10613	8830
NCC		297	1272	1524	1937	2894	2937	3322	4418	5934	5837	5084	5085	7142	8373	9217	12868	15920	17846	21268	7009	5798
LBL				472	922	1793	2295	2627	3207	3817	4315	4938	5366	5680	5480	6211	6979	9175	14247	17240	5574	4331
NIC				481	1659	2573	2329	2528	3729	4895	6883	9108	11447	13889	12906	15149	17460	32241	37301	42042	12742	12491
MPL						499	681	1494	2542	5051	6033	7281	8881	12957	14934	14711	16023	21634	29220	33770	11714	9904
KBL						264	1120	2144	3709	5519	6918	9011	11449	14682	14875	14898	17809	20083	22797	27024	11487	8001
LXBL							124	764	1701	2701	4274	6528	9784	13446	14732	15263	15848	19143	21865	29414	11113	8577
SBL								629	1568	2635	3869	6320	9481	13505	16859	18398	20115	37844	27577	36382	15014	12248
ADBN												34225	36585	38271	39375	40389	45338	54959	62455	72216	47090	12429
GBL												2597	5058	9149	12139	12762	20410	26832	42555	49321	20091	15539
CBL												2047	4788	8196	10906	12437	14326	17684	23106	29095	13620	8142
PCBL													5154	9817	14102	17070	19160	21736	27815	33077	18491	8552
SNBL													4045	8907	12147	12369	14597	18335	20846	27348	14824	6800
GRBL													3691	6456	7501	9034	11382	14322	14677	9566	9578	3549
NMB													2010	5010	7508	10815	11135	15880	20135	26819	12414	7669
Mean	4827	5017	5917	5990	7057	6761	6553	6730	7630	8759	9550	11448	12507	15981	18448	20097	22615	28257	33037	39605		
Std Dev	6404	6802	7591	8380	8745	7889	7595	7088	6583	6402	5598	7804	8808	9644	10473	10912	11596	13307	14757	18040		

Source: Bank and Financial Statistics, NRB.