CHAPTER 1

INTRODUCTION

1.1 General Background:

Financial development is defined as the improvement in the quantity, quality and efficiency of financial intermediary services (Choong and Chan, 2010). Financial system is very important for any country in performing several crucial functions. Two main function of the financial system can be named as its monetary function and its financial intermediation function. The monetary function of the financial system plays several roles to facilitate payment system of a country. Its roles are to provide a medium of exchange, store of wealth and a stable unit of account, removing inefficiencies of the barter system. Its intermediations function facilitates the process of transferring saving to investments in an economy. Financial system mobilizes resources and creates liquidity in an economy through short-run borrowing and long-term lending. Since banks provide funds collected from savers and provide loans for investment made efficiently on the productive purposes then it ultimately leads to the economic growth (Guruge, 2012). Economic growth is one of the most important macro economic variables. Theoretically, economic growth refers to the increase in real GDP over time. An economy's production capacity increases over time, accompanied by capital accumulation, technological progress and labor productivity. Thus, the relationship between the financial development and economic growth is the most important things in the developing or developed countries (Guruge, 2012).

Historically, the study of the relationship between financial development and economic growth can be traced back to the work of Schumpeter who argued that financial services are paramount in promoting economic growth (Schumpeter, 1911). However, until 1960 the impact of financial sector's development on the process of economic growth of a nation did not gain sufficient weight in

literature. The later works of economists like Mckinnon (1973) and Shaw (1973) threw light on this aspect of economic growth, which has succeeded in drawing attention and interest of many economists in modern times. But it was the finding of a study by King and Levine (1993) that has promoted to generate renewed interest in the effect of financial sector development on economic growth and there has been considerable research into this relationship since then.

The direction of causality between financial development and economic growth has always been a matter of great controversy. Patrick (1966) posited that the direction of causation could either run from economic growth to financial development (demand-following phenomenon), or it could run from financial development to economic growth (supply-leading phenomenon). Patrick's conclusion was that the supply leading phenomenon was likely to be predominant in the early stages of development and then as the economy develops the demand-following phenomenon begins to gain prominence. Besides, there is another possibility that the financial development and economic growth is not causality related. This implies that neither financial development causes economic growth nor economic growth causes financial development.

Nepal's organized effort towards developing financial system is not long enough. The modern banking history of Nepal begins from 1937 AD when Nepal Bank Limited was established under the aegis of Emperial Bank of India. After 19 years of the establishment of NBL, Nepal Rastra Bank (NRB) was established in 1956 AD, with the enactment of NRB Act of 1955, in order to develop the financial system of Nepal. Later in 1959, the government set up Nepal Industrial Development Corporation (NIDC), in order to assist the industrial loan for the industrial sector. In 1964 AD, Nepal Rastriya Banijya Bank (RBB), a fully government owned commercial bank was established with the enactment of RBB Act 1964. This was the second commercial bank that came into operation, after a gap of 29 years since the first one was established. Similarly, in 1968 Agriculture Development Bank was established in order to fulfill the need of agriculture finance. All these institutions were established in the government sector. Until 1980s NRB used to control the commercial banks' activities. Mostly government was the owner of the commercial banks, other depository banks and non-bank

financial institutions. Financial institutions were not independent in regard to credit decisions. There lending capacity was restricted with high statutory liquidity ratio (SLR), cash reserve ratio (CRR) and cash vault requirement. Financial institutions were bound to follow government institutions to invest instead of investing in profitable ventures. Therefore, before 1980s financial system of Nepal was repressed. Nepal embarked financial sector reform since mid-1980s as a part of economic stabilization and structural adjustment program. Financial sector reform is aimed at alleviating financial repression and promoting financial market efficiency in mobilization and allocation of resources. International financial institutions like World Bank and International Monetary Fund as well as Asian Development Bank have been assisting the government in this connection. With the liberalization and financial sector reforms, the banks and banking, non-banking financial intermediaries are playing vital roles in capital formation, resources mobilization and also mobilizing the funds from surplus units to the deficits units. The investors are investing the funds on different sectors of the economy such as trade, commerce, and industries etc. so as to mobilize the unutilized resources. Thus the productivity of the economy has increased through the financial development and it has also helps to increase economic growth in some extent (Bhusal, 2012). This financial sector has contributed the economy in two ways. First they play a primary role in the economy through development activities and second they provide capital to general public to develop organizations for which helps to accelerate the economic growth. In Nepal, the main institutions that are playing significant role in mobilizing resources are commercial banks, development banks, finance companies and micro development banks. However, other savings and cooperative institutions and non-government organizations are also providing limited banking facilities. Over the past decade, substantial interest is focused on the link between the financial sector and economic growth. Endogenous growth theory emerged in the late 1980s and paved way for the new theories exploring the link between financial development and economic growth. In addition, improved empirical methods added considerable value to subsequent studies. Many studies have been done such as financial sectors reforms, financial access, in Nepal. However a very few studies have been done that examines the relationship between the financial development and economic growth, in the case of Nepal. Hence, this study is aimed to analyzing the relation between financial development and economic growth which is relevant to the country like Nepal.

1.2 Statement of the Problems:

Before the liberalization of 1980s, financial sector of the Nepalese economy was less developed. All institutions were established in the Government sector. Until 1980s NRB used to control the commercial banks' activities, government was the owner of the commercial banks, other depository banks and non-bank financial institutions. Financial institutions were not independent in regard to credit decision. Hence opening up the financial sector to private sector investment and decontrolling of the system seemed essential. The central bank and government started to liberalize the system through the adoption of free entry policy for banks and financial institutions. Three joint venture banks were established in the three subsequent years from 1984 and 1986. Following it, interest rates were liberalized gradually. Then especially after restoration of democracy in 1990, elected government gave major thrust on economic and financial liberalization in Nepal. The institutional network and volume of operations and the financial system has expanded and diversified, with the commercial bank going up from 5 in 1990 to 32 in 2012. Thus after the liberalization, the number of banks and non bank financial intermediaries have increased significantly and such financial intermediaries are playing important role to capital formation, resources mobilization and also mobilizing the funds from surplus units to the deficits units. The investors are investing the fund on different sectors of the economy such as trade, commerce, and industries etc so as to mobilize the unutilized resources. Thus the productivity of the economy is expected to increase through the financial development and it is expected to enhance level of economic growth. However, the problem is that the growth became lower than expected, which also affected the performances of its financial sector. With respect to the above mentioned changes, it is conceivable to know, whether the innovation in the banking sector

or financial sector reform leads to the economic growth or not. Another problem is that many theoretical studies have been done such as financial sectors reforms, financial sector liberalization and economic growth etc. but, there are only a few empirical studies that have examined the relationship between the financial development and economic growth, in the case of Nepal. Thus, it is reasonable to this bridge this gap and hence this study is an effort for the same.

Though, Nepal has been adopting the financial liberalization policy in order to achieve economic growth via financial development. But it may be argued that does the financial development cause the economic growth? Despite the concerted efforts on the financial sector reform, the critics argue that the reform has made only a little impact on mobilization of financial resources and in the growth of real sector. In such a context, the present study is focused on answering the following questions:

- Is there significant long run relationship between the financial development and economic growth in Nepal?
- Is there causal relationship between the financial development and economic growth in Nepal?

1.3 Objectives of this Study:

Considering the above mentioned problems, this study has set the following objectives:

- To examine the relationship between financial development and economic growth in Nepal.
- To test the casualty relationship between financial development and economic growth in Nepal.

1.4 Significance of the Study:

At present, the growth of financial services sector is theoretically important for a nation's economic growth and development. Its importance to economic growth emanates from its critical role in facilitating financial intermediations and enhancing trade related payments. The efficacy of financial system to reduce information and transaction costs plays an important role in determining the rate of savings, investment decisions, technological innovations and hence the rate of economic growth. Therefore, the financial sector reform or development has been considered to be one of the principal agendas for the policymakers for making it well developed, diversified, modern and shock observing through which the rebalancing between internal as well as external demand in the short run and expand capacity of an economy in the long run is possible so as to make the growth process sustained and persistent. There is lack of empirical literature regarding financial sector development and its relationship in real sector in Nepalese context. Some of the previous literatures were related to assessing the impact of financial reform on financial sector development only. Again it has been found that some of the literatures are focusing on the liberalization policy. Thus, this study is unique as it has focus on the empirical relationship between the financial development and economic growth.

1.5 Limitations of the Study:

The study has the following limitations:

1. The study covers the time series data from FY 1974/75 to FY 2010/11only.
2. It is based on annual data as there is no availability for quarterly data on real GDP in Nepal.

1.6 Organization of the Study:

The present study is organized in five chapters. The first chapter is an introductory part of the study covering the background of the study, statement of the problems, objectives of the study, significant of the study and limitations of the study. The second chapter covers the review of some of the theories concerning the financial development and economic growth and review of empirical studies at national and international level. The third chapter provides a glimpse of the methodology used. The fourth chapter covers the analysis of data and finally, the fifth chapter presents the summary, conclusions and recommendations.

CHAPTER 2
REVIEW OF LITERATURE

2.1 Introduction:

The relationship between financial development and economic growth has been subject to a considerable debate and interest among economists for many years. Ever since Schumpeter (1911), Goldsmith (1969), Mckinnon (1973), Shaw (1973), the relationship between financial development and economic growth has been extensively studied. Recent work includes Levine (1998), King and Levine (1993, 1993a), Rousseau and Wachtel (2002). But the results are different in Latin American countries. In the Latin American countries, financial development shows a negative impact on the economic growth. Studies draw a greater attention for the researchers to check causality between financial development and economic growth because results usually are not clear (Calderon et al, 2003). While empirical studies often provide a direct relationship between financial development and economic growth but much controversy remain about how these results should be interpreted. In the review of empirical study, it has been found that the main sources of controversy are the selection and measurement of financial development indicators to show the relationship between financial development and economic growth. To examine the interaction between financial development and economic growth, many economists have analyzed various models by using different methodologies, such as, simple linear regression model, Vector error correction model, Granger causality test model, Johansson's cointegration model, auto regressive distributed lag model etc. Among them a recent technique is the cointegration analysis and use of error correction modeling to time series data used in the financial development and economic growth function. This chapter presents some brief theoretical reviews concerning with the financial development and economic growth in section 2.2. Section 2.3 presents the review of empirical studies on the financial development

and economic growth function at international level, Section 2.4 presents a brief review of the studies on the financial development and economic growth function at national level and conclusion from the reviews has been discussed in section 2.5.

2.2 Theoretical Review:

Different economists have expressed their views regarding the financial development and economic growth. The different views are outlined as below:

Economists hold different opinions regarding the importance of the financial system for economic growth. Until 1950s, the role of financial system was largely ignored in the process of economic development. Keynesian economists believed that the real sector contributes more than the financial components in economic growth process. Rather than credit, Keynes's liquidity preference theory emphasized the role of liquidity. Thus, the financial sector was given less importance till the dominance of Keynesian thought in policy making. Keynes's General Theory more or less ignored the importance of credit and credit markets in the economy. Therefore, little attention was given to the growth and development of financial sector in the regime of the Keynesian period. However, Hicks (1937) and Modigliani (1944) have recognized an indirect role of finance. According to them, level of financial development and its diversification can play a significant role in real sector growth. Financial sector establishes a link to the rest of the sectors, and thus buoyancy in financial market brings about the same tendency in the rest of the sectors in the economy. A weak financial sector raises the cost of an economy in the form of higher cost of money and credit making investment costly. The higher cost of an economy is reflected in it's a low competitive capacity, slower capital formation and a low level of living standard of the masses. This further leads to vicious circle of poverty, due mainly to the lack of quality products of the financial markets. Thus it is essential to measure the intensity of the financial market in terms of its growth, status, financial outreach and its depth so as to measure the strength and

potentials of an economy to address the problems of low growth manage economic shocks and ensure fair distribution of resources. A well developed, modern and diversified financial market helps to expedite the monetary transmission mechanism and makes the function of maintaining macroeconomic stability more easy, flexible and transparent. Thus, financial variables influence aggregate economic behavior.

The theories of finance-growth can be subdivided into two broad schools of thought, the structuralists and the repressionists. The structuralists contend that the quantity and composition of financial variables induces economic growth by directly increasing saving in the form of financial assets, thereby, encouraging capital formation and hence, economic growth [Goldsmith (1969); Gurley and Shaw (1955); Patrick (1966); Demetriedes and Luintel (1996)]. Thus, factor such as, financial deepening and composition of the aggregate financial variables are important for economic growth. The financial repressionists, led by Mckinnon (1973) and Shaw (1973) believed that financial liberalization in the form of an appropriate rate of real cash balance is a vehicle of the rate of capital formation and promoting economic growth. According to this hypothesis, a low or negative real interest rate will discourage saving. This will reduce the availability of loanable funds for investment, which in turn lower the rate of economic growth. Mckinnon-Shaw model posits that a more liberalized financial system will induce and increases saving and investment and therefore, promote economic growth.

Does financial development promote economic growth, or does economic growth propel financial development? The possible directions of causality between financial development and economic growth are labeled by Patrick (1966) as the demand-following and supply-leading hypothesis. The demand-following hypothesis postulates a causal relationship from economic growth to financial development. Here, an increasing demand for financial services might induce an expansion in the financial sector as the real economic grows (i.e. financial sector responds passively to economic growth). Gurley and Shaw (1967) and Goldsmith (1969) support this

hypothesis. On the other hand, supply-leading hypothesis postulates a causal relationship from financial development to economic growth, which means deliberate creation of financial institutions and markets, increases the supply of financial services and thus leads to real economic growth. The emergence of the so-called new theories of new endogenous economic growth has given a new impetus to the relationship between growth and financial development as these models postulate that saving behavior directly influences not only equilibrium level but also growth rates. Thus financial market can have a strong impact on real economic activity. Luintel and Khan (1999) argue that a number of endogenous growth models show a two-way relationship between financial development and economic growth.

Levine (1997), after reviewing many studies on the relationship between financial development and economic growth states that broad cross-country comparison, individual country studies, industry-level analyses and the firm level investigations point in the same direction: the functioning of financial system is important for economic growth. According to the survey results, countries with larger banks and more active stock markets grow faster over subsequent decades even after controlling for many other factors underlying economic growths. Furthermore, according to this results, industries and firms rely heavily on external financing grow, disproportionately faster in countries with well developed-banks and securities market than in countries with poorly developed financial system.

2.3 Review of International Empirical Studies:

Theoretical views allow for the complex relationship between the financial development and economic growth. To detect this complexity, there are several empirical studies that have been made on this context. However, the recent focus has been on empirical analysis where research has been almost equivocal in its conclusions regarding the hypothesis that financial development “leads” economic growth. For example, King and Levine (1993) concluded that financial development “leads” economic growth and Levine and Zervos (1998) found that stock market and banking development “leads” economic growth. In contrast Arestis and Demetriades

(1997) and Shan, Morries and Sun (2001) found that the hypothesis was supported in only a few of the countries surveyed and therefore, that no general conclusions could be drown.

Jalil and Ma (2008) have attempted to express the relationship between financial development and economic growth for China and Pakistan over the period 1960-2005. The bound testing (ARDL) approach to cointegration is conducted to establish the existing long-run relationship. They empirically tested the hypothesis "financial development leads to growth" under the (ARDL) framework by using the deposit liability ratio and credit to private sector as the indicators of financial development. The study found that a positive and significant relationship between financial development and economic growth exists in the case of Pakistan. In the case of China, the analysis shows a positive and significant relationship between deposit liability ratio and economic growth but a positive yet insignificant relationship between credit to private sectors and economic growth. Furthermore, the non performing loan (NPL) has prevented financial development from contributing to the economic growth. However, they have not used a good proxy for financial development in the case of China due to the lack of data on credit to private sector.

King and Levine (1993) have examined the issue by using correlation and contemporaneous regression taking a cross-section sample of 80 countries for the period 1960-89 to gauge the strength of the partial correlation between financial development and the growth indicators. The variables used are size of the formal financial intermediary sector relative to GDP, the importance of bank relative to the central bank, the percentage of credit allocated to the private firms, and the ratio of credit issued to private firms to GDP. The empirical results indicate that there is strong positive correlation between each of the four financial indicators and economic growth. The data are consistent with the view that financial services stimulate economic growth by increasing the rate of capital accumulation and by improving the efficiency with which economies use that capital. Based on these empirical results they concluded that Schumpeter might be right saying that the services provided by financial intermediaries (i.e. mobilizing savings, evaluating projects,

managing risk, monitoring managers and facilitating transactions and these services) stimulate technological innovation and economic development.

Shan and Jianhong (2006) have used the Vector Autoregression (VAR) technique of innovation accounting or variance decomposition and impulse response function analysis including the Granger causality test using annual data for the period of 1978-2001 to provide a quantitative assessment of the relationship between financial development and GDP growth in China considering the variables: real GDP, total credit to economy, labor force, net investment and total trade as percentage of GDP. The study shows financial development as the second force (after labor force) for economic growth in China. They also found that a strong economic growth has significant impact on financial development by providing a solid credit base (through rising personal income and private and public resources) in China. The study has also supported the view that financial development and economic growth exhibit a two-way causality and hence is against the so-called "finance-led-growth" hypothesis.

Hussain and Chakraborty (2012) have examined the empirical relationship between financial development and economic growth and their causality in the context of Assam state of India using the annual time series data for the time period 1985-2009. They have used the gross domestic product of the state (GSDP) as growth variable and number of bank branches per house population, the ratio of outstanding credit of all the scheduled commercial banks of the state to the different sectors to the GSDP, the share of financial system in GSDP and credit deposit ratio of all scheduled commercial banks of Assam as the financial development indicator variables.. They have used Johansen and Jesulius cointegration analysis to examine the long term relationship between the financial development and economic growth. In this study, the presence of long term relationship between the variables was found in Assam. It has also supported the unidirectional causality running from financial development to economic growth. Hence, the contribution of financial development to economic growth is statistically significant in Assam.

Guruge (2012) has examined the casual relationship between economic growth and financial development in Sri Lanka during the period 1971 to 2010, using the vector autoregressive (VAR) model taking financial repression and real interest rate into consideration. Financial development is measured by constructing a single index using three variables: a) consolidated broad money supply as a percentage of nominal GDP, b) commercial bank assets as a percentage of commercial bank assets plus central bank assets and c) domestic credit to private sector divided by nominal GDP. Granger causality tests are used along with the cointegration and vector error correction methodology (VECM). The empirical study shows that financial development has a significant positive impact on economic growth in Sri Lanka, even though featured with short-term effects. Financial repressionists polices have negative effect on financial development in the long run. His finding is pointing towards a bi-directional causal relationship between economic growth and financial development in Sri Lanka. The causal relationship is asymmetric: economic growth causes financial development to grow in both long and short term but financial development causes economic growth only in the short term.

Johannes, Njong and Cletus (2011) have investigated the relationship between financial development and economic growth in Cameroon, using time series data for the period 1970-2005, applying Johansen method of cointegration analysis by taking GDP per capita as the endogenous variable that reflects the degree of development of the economy and two indicator variables (1) size of financial sector (LLI) that is currency plus demand and interest bearing liabilities of banks and other financial intermediaries divided by GDP which is also known as the depth of the financial sector and (2) bank credit allocated to private enterprises by the financial sector (BPCRE). They have also used the control variables as the investment rate (INV), size of the government consumption (GOVC) and openness of the economy. They have found that the financial development has a positive effect on economic growth in the long run through efficient collection and allocation of financial resources. No causal relationship was found in the short run, but in the long run this relationship exist and runs from financial development to economic growth.

Rachdi and Mbarek (2011) have examined the causality between financial development and economic growth with a sample of 10 countries: 6 from the OECD region and 4 from MENA region during 1990-2006. They have used two econometric approaches i.e. panel data cointegration and GMM system approaches. They have used the financial development indicators as private credit by deposit money banks and other financial institutions to GDP and liquid liabilities. The real GDP per capita has been used as a proxy of economic growth. For consistency check they used a GMM system dynamic panel estimator. They have found that financial development is positively and strongly correlated with real GDP. This implies that financial sector and real sector are interrelated to each other in OECD and MENA countries. For robustness tests, they have used the error correction approach. Their result supports the idea that the causality is bidirectional for the OECD countries and unidirectional (economic growth- financial development) for the MENA countries due to the cause of weak financial system and the state's intensive intervention in them. Such interventions tend to limit the contribution of the financial sector in the growth process of real sector.

Sinha and Macri (2009) have examined the relationship between financial development and economic growth using time series data for eight ASEAN countries. The empirical results from their study did not support the general consensus view of a positive relationship between financial development and economic growth. First, they estimated augmented production function where a financial development variable was added. Second, they conducted the multivariate Granger causality tests between the growth rate of income and the growth rates of financial development variables. The regression results show a positive and significant relationship between the income variable and financial variable for India, Malaysia, Pakistan and Sri Lanka. The multivariate Granger causality tests show a two-way causality relationship between income and the financial variables for India and Malaysia, one-way causality from financial variables to income variables for Japan and Thailand and reverse causality for Korea, Pakistan and Philippines. For Sri Lanka there is a little evidence of causality in either direction. Thus their empirical results do not unambiguously support the general view of a clear and positive relationship between financial development and economic growth.

Acaravci, Ozturk and Acaravci (2009) have investigated the causal link between financial development and economic growth in a sample of 24 sub-Saharan African countries over the period 1975-2005. The empirical methodology was based on the Pedroni Panel Cointegration Test and Panel GMM estimation for causality. They have used real GDP as a growth variable and domestic credit to private sector (percentage of GDP), domestic credit provided by the banking sector (percentage of GDP) and M3 broad money supply as the financial development variables. The study has found evidence of no long-run relationship between financial development and growth. Besides, there is a bi-directional causal relationship between the growth of real GDP per capita and domestic credit provided by the banking sector. It has also concluded that the growth of real GDP per capita also causes financial deepening.

Kenani and Fujio (2012) analyzed the dynamic causal relationship between financial development, trade openness and economic growth in Malawi using trivariate (VAR) model. The study has also explored a possible indirect casual effect which finance may have on growth through trade openness. Three alternative measures of financial development: money supply, liquid liabilities, and private sector credit are employed to determine the impact of different aspects of financial development and economic growth during the study period. The Johansen Cointegration Tests results indicate a long run positive relationship between financial development, trade openness and economic growth. The Granger causality tests results based on VECM shows that financial development has a unilateral causal effect on economic growth in short run; while financial development and trade openness have a short run bidirectional relationship depending on financial development measure. However, the finding indicates that indirect causal effect that financial development has on economic growth through trade openness depends on financial development measure.

2.4 Review of National Empirical Studies:

Empirical studies at the national level using the latest techniques of cointegration and error correction modeling are still lacking. The main problem behind this is lack of sufficient data observations, lack of high frequency data etc. Some of the empirical studies relating to relationship between financial development and economic growth in Nepalese context are as follows:

Regmi (2010) has analyzed the impact of financial development on economic growth in Nepal, using a regression analysis for the period 1987-2006. He has used GDP as a growth variable and population, trade, investment, deposit, credit and money as the financial development indicator variables. His study shows the development of financial sector in Nepal has not promoted economic growth. The development in the financial system is actually inhibiting growth of the economy. Also, private credit has not significantly contributed to economic growth in Nepal because, in his view, most of the credits are distributed to household for consumption rather than businesses for productive investment.

Vuong (2013) has examined the relationship between financial development and economic growth, using the multiple regression analysis over the period from 1994 to 2011, in Nepal, considering total deposit, credit, term deposit, current deposit and investment as independent variables and GDP as a dependent variable. This study has revealed that the credit, term deposit and investment are positively but insignificantly related with GDP. Thus, these variables have only a little influence on economic growth In contrast to other studies, current deposit ratio has been found to be negatively associated with economic growth. Finally, this study has also shown that there is positive and significant relationship between total deposit and economic growth.

Bhurtel (2010) has examined the relationship between financial sector development and long run economic growth using cross-sectional and panel data regressions model for selected 58 countries depending upon two criteria i.e. level of income and rate of availability of data for the period of 1980 to 2000. Cross-country and panel time variation specifics as well as endogeneity problems have been addressed in an attempt to explain the relationship between financial sector development and sustained long run economic growth in the selected sample countries. It represents evidence based on cross-sectional model, Generalized Least Squares, VAR model and Granger Causality Tests. He has used real GDP per capita, human capital, investment, government expenditure, openness and inflation as the control variables and bank credit, private sector credit and liquid liabilities as the indicators of financial development. The study has found that there exists positive and significant relationship between financial sector development and long

run economic growth. Also, it has supported the existence of bi-directional causal relationship between financial sector development and long run economic growth. Further, the results also indicate that human capital, investment share and international trade have positive impact on economic growth while government spending exhibits a negative effect on economic growth.

Kharel and Pokhrel (2012) have analyzed the long run debate regarding the relative merits of bank vs. capital market-based financial system in promoting economic growth in the context of Nepal. Using Johansen's Cointegration Vector Error Correction model based on aggregate annual data from 1993/94 to 2010/11. Variables are used in the study are output per capita, the structure of financial system (S_t) defined as the ratio of banking sector to capital market development indicators. They have employed market capitalization over GDP as the representation of capital development. On the other hand, total assets of commercial banks, development banks and finance companies over GDP are considered to be a leading of the banking sector development. Again they have also considered total loans and advances of same institutions as an alternate indicator of the banking sector development. The empirical result suggests that banking sector plays a key role in promoting economic growth compared to capital market in Nepal.

Khatri, Aryal and Sapkota (2008) have examined the interaction between financial development and economic growth in Nepal, employing correlation analysis, regression analysis, financial ratios and other related theories. They have found that financial institutions have grown rapidly which has implications in overall economy of the nation. They have used the economic indicators such as GDP, GDP per capita, loan assets of commercial banks, investment, deposit, number of commercial banks and inflation rate from fiscal year 2001 to 2007. They have found that investment growth rate is not significant at all possibly due to the time lag of the effect of investment on the economic development. The growth rate of GDP and investment over GDP is positively related with a correlation

coefficient. Correlation between growth rate of GDP and Deposit/GDP are these two variables are highly correlated. Thus, the study shows that the saving rate in a country is crucial to the economic development (GDP per capita), especially for developing countries.

2.5 Conclusion:

In this section, we present a conclusion relating to the financial system and economic growth. It reveals that the development of financial system is possible in a more liberalized and market oriented environment. Financial intermediaries play a crucial role in the process of economic development. Economists have proposed a number of financial indicator and proxies to measure the financial development such as; money supply, liquid liabilities, deposit liability ratio, credit to private sector, size of financial sector. These indicators may not be equally important to all economies. Advanced economies have evolved a variety of financial markets in addition to having a well-developed banking sector. Commercial banks in these countries are forced to compete with other financial institutions such as security markets, foreign exchange mortgage and leasing companies, pension funds and many others. The case of developing countries may be quite different from that of advanced countries and the choice of financial deepening indicators depends on market structure, institutional environment and financial openness. To promote growth in the economy an efficient, a well functioning financial system is equally important and the efficiency of the financial system can be increased by increasing the depth and breadth of financial market and by reducing the sensitivity of financial system to adverse shocks.

The theoretical reviews made on section 2.2. Most of the theories suggested that financial sector development can make an important contribution to economic growth and poverty reductions for developing or developed countries. However, this section reveals the complex relationship between financial development and economic growth for development. Another review on section 2.3 deals with the empirical reviews between financial development and economic growth. To conduct the empirical study, researchers have used various models and techniques. However, there is no similarity in the selection of model. King and Levine (1993) have used simple correlation and contemporaneous regression whereas Shan and Jianhong (2006) have used Vector Autoregression (VAR) and Granger

causality test. Similarly, Guruge (2012) has also used Vector Autoregressive (VAR) and Granger causality test including error correction methodology and Kenanim and Fujio (2012) have applied trivariate (VAR) model, Johansen cointegration tests and Granger Causality tests based on VECM. Sinha and Marci (2009) have used regression and multivariate Granger causality tests. Johannes, Njong and Cletus (2011) have applied Johansen method of cointegration analysis. Rachdi and Mbarek (2011) have used two econometric approaches i.e. panel data cointegration and GMM system approaches whereas Acaravi, Ozturk and Acaravi (2009) have applied Pedroni Panel Cointegration test and Panel GMM estimation. Jalil and Ma (2008) have used bond testing Atoregressive Distributed lag approach to cointegration and Granger causality test. It has been found only few empirical studies about the causal relationship between financial development and economic growth in national literature in section 2.4, which makes few things clear that the available literature are based on OLS estimation except Bhurtel (2010) and Kharal and Pokhrel (2012). Bhurtel (2010) has used cross-sectional model, Generalized Least Square, VAR model and Granger causality tests and Kharel and Pokhrel (2012) have applied Johansen's Cointegration Vector error Correction model. There is no significant difference in selection of variables. Regarding the variable selection there are similarity among them. The most commonly used variables to represent the financial development on their model are money supply, liquid liabilities, deposit liabilities ratio and credit to private sector.

Finally, in the literature on the issue of financial development and economic growth at national level shows that there is a need of an extensive study of the nexus between the two variables in context of Nepal using a suitable econometric technology due to low frequency annual data. There is a lack of literature that give sufficient consideration to small sample biases and stationary issues of time series data. Besides this issue, most of the studies have the sample up to the FY 2006. Thus, study on the relative role of financial deepening on economic growth by using the sample size including the recent years has been on demand. This study aims to re-estimate the causal relationship between financial development and economic growth in Nepal, extending the data set from 1975 to

2011 and by adopting the ARDL modeling to cointegration analysis proposed by Pesaran and Shin (1999) to get rid of the spurious regression problem.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction:

This chapter is mainly concerned with the discussion of the methodology used in this study. Section 3.2 provides a discussion on the selection of appropriate variables, section 3.3 presents the empirical model and variable details, section 3.4 discuses the estimation model, section 3.5 discusses the Autoregressive Distributed Lag (ARDL) to Cointegration, hypothesis and various econometric tools and tests used in the study, section 3.6 discuses the Granger Causality test and finally section 3.7 discusses the data sources.

3.2 Selection of Variables:

There is no universal technique or method in selecting variables to explain the long run relationship between financial development and economic growth. Researchers have used different variables in different countries as a proxy of financial development indicators to address the long run relationship between financial development and economic growth. In this research work, the methodology used by Jalil and Ma (2008), to explain the long run relationship between financial development and economic growth, in China and Pakistan, is used mainly because the objective of this research work is to examine the relationship between financial development and economic growth, in Nepal. Besides this, the economic situation of Nepal is almost similar to that of Pakistan and China.

Jalil and Ma (2008) have chosen two independent variables namely deposit liability ratio and credit to private sector and dependent variable as real per capita GDP to explain long run relationship between financial development and economic growth, in China and

Pakistan. In the Nepalese context, Khatri, Aryal and Sapkota (2008) have analyzed the relationship between financial development and economic growth of Nepal by considering loans, assets, investment, deposit of commercial banks and inflation as independent variables and GDP per capita as a dependent one with the data span from fiscal year 2001 to 2007. Considering the objectives of this research work, this study has included some new independent variables which were not included in the previous studies. In Nepalese context, it is viable and relevant to study about the relationship between financial development and economic growth and these variables are easily available in Nepal and may reflect the appropriate result too. The variables chosen in this research are as follows:

a) Real Gross Domestic Product (RGDP).
b) Real Broad Money Supply (BMS).
c) Loans and Advances of Commercial Banks (LOA).
d) Total Assets of Commercial Banks (TA).

3.2.1 Real Gross Domestic Product (RGDP):

Real Gross Domestic Product is the inflation-adjusted measure that reflects the market price of all final goods and services produced in a given geographical boundary at the given period of time, generally one year. Usually, real GDP is referred as constant-price because it is measured in terms of base-year prices. Real GDP is calculated dividing nominal GDP by GDP deflator. This research work has used the real GDP as dependent variable so that to explain the relationship between economic development and financial development which is taken from economic survey 2011/12, published by Ministry of Finance, Nepal. This variable is denoted by RGDP.

3.2.2 Broad Money Supply in Real Term (BMS):

Broad money supply is defined in Nepal as the sum of narrow money supply and time deposits where narrow money means the sum of all currencies and coins that is with public including the demand deposits. Real broad money supply is obtained by the broad money supply divided by consumer price index CPI (2004/05= 100). It is taken as an independent variable in this research work. Reason behind selecting money supply is that an increase in money supply stimulates increased spending because it puts more money in the hands of consumers which makes them feel wealthier, stimulating them to increase their spending. A decrease in money supply or a decrease in the growth of money supply, results in decreased spending because there is a less money in the hands of consumers, stimulating them to decrease their spending. This causes a decline in economic activity and can cause disinflation (reduced inflation) or deflation (falling prices). Due to this reason BMS has been chosen and expected to have positive relation with the RGDP. The source of broad money supply is quarterly economic bulletin published by Nepal Rastra Bank 2012. It is denoted by BMS.

3.2.3 Loans and Advances (LOA):

Loans and advances of commercial banks hold the dominant share on their balance sheet. Thus commercial banks are the largest financial intermediaries. Almost 80% share in the total asset is found on NRB licensed financial institution. Therefore, the loans and advances of commercial banks are used as an independent variable which represents the financial system too. When the commercial banks provide loans and advances to the investors basically they provide for productive purposes. When investors invest it in productive sectors rather than consumption purposes it may increase the production of the country and ultimately economic growth of the country. Thus, LOA is expected to have positive relation with RGDP. The source of information of LOA is quarterly economic bulletin published by Nepal Rastra Bank 2012. It is denoted by LOA.

3.2.4 Total Assets (TA):

Bank assets are the physical and financial property of bank, what a bank owns. The commercial banks are largest financial intermediaries, which hold more than 80% share in total financial assets of the NRB licensed financial institutions. Therefore total assets of commercial banks are used as representation of total assets of financial system. When banks' total assets increase, the lending capacity of the banks also rises to the investors. When the lending funds are used for productive purposes, there are more possibilities to increase national production; hence economic growth occurs in the economy. In this study total assets of commercial banks is also included as an independent variable proxied for financial development variable. TA is expected to have positive relation with RGDP. The source of information of TA is quarterly economic bulletin published by Nepal Rastra Bank 2012. It is denoted by TA for analysis.)

3.3 The Econometrics Model:

This research paper has selected the major financial development indicators such as broad money supply, loans and advances and total assets of commercial banks as an independent variables and real GDP as a dependent variable. This paper aims to evaluate relationship between the economic growth and financial development and also analyzes the causality between economic growth and financial development. To attain these research objectives it becomes important to present the selected variables in functional form, initially as follow:

rgdp = f (bms, loa, ta)……..(3.0)

Where, rgdp, bms, loa and ta represent the real gross domestic product, broad money supply, loans and advances and total assets respectively. The functional form explains economic growth (that is real gross domestic product) is also determined by financial development (which is proxied by the variables broad money supply, loans and advances and total assets).

Following the research paper of Jalil and Ma (2008) relationship between financial development and economic growth has been presented in log-log linear form as:

$$\ln RGDP_t = \alpha + \beta_1 \ln BMS_t + \beta_2 \ln LOA_t + \beta_3 \ln TA_t + U_t \ldots\ldots\ldots\ldots\ldots\ldots (3.1)$$

Where, RGDP, BMS, LOA and TA represent the real gross domestic product, broad money supply, loans and advances and total assets of commercial banks respectively. All these variables are presented into natural logarithmic form because natural logarithm converts every variable into same base. Furthermore, β_1, β_2 and β_3 represent the elasticity of broad money supply coefficient, elasticity of loans and advances coefficient and elasticity of total assets coefficient respectively. Each coefficient β_1, β_2 and β_3 are expected to be positive. It means as the rate of broad money supply, loans and advances and total assets of commercial banks increases it brings positive result in the economic growth.

3.4 Estimation Models:

This research work aims to achieve the relationship between the economic growth and also analyzes the causality between economic growth and financial development. So that to achieve these objectives this work initially analyzes the short run as well as long run relationship of economic growth with real broad money supply, loans and advances and total assets based on Nepalese economy. This research has considered autoregressive distributed lag (ARDL) to cointegration technique for the initial objective and for later one Granger Causality test has been conducted to explain the causality of real GDP as an economic growth variable with broad money supply, loans and advances and total assets of commercial banks proxied for financial development.

3.5 Autoregressive Distributed Lag (ARDL) to Cointegration:

To deal with the short run as well as long run relationship among variables Pesaran and Shin (1999) and Perasan et al (2001) has introduced a new method of testing for cointegration. The method is known as the autoregressive distributed lag (ARDL) model which is based on general to specific modeling technique. This method has the advantage of avoiding the classification of variables into I(0) or I(1) and unlike standard cointegration tests, there is no need for unit root pre-testing. The ARDL approach is suitable to explain long run relationship behavior between financial development and economic growth because this method deals with stationary along with non-stationary variables.

Unlike the residual based test such as Engle-Granger (1987) and the maximum likelihood based test such as Johansen and Juselius (1990) for testing the long run association, the ARDL approach does not require the underlying series, included in the system have same order of integration. Another advantage of this approach is that the model takes sufficient number of lags to capture the data generating process in a general-to-specific modeling framework. Furthermore, a dynamic error correction model (ECM) can be derived from ARDL through simple linear transformation. The ECM emerges the short run dynamics with the long run equilibrium without losing long run information (Pesaran and Shin 1999).

According to Pesaran and Shin (1999), the ARDL approach follows two steps. First one to identify the long-term relationship among the variables by using standard F-test and as a second step of the analysis, values of coefficients of the long run is determined followed by the estimation of the short run elasticity of the variables with the error correction representation of this ARDL model. By applying the ECM version of ARDL, the speed of adjustment of each variable to equilibrium will be determined. Thus ARDL model has chosen to explain the long run relationship between financial development and economic growth in Nepal. But according to the procedure of ARDL model, each variables in equation (3.1) is I(0) or I(1). If any variable has more than I(1), then the ARDL model is not applicable in this case. Thus, to ensure that none of these variable is more than I(1) order of integration, it is necessary to perform

unit root test. To test the order of integration of time series data, Augmented Dickey Fuller (ADF) unit root test is selected. This ADF unit root test only ensures the order of integration of each variable.

The ARDL model is obtained by rewriting the equation (3.1) including the lagged levels of first difference of the variables $RGDP_t$, BMS_t, LOA_t and TA_t which is as follows:

$$\Delta ln\ RGDP_t = a_0 + \sum_{j=1}^{p} b_j\, \Delta lnRGDP_{t-j} + \sum_{j=1}^{p} c_j\ \Delta ln\ BMS_{t-j} + \sum_{j=1}^{p} d_j \Delta\ lnLOA_{t-j} + \sum_{j=1}^{p} e_j\, \Delta lnTA_{t-j} + \gamma_1\, lnRGDP_{t-1} + \gamma_2\, lnBMS_{t-1} + \gamma_3\, lnLOA_{t-1} + \gamma_4 lnTA_{t-1} + u_t \quad \ldots\ldots\ldots\ldots\ldots\ldots (3.2)$$

where,$RGDP_t$ represents the real GDP, BMS,, LOA_t and TA_t represents real broad money supply, loans and advances and total assets respectively. $\gamma_1, \gamma_2, \gamma_3$ and γ_4 are long run coefficients and b_j, c_j, d_j and e_j are represent short run dynamics where as u_t is a random disturbance term. Moreover, Δ is a notion of first difference and p is considered as optimal lag length of each variables. Equation (3.2) is the initial extension of equation (3.1) as a part of ARDL approach to cointegration.

As first step, to test the existence of long run relationship of each variable, we examine the cointegration through the bounds testing approach. Bounds test involves the performing of F-test on the null hypothesis of no cointegration. Symbolically, null hypothesis can be written as H_0: $\gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = 0$ i.e. there is no cointegration or long-run relationship between dependent variable real GDP and independents variables broad money supply, loans and advances and total assets. This null hypothesis has tested against the alternative hypothesis that there is long run relationship between dependent and independent variables. The value of calculated F statistic is compared with two sets of critical values tabulated by Pesaran et al (2001), which provides the upper and lower bounds for the standard F-test. If the calculated F-statistic is larger than the upper bound critical value, then the null hypothesis of no cointegration is

rejected irrespective of whether the variables are I(0) or I(1). If it is below the bounds, then the null hypothesis of no cointegration cannot be rejected. If it falls inside the upper and lower critical value, the test is inconclusive. Once the cointegration relationship among variables is identified lag length is selected. The ARDL model estimates $(P+1)^k$ number of regression to determine the optimal lag length for each variables. Lag length can be selected using either Schwartz Bayesian Criteria (SBC) or Akake's Information Criteria (AIC) or Hanna Quinn (HQ) information criteria.

In second steps of ARDL model, the long run relationship and the resulting error correction model is estimated by using equation (3.3) the error correction term indicates the speed adjustment to restore equilibrium in the dynamic model. The ECM coefficient (λ) shows the speed of adjustment parameter and shows the divergence/convergence towards the long-run equilibrium. Positive value of λ indicates divergence and negative value indicates convergence towards the long run equilibrium. The highly significant error correction term, (that is measure in probability form in data analysis) further confirms the existence of a stable long run relationship. The ECM model is derived after substituting $EC_t = \gamma_1 \ln RGDP_{t-1} + \gamma_2 \ln BMS_{t-1} + \gamma_3 \ln LOA_{t-1} + \gamma_4 \ln TA_{t-1} + u_t$ on equation (3.2) then we get error correction model of ARDL model, which can be presented as below:

$$\Delta lnRGD_t = a_0 + \sum_{j=1}^{p} b_j \Delta lRGDP_{t-j} + \sum_{j=1}^{p} c_j \Delta lnBMS_{t-j} + \sum_{j=1}^{p} d_j \Delta lnLOA_{t-j} + \sum_{j=1}^{p} e_j \Delta lnTA_{t-j} + \lambda ECM_{t-1} + u_t$$

……………………………………………………………………………………….*(3.3)*

Where, λ is the speed adjustment parameter and EC is the error correction term.

Finally after computing the error correction coefficient recursive residuals test is conducted to evaluate the stability of short run and long run coefficients of each variable. These tests are known as cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests.

3.5.1 Hypothesis:

The main hypothesis of ARDL model to cointegration is to test that each variable does not have long run relationship against the presence of long run relationship. It means ARDL tests null hypothesis that there is no cointegration, then alternative hypothesis becomes there is long run relationship between the variables or there is cointegration. This can be presented symbolically as:

Null Hypothesis (H_0): $\gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = 0$ i.e. there is no cointegration or long-run relationship between real GDP and its determinants.

Alternative Hypothesis (H_1): $\gamma_1 \neq \gamma_2 \neq \gamma_3 \neq \gamma 4 \neq 0$ i.e. there exist long run relationship between real GDP and its determinants.

This hypothesis is tested by using the standard version of F-test.

F-Statistic is calculated as:

$$F = \frac{(RSS_R - RSS_{UR}) / m}{RSS_{UR} / (n-k)};$$

Where,

RSS_R =RSS of the restricted regression,

RSS_{UR} = RSS of unrestricted regression,

m= number of restrictions,

k= number of parameters in unrestricted regression and

n=number of observations.

In this study, equation (3.2) is unrestricted regression. To test the existence of long run relationship of each variable, we examine the cointegration through the bounds testing approach. Bounds test involves the performing of F-test on the null hypothesis of no cointegration. Symbolically, null hypothesis can be written as H_0: $\gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = 0$ i.e. there is no cointegration or long-run relationship between dependent variable real GDP and independents variables broad money supply, loans and advances and total assets. Now the restricted regression can be presented below:

$$\Delta ln\ RGDP_t = a_0 + \sum_{j=1}^{p} b_j\ \Delta lnRGDP_{t-j} + \sum_{j=1}^{p} c_j\ \Delta ln\ BMS_{t-j} + \sum_{j=1}^{p} d_j \Delta\ lnLOA_{t-j} + \sum_{j=1}^{p} e_j\ \Delta lnTA_{t-j} + u_t \quad \text{.....(3.2.A)}$$

The hypothesis is tested by using the standard version of F-test. Its standard version is calculated by using Wald's test and the resulting F-statistics is compared with two critical values (they are lower and upper two critical values) provided by Pesaran and Pesaran (1997) and Pesaran et al. (2001). If the computed F-statistics lies outside these two critical values, then only conclusion can be drawn, otherwise this result may be inconclusive. Suppose F-statistics falls outside these given two critical values then two conditions arises i.e. its value either lies below the lower critical value or lies above the upper critical value. If the F-statistic lies above critical value, then the null hypothesis is rejected, otherwise accepted.

3.5.2 Econometric Tools:

A. Augmented Dickey-Fuller (ADF) Test

ADF test statistic is used to examine the stationary of the time series variable. The following regression is run in Augmented Dickey-Fuller (ADF) test to check for unit root of the variables or to check the order of integration:

$$\Delta x_t = \eta + \gamma t + \alpha x_{t-1} + \sum_{j=1}^{k} \delta_j \Delta x_{t-j} + \varepsilon_{1t} \quad \text{..... (3.4)}$$

Where x_t is any variable used in this study, that is, $\ln RGDP_t$, $\ln BMS_t$, $\ln LOA_t$, and $\ln TA_t$, Δ indicates the first difference operator and k is the length of lag which ensures residuals to have white noise empirically. The ADF statistic is simply the t-value of the coefficient α in equation (3.4). The null hypothesis is that x_t has a unit root, that is, H_0: $\alpha = 0$ and is rejected if the calculated ADF statistic is above the critical value implying that x_t has no unit root or x_t is stationary.

B. Bounds Test (F-version)

The F-test can be used to test the hypothesis about one or more parameters of the k-variable regression model:

$Y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + \ldots\ldots\ldots + \beta_k X_{ki} + u_i$ ..... (3.5)

Let, the hypothesis to be tested is H_0: $\beta_4 = \beta_5 = \beta_6 = \beta_7 = 0$

Then, another regression by dropping the variables X_{4i}, X_{5i}, X_{6i} and X_{7i} is run as

$Y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_8 X_{8i} + \ldots\ldots\ldots + \beta_k X_{ki} + u_i$ ..... (3.6)

and residual sum of squares is calculated from both models. Equation (3.5) is called unrestricted regression and equation (3.6) is called restricted regression. The F statistic is calculated by the formula:

$$F = \frac{(RSS_R - RSS_{UR}) / m}{RSS_{UR} / (n-k)};$$

Where,

RSS_R =RSS of the restricted regression,

RSS_{UR} = RSS of unrestricted regression,

m= number of restrictions,

k= number of parameters in unrestricted regression and

n=number of observations

According to Pesaran (1997), the bounds test (General F test) can be used test the long run relationship in equation (3.2)

C. Lag Length Selection Criterion

Traditional information criteria explain about the three lag length selection criterion, they are Akaike Information Criteria (AIC), Hanna Quinn (HQ) and Schwarz Criterion (SC). Schwarz or Hannan-Quinn criteria may create the over parameterization problems as well as may choose too small lag-length. Thus AIC criteria is chosen for lag length selection because it has better performance in selecting the true model more frequently for both the IC(p; s) and the IC(p) criteria (Gutiérrez, 2007). Another reason for selecting these criteria is that the AIC based model passed a range of diagnostic tests such as serial correlation, functional form specification, normality and heteroscedasticity. Thus, again there is no need to conduct these diagnostic tests.

Being the best alternate among the three tests mentioned above, this research paper has adopted AIC criteria which are calculated by using VAR lag length selection criteria. This criterion has applied on all four variables that are chosen in this research work. The procedure of selecting the lag length from AIC criteria follows the following method:

$$AIC(p; s) = \ln(1-\lambda_i^2(p)) + 2 / T\ [\text{number of parameters}] \quad (3.7)$$

Number of parameters = [n * (n * (p - 1)) + n * r] - [s * (n * (p * 1) + (n - s))]

Where ln = natural logarithm, p= order, s= lag length, n = total number of observation and λ= eigen values.

D. Recursive Residuals, CUSUM Test and CUSUMSQ Test

In recursive least squares, the equation is estimated repeatedly, using ever larger subsets of the sample data. If there are k coefficients to be estimated in the regression, then the first K observations are used to form the first estimate of the parameters. The next observation is then added to the data set and k+1 observations are used to compute the second estimate of parameters. This process is repeated until all the T sample points have been used, yielding T-k+1 parameter estimates. At each step the last estimate of the parameters can be used to predict the next value of the dependent variable. The one-step ahead forecast error resulting from this prediction, suitably scaled, is defined to be a recursive residual.

- **CUSUM Test**

The CUSUM test (Brown, Durbin, and Evans, 1975) is based on the cumulative sum of the recursive residuals. This option plots the cumulative sum together with the 5% critical lines. The test finds parameter instability if the cumulative sum goes outside the area between the two critical lines.

The CUSUM test is based on the statistic

$$W_t = \sum_{r=k+1}^{t} \frac{w_r}{s}$$

For t=k+1,…….T , where W_t is the recursive residual and *s* is the standard error of the regression fitted to all sample points T. If the vector of the parameter remains constant from period to period, E (W_t) = 0, but if this vector changes, W_t will tend to diverge from the zero mean value line. The significance of any departure from the zero line is assessed by reference to a pair of 5% significance lines, the distance between which increases with t.

The 5% significance lines are found by connecting the points

[k, ± -0.948(T-k)$^{1/2}$] and [T, ±3×0.948(T-k)$^{1/2}$]

Movement of outside the critical lines is suggestive of coefficient instability.

- **CUSUMSQ Test**

The CUSUM of squares test (Brown, Durbin, and Evans, 1975) is based on the test statistic

$$W_t = \sum_{r=k+1}^{t} w_r^2 \Big/ \sum_{r=k+1}^{T} w_r^2$$

The expected value of under the hypothesis of parameter constancy is E (S_t) = t-k/T-k which goes from zero at to unity at. The significance of the departure of from its expected value is assessed by reference to a pair of parallel straight lines around the expected value. The CUSUM of squares test provides a plot of against and the pair of 5 percent critical lines. As with the CUSUM test, movement outside the critical lines is suggestive of parameter or variance instability.

3.6 Granger Causality Test:

Following the procedure of Jalil and Ma (2008) to conduct the causality, this research work also has considered granger causality test to explain the causal relationship between economic growth and financial development. To attain the objective that whether there is causality with real GDP and BMS, causality with real GDP and LOA and causality with real GDP and TA, this research has selected Granger Causality test. Granger has started his causality analysis from the premise that the future cannot cause the present or the past. If event A occurs after event B, we know that A cannot cause B. At the same time if A occurs before B, it does not necessarily imply that A causes B. Consider two time series, Y_t and X_t. The series X_t fails to Granger cause Y_t if in a regression of Y_t on lagged Y's and lagged X's, the coefficient of later is zero (Maddala, 2009). This model is presented as below;

$$d(Y)_t = \sum_{i=1}^{n} \alpha_i d(Y)_{t-i} + \sum_{i=1}^{n} \beta_i d(X)_{t-i} + u_{1t} \ldots\ldots\ldots\ldots\ldots\ldots (3.9)$$

$$d(X)_t = \sum_{i=1}^{n} \lambda_i d(X)_{t-i} + \sum_{i=1}^{n} \delta_i d(Y)_{t-i} + u_{2t} \ldots\ldots\ldots\ldots\ldots\ldots (3.10)$$

It is assumed that the disturbances u_{1t} and u_{2t} are uncorrelated, d is first difference and n is the lag length. Equation (3.9) postulates that current Y is related to past values of itself and past values of X, and equation (3.10) depicts the similar behavior of X. With respect to this model, we can distinguish the following cases (Gujarati and Sangeeta, 2007);

a) The existence of unidirectional causality from X_t to Y_t. It is predicted that X_t causes Y_t if $\beta_i \neq 0$ and $\delta_i = 0$.

b) The existence of unidirectional causality from Y_t to X_t. It is predicted that Y_t causes X_t, if $\beta_i = 0$ and $\delta_i \neq 0$.

c) The existence of bidirectional (or feedback) causality between X_t and Y_t, if $\beta_i \neq 0$ and $\delta_i \neq 0$.

d) Independence between X_t and Y_t. In this case there is no Granger-Causality in any direction, thus, $\beta_i = 0$ and $\delta_i = 0$.

In order to test the hypotheses referring to the significance or lack thereof, the hypotheses in this test may be formed as follows:

H0: X does not Granger cause Y.

H1: X does Granger cause Y.

In this research work RGDP is dependent variable and BMS, LOA and TA have considered as independent variables. For the purpose of causality analysis, this research work replace Y_t by RGDP and X_t are replaced by BMS, LOA and TA one after another. The main reason behind doing this is that we want to evaluate the causality of RGDP with BMS, causality of RGDP with LOA and causality of RGDP with TA.

To conduct the Granger Causality two tests are considered as a pre-requisite of unit root test. First one is unit root test as explained in section (3.5.2, A) and after unit root test lag length selection has been conducted as explained in section (3.5.2, C). The result of Granger Causality only helps to identify the direction among the variables.

3.7 The Data:

This study is based on the secondary data. The data span of this paper covers from the period 1975 to 2011. The time series data of real GDP of Nepal has been abstracted from economic survey-2011/12. Loans and Advances, Credit deposit ratio and Broad money supply are extracted from Quarterly Economic Bulletin (various issues) published by NRB. Data analysis of this work has been completed with the help of E-views 4.1 statistical package.

CHAPTER 4
ESTIMATION OF THE STUDY

4.1 Introduction:

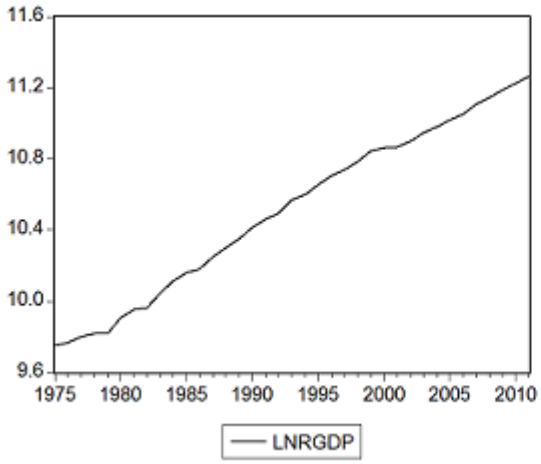
In this chapter following the methodology discussed in chapter three and information related to this work are analyzed. This chapter comprises of four sections. Section 4.2 deals with the time series properties of variables, section 4.3 shows the result of estimation and section 4.4 presents the stability testing techniques and final section 4.5 is for Granger Causality.

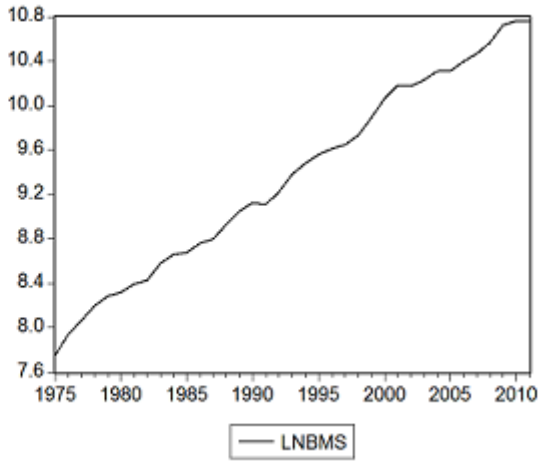
4.2 Time Series Properties:

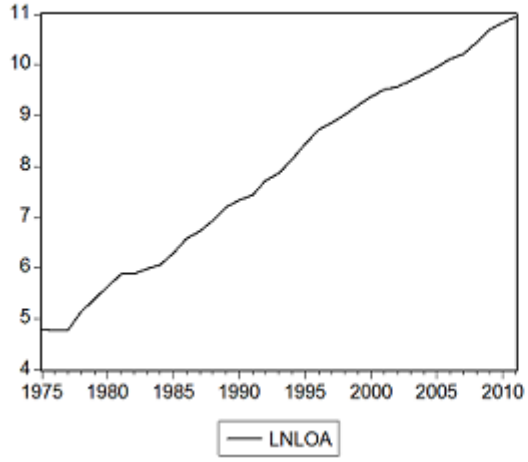
The basic assumption of ARDL model is that each variables of long run function is either integration of order zero i.e. I(0) or integration of order i.e. I(1). If any of these variables are integrated of higher order than one then ARDL model is not applicable. Thus, before investigating the short run and long run relationship among variables, their order of integration must be identified otherwise the regression of non-stationary variables can possibly give spurious results. Although, ARDL approach to co-integration does not require pre testing of variables whether variables are of I (0) or of I (1) or integrated of same order. It is mandatory to select the variables which do not have integration of order two or more, otherwise, it gives misleading results (Acharya, 2012).

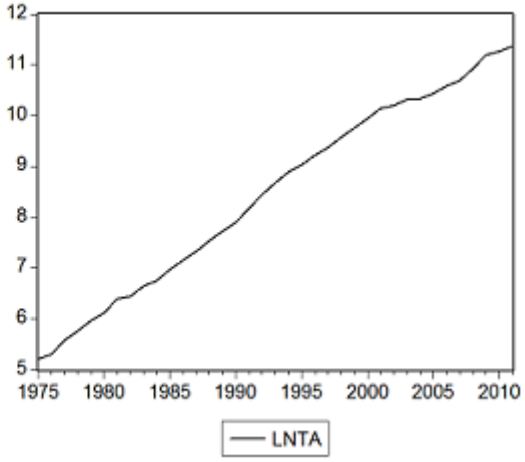
Before identifying the order of integration of order, it would be better to discuss about the nature of data. Here the nature of data is discussed graphically which is presented in figure (4.1). The figure 4.1 shows the graphical presentation of each time series variables that are used in this study in their natural logarithm form. In the figure, lnRGDP, lnBMS, lnLOA and lnTA are non-stationary data because each has increased upward as time changes. Real GDP has sharply declined in 1979 and 1984 because of political instability and has increased significantly in 1998. The rate of increase in broad money supply is not as smooth as RGDP. Likewise loans and advances and total assets of commercial banks have been increasing rapidly which indicates that there is a role of financial sector in the economy that has been increasing day by day. These informations are presented graphically in figure 4.1.

Figure 4.1: Multiple Graph of lnRGDP, lnBMS, lnLOA and lnTA


11.6
11.2
10.8
10.4
10.0
9.6
1975 1980 1985 1990 1995 2000 2005 2010
LNRGDP


10.8
10.4
10.0
9.6
9.2
8.8
8.4
8.0
7.6
1975 1980 1985 1990 1995 2000 2005 2010
LNBMS


11
10
9
8
7
6
5
4
1975 1980 1985 1990 1995 2000 2005 2010
LNLOA


12
11
10
9
8
7
6
5
1975 1980 1985 1990 1995 2000 2005 2010
LNTA

These figure only helps to show the general proprties of time series data. Now it is necessary to test the order of integration, which is a most to fulfill the purpose of this research work. Testing the order of integration of each variable, Augmented Dickey Fuller (ADF) is conducted. The results of ADF unit root test are presented in table 4.1.

Table 4.1: Identification of Order of Integration

	Level				First Difference			
Variables	ADF Statistics	Test critical values			ADF Statistics	Test critical values		
		1%	5%	10%		1%	5%	10%
ln(RGDP)	-0.28	-3.63	-2.95	-2.61	(-6.14)*	-3.63	-2.95	-2.61
ln(BMS)	-0.76	-3.63	-2.95	-2.61	(-4.92)*	-3.63	-2.95	-2.61
Ln(LOA)	-0.27	-3.63	-2.95	-2.61	(-5.04)*	-3.63	-2.95	-2.61
ln(TA)	-1.63	-3.63	-2.95	-2.61	(-5.51)*	-3.63	-2.95	-2.61

* shows that the data is significant at 1%

** shows that the data is significant at 5%

*** shows that the data is significant at 10%

Table 4.1 shows the detail result of ADF t-statistic of lnRGDP, lnBMS, lnLOA, lnTA. It can be evaluated with the help of t-statistics, t-statistics to be compared with the given critical values. Order of integration is nothing but testing the stationary of the given

variables. If each of the given variables are found significant at their 'level', then that variables are known as I(0), and If each of the given variables are found significant at their first difference, then the variables are known as I(1). In above table, it is found that the t-statistics of lnRGDP, lnBMS, lnLOA and lnTA is insignificant at their level whereas t-statistics of lnRGDP, lnBMS, lnLOA and lnTA is significant at 1% in their first difference. Thus from above table what we can conclude is that each variables are order of integration one i.e. I(1). Hence, the estimated results help us to conclude that each variables that has been chosen to analyze relationship between economic growth and financial development of Nepal has order of integration not more than one i.e. I(1). Hence in this case ARDL model can be used without any problem.

4.3 Estimation of Autoregressive Distributed Lag (ARDL) to Cointegration:

Testing the order of integration of each variable is the pre-requisite to apply the ARDL model. Only after completing this task one can proceed for testing the properties of ARDL to cointegration model. The first and foremost task is to conduct the bound testing approach with the null hypothesis that there is no long run relationship between the variables. This bound testing approach uses the standard version of F-test, which is also known as Wald test. This test helps us to identify whether all variable which are used in this work has long run correlation or not. The computed result of Wald Test is presented in table 4.2.

Table 4.2: Result of Wald Test

F statistics for Testing the Existence of cointegration amongst the variables	
df (4,31)	F-statics: 117.67(0.0000)
95% Lower Limit: 2.86	95% Upper Limit: 4.01

90% Lower Limit: 2.45	90% Upper Limit: 3.52

1). The F-statistic (Wald test) is a joint test for the coefficients of logP(-1), logM(-1), logY(-1) and logI (-1) all are set equal to zero.

2). The reported bounds critical values are taken from Pesaran et.al. (2001) table.

According to the bound test approach, two sets of asymptotic critical values are provided for two polar cases i.e. lower limit and upper limit, which assumes that all the regressors are on the one hand purely I(0) and on the other purely I(1) (Detail of Pesaran et.al, 2001 is in Appendix-A) . If the computed F-statistic falls outside the critical value bounds, a conclusive inference can be drawn. If the computed F-statistic lies between given two limits, then the result would be inconclusive. Here to accept the null hypothesis, F-statistic must lie below the lower limit, in case, if F-statics lies above the upper limit, then null hypothesis is rejected. Above table 4.2 shows that the calculated F statistics is 117.69 which neither lies below nor lies between the lower and upper limit in both 5% (95% mention in above table) and 10% (90% mention in above table) level of significance. This rejects the null hypothesis that there is no long run correlation. It means there is long run correlation among the economic growth proxied by real GDP and financial development proxied by real broad money supply, loan and advances and total assets of commercial bank of Nepal. In other words there is cointegration among these variables.

To estimate equation 3.2, lag length of each variable must be identified. This research work prefers only AIC information criteria for lag length selection because it has better performance in selecting the true model more frequently for both the IC(p; s) and the IC(p) criteria. Moreover AIC based model passed a range of diagnostic tests such as serial correlation, functional form specification, normality and heteroscedasticity. Thus, there is no need to conduct these diagnostic tests again. AIC is calculated by using VAR lag

length selection criterion from Eviews 4.1(detail of the lag length selection is presented in Appendix-B). AIC has selected the lag length (0, 4, 0, 0) and applied on ARDL and error correction model.

Akaike's Information Criteria (AIC) has selected the lag length (0,4,0,0), which explains that lnBMS has regressed with its four lag length whereas lnRGDP and lnCDR and and lnLOA have regressed without lag. By using this lag length, equation (3.2) model is estimated and the detail result of estimation of ARDL approach based on AIC is presented in the following table (4.3).

Table 4.3: Result of ADRL (0,4,0,0) approach based on Akaike's Information Criteria (AIC)

Dependent Variable: lnRGDP				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNBMS	-0.046085	0.070946	-0.649572	0.5205
LNLOA	0.078649	0.052591	1.495485	0.1443
LNTA	0.191167	0.055018	3.474661	0.0015
C	8.704737	0.396955	21.92879	0.0000
R-squared	0.996492	Adjusted R-squared		0.996173
F-statistic	3125.008	Prob(F-statistic)		0.000000

Table 4.3 shows that the considered model is significant at 1% level, because the value of F-statistics is 3125.01 which is significantly higher than critical F-stat. Likewise R-square is 0.9964, which means that the independent variables that have been considered in this model has 99.64% explanatory capacity on real GDP. More precisely it rigorously explains that real broad money supply, loan and advances and total assets of commercial banks of Nepal, considered as financial development indicators have 99.79% of explanatory

capacity on real gross domestic product, considered as economic growth. Based on above table the coefficient of each variable is presented in the estimated equation as:

$lnRGDP_t = 8.7 - 0.04xlnBMS_t + 0.08xlnLOA_t + 0.19xlnTA_t$

This equation is written based on the table 4.3. This equation shows that only one variable that is total assets of commercial banks is significant at 1%, with previously expected sign but other variables viz. lnBMS and lnLOA are insignificant. Then the estimated equation shows that one percent increase in total assets of commercial banks causes to increase in real GDP by 0.19% in long run. This may be due to the BMS is a monetary policy instrument, which does not have long run impact on real GDP and LOA may be allotted towards households for consumption rather than business for productive investment so that it is found insignificant in real GDP. This result has been supported by the research work of Regmi (2010) who also found these variables insignificant with economic growth.

After analyzing the long run coefficient of each variable, next step of analyzing ARDL model is to estimate and analyze the short run coefficient, which is based on the error correction model (ECM). The error correction variable is generated with the help of long run variables, which is obtained as;

ECM(t-1) = Residual (t-1). The value of ECM helps to determine the short run coefficients of each variables. The estimation of error correction model of ARDL model (0,4,0,0) is based on Akaike's Information Criteria (AIC) that has been presented in Table 4.4.

Table 4.4

Error Correction Representation of ARDL (2,0,0,4) model based on Akaike's Information Criteria (AIC)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.044667	0.021187	2.108218	0.0466
D(LNBMS)	-0.071072	0.097138	1.731661	0.2421
D(LNBMS(-1))	0.018353	0.083229	3.220509	0.0875
D(LNBMS(-2))	-0.134944	0.090537	-1.490483	0.1503
D(LNBMS(-3))	-0.029825	0.080084	-0.372420	0.7131
D(LNBMS(-4))	0.001484	0.084032	0.017659	0.9861
D(LNLOA)	-0.006340	0.060684	-0.104482	0.0977
D(LNTA)	0.103440	0.069087	1.497241	0.1485
ECM(-1)	-0.291657	0.247897	-1.176526	0.0220
R-squared	0.388144	Adjusted R-squared		0.2170
F-statistic	844.1038	Prob(F-statistic)		0.0013

Table 4.4 shows that ECM is significant in 5%. The ECM coefficient shows how quickly variables converge to equilibrium and it should have a statistically significant coefficient with a negative sign. According to Bannerjee et al. (1998), the highly significant error correction term further confirms the existence of a stable long-run relationship. The result as in table 4.4, for real GDP shows that the expected negative sign of ECM is highly significant. This confirms the existence of the long run relationship among the variables with their various significant lags. The coefficient of ECM = -0.2917, imply that deviation from the long-term growth rate in real GDP corrected by 29.17% by the following year, because the F-statistics has 844.1038 and the probabilistic value of F-static is less than 10%(i.e. 0.0013 = 0.13%). Moreover, the short run variables has only 39% goodness of fit which is measured by R-square whereas adjusted R-square is significantly low that does not affect our result because it happens due to the selection of a restricted error correction model without a constant term (Pesaran and Shin, 1999). Furthermore, the coefficient of ECM is -0.2917 and has negative sign; reflects the significant relation to achieve the equilibrium in short run. In absolute term, coefficient of ECM lies between zero and one, which indicates the fast speed of adjustment to equilibrium following short-run shocks.

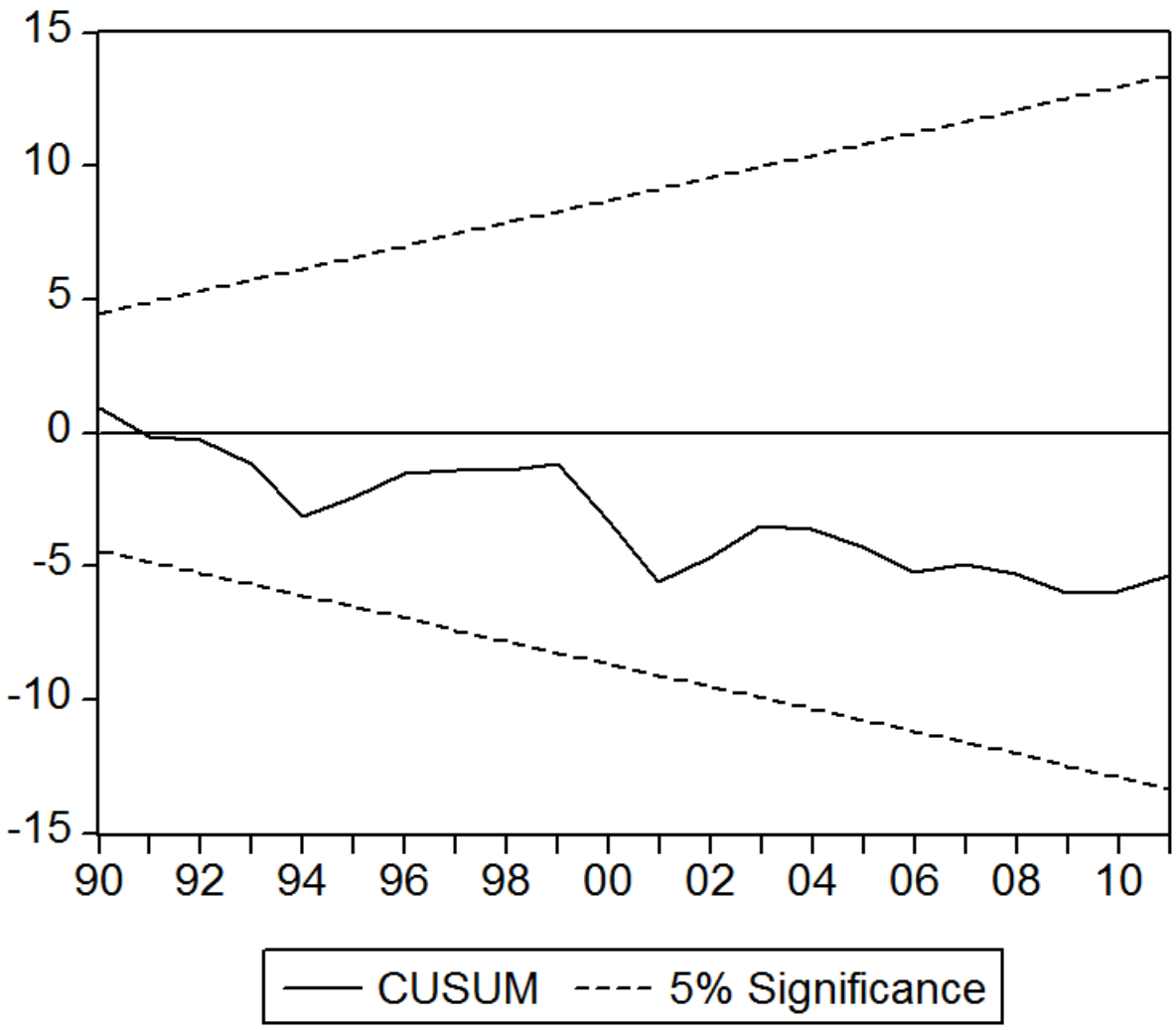
The result above shows that there are significant effects of the lags of some of the financial development variables on real GDP. We have a significant effect of the first lag of lnBMS has significant effect on the real GDP, implying that the current BMS would still affect the real GDP in the next year, the loan and advances would affect the real GDP on the same year and both have 10% level of significant.

4.4 Stability Tests:

For model stability, Pesaran and Pesaran (1977) and Brown et al. (1975) stability testing technique has been used. This technique is known as cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests. The CUSUM and CUSUMSQ statistics are updated recursively and plotted against the break points. The null hypothesis of this stability tests is that all the coefficients in the given regression are stable. If the plots of CUSUM and CUSUMSQ statistics stay within the critical bounds of 5% level of significance, the null hypothesis cannot be rejected. The CUSUM and CUSUMSQ check the stability of short run and long run coefficients in the ARDL error correction model. The graphical representation of the CUSUM and CUSUMSQ plots applied on the long run relationship between financial economic growth and financial development with the help of AIC criterion. Both CUSUM and CUSUMSQ plots lies in between the critical bounds, which indicates that all coefficients in the ARDL error correction model are stable (Acharya, 2012). This is presented in the following figures 4.4(a) and 4.4(b).

Figure 4.2(a) : CUSUM Plots for Stability tests

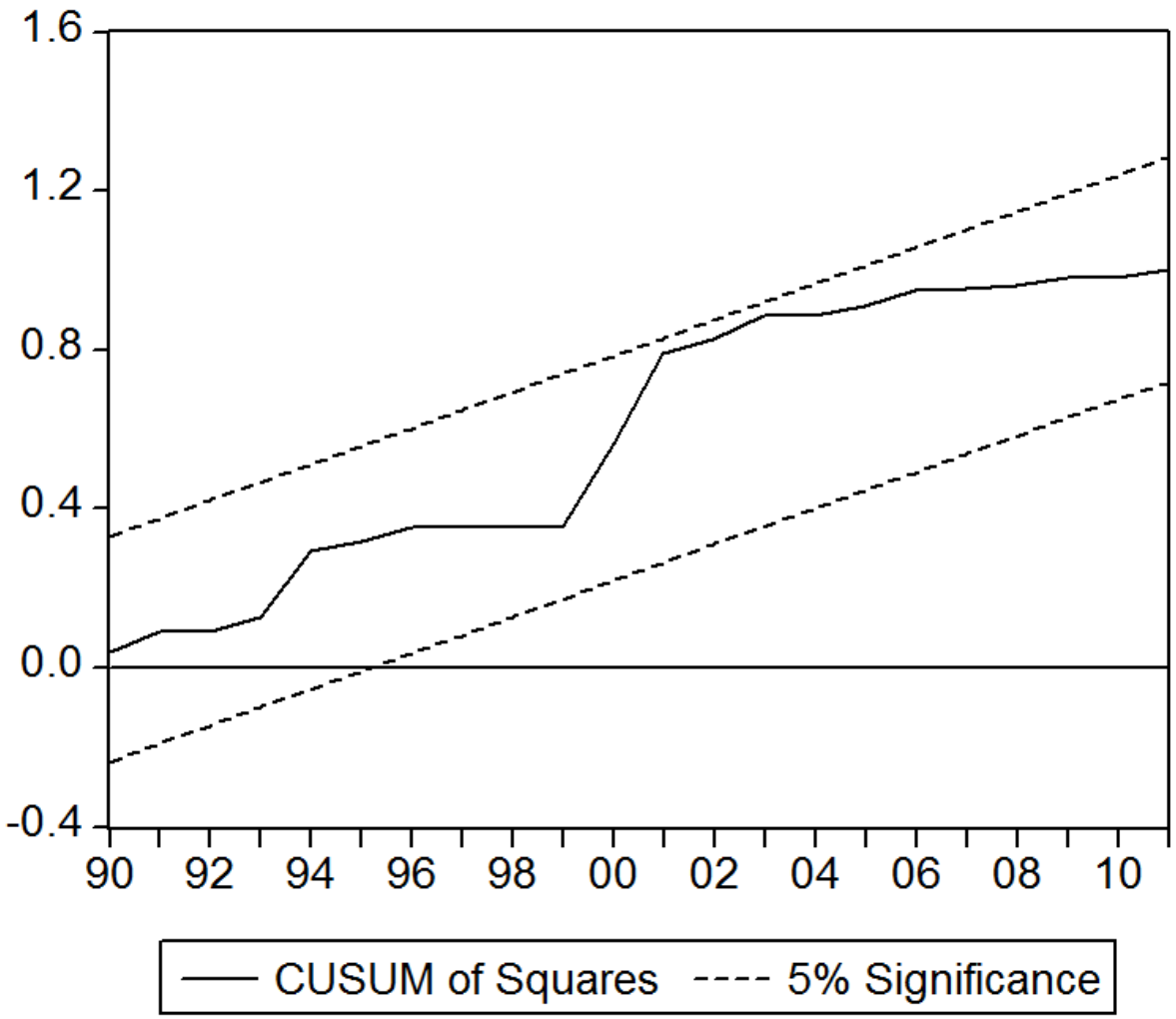
Plot of Cumulative Sum of Recursive Residuals


15
10
5
0
-5
-10
-15
90
92
94
96
98
00
02
04
06
08
10
CUSUM
5% Significance

The straight lines represent critical bounds at 5% significance level

Figure 4.2(b) : CUSUMSQ Plots for Stability tests

Plot of Cumulative Sum of Square of Recursive Residuals


1.6
1.2
0.8
0.4
0.0
-0.4
90
92
94
96
98
00
02
04
06
08
10
CUSUM of Squares
5% Significance

The straight lines represent critical bounds at 5% significance level

Examination of plots in figure 4.1(a) and (b), show that CUSUM and CUSUMSQ both lines lies between the two dashed lines. It indicates that CUSUM and CUSUMSQ statistics are well within the 5% critical bounds, which implies that short run and long run coefficients in the error correction model are stable.

This ARDL to cointegration shows that each variable that has considered in this work has long run relation, and in long run only total assets influences on real GDP. In short run, there is significant effect of broad money supply. It has first lag effect on the real GDP, implying that the current BMS would still affect the real GDP in the next year, whereas the loan and advances would affect the real GDP on the same year and both have 10% level of significant. Furthermore, the coefficient of ECM is -0.2917 and has negative sign; reflects the significant relation to achieve the equilibrium in short run. In absolute term, coefficient of ECM lies between zero and one, which indicates the fast speed of adjustment to equilibrium following short-run shocks.

4.5 Granger Causality:

After analyzing the long run and short run relationship between economic growth and financial development, this work has evaluated the causality between the economic growth and financial development variable. This section presents the result of causality with real GDP and BMS, causality with real GDP and LOA and causality with real GDP and TA by conducting the Granger Causality test. To conduct the granger causality two tests are considered as a pre-requisite. First is unit root test and second is lag length selection. Here results of unit root test of each variable have been presented in detail.

Table 4.5: Unit Root Test

	Level				First Difference			
Variables	ADF Statistics	Test critical values			ADF Statistics	Test critical values		
		1%	5%	10%		1%	5%	10%
ln(RGDP)	-0.28	-3.63	-2.95	-2.61	(-6.14)*	-3.63	-2.95	-2.61
ln(BMS)	-0.76	-3.63	-2.95	-2.61	(-4.92)*	-3.63	-2.95	-2.61
Ln(LOA)	-0.27	-3.63	-2.95	-2.61	(-5.04)*	-3.63	-2.95	-2.61
ln(TA)	-1.63	-3.63	-2.95	-2.61	(-5.51)*	-3.63	-2.95	-2.61

* shows that the data is significant at 1%

** shows that the data is significant at 5%

*** shows that the data is significant at 10%

Table 4.5 shows the result of ADF statistic to test the null hypothesis that there is unit root test (or non-stationary data) against the alternative hypothesis that there is no unit root test. To detect the unit root, it is necessary to compare ADF statistics with the test critical values of each variable. If ADF statistics is found greater than that of critical values, then that value is considered to have unit root (Acharya, 2014). Above table shows that, ln(RGDP), ln(BMS), ln(LOA) and ln(TA) have unit root because ADF statistics of each

value is greater than the test critical values. Thus, we can conclude from the above table ln(RGDP), ln(BMS), ln(LOA) and ln(TA) have unit root. This test identifies the presence of unit root on the selected variables.

After detecting whether there is presence of unit root on each variable, it is needed to nullify the unit root. To remove the unit root, Gujarati and Sangeetha (2007) suggest to take the first difference of such time series variables. After considering the first difference, as shown in above table, of each variables ln(RGDP), ln(BMS), ln(LOA) and ln(CDR) becomes the unit root free because as ADF statistics of each variable is less than the test statistics of the respective consideration even at 1% level of significance.

Now, after unit root test, to conduct the Granger Causality test, lag length selection is needed to identify. For an issue concerning the selection of lag length of each variable, VAR criterion of lag length selection has been used with the help of Statistical software Eviews 4.1. The details of this test has been presented in the table 3.2.

Table 4.6: VAR Lag Length Selection Criterion

Lag	LogL	LR	FPE	AIC	SC	HQ
0	208.3772	NA	1.42E-11	-13.62515	-13.43832*	-13.56538
1	214.5297	10.25415	2.78E-11	-12.96865	-12.03451	-12.66981
2	235.2159	28.96075*	2.16E-11	-13.28106	-11.59963	-12.74316
3	253.6581	20.90115	2.18E-11	-13.44388	-11.01513	-12.66690
4	278.2125	21.28042	1.77E-11	-14.01416	-10.83812	-12.99812
5	321.4465	25.94042	5.98E-12	-15.82977	-11.90642	-14.57465
6	371.3705	16.64133	3.04E-12*	-18.09137*	-13.42071	-16.59718*
* indicates lag order selected by the criterion						

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Table 4.6 shows the five types of lag length selection methods i.e. AIC which is known as Akaike information criterion, SC is known as Schwarz information criterion, HQ is called Hannan-Quinn information criterion, LR is of sequential modified LR test statistic and FPE is of Final prediction error. Among them, this paper has considered only AIC criterion. To select the appropriate lag length the AIC value should be observed at different lag length till not getting the asterisk (*) which provides the minimum value of AIC at the given table. In table 4.6, -18.09137 is the asterisk value of AIC which has given on the seventh row of table 4.6. For the appropriate lag length its corresponding first column should be observed and gives the appropriate lag length that is 6. Hence the AIC criterion suggests that the appropriate lag length is 6 for Granger Causality test.

The Granger Causality test null hypothesis that; D(lnBMS)) does not Granger Cause DlnRGDP and D(lnRGDP)) does not Granger Cause DlnBMS; DlnLOA does not Granger Cause DlnRGDP and DlnRGDP does not Granger Cause DlnLOA; DlnTA does not Granger Cause DlnRGDP and DlnRGDP does not Granger Cause DlnTA. The result of these six null hypothesis has been presented in table 4.7. Table 4.7 reveals the result of Pair-wise Granger Causality test conducted with the help of statistical software Eviews 4.1.

Table 4.7 : Pairwise Granger Causality Tests

Null Hypothesis	Lags	F-Statistic	p-value	Decision

D(ln(BMS)) does not Granger Cause DlnRGDP	6	0.70613	0.64909	Accept
D(lnRGDP)) does not Granger Cause DlnBMS	6	1.36592	0.28356	Accept
DlnLOA does not Granger Cause DlnLNRGDP	6	2.05874	0.11299	Accept
DlnRGDP does not Granger Cause DlnLOA	6	4.23112)***	0.00872	Reject at 1%.
DlnTA does not Granger Cause DlnRGDP	6	1.02897	0.44036	Accept
DlnRGDP does not Granger Cause DlnTA	6	2.77906)**	0.04529	Reject at 5%

Pairewise Granger Causality test reject a null hypothesis that real GDP does not Granger cause the loans and advances of commercial bank at 1% level of significant. It means change in real GDP causes to change the loans and advances of commercial bank. This only shows the unidirectional causality between RGDP and loan and advances. Likewise, another null hypothesis real GDP does not granger cause to total assets of commercial banks is also rejected at 5% level significant. This means that real GDP influence on total

assets of commercial bank. Other four null hypothesis which are tested for the rejection of each null hypothesis has been accepted. From this analysis, it has been concluded with the help of F-statistic and their p-value that economic growth variables proxied by real GDP and financial development variables proxied by broad money supply are not causing each other. This test concludes that real GDP causes on loans and advances and total assets of commercial banks. This implies that, economic growth matters a lots for the financial development whereas financial development does not show clear effect on economic growth.

CHAPTER 5
SUMMARY, CONCLUSIONS AND RECOMMENDATION

This study has attempted to assess the relationship between financial development and economic growth, in Nepal and it also exam the causality between financial development and economic growth over the study period 1975-2009. It has followed the recently developed ARDL modeling to cointegration and error correction modeling approach developed and popularized by Pesaran and Shin (1999) and Pesaran et.al.(2001) in analyzing the relationship between financial development and economic growth. It is expected that the results from this study will provide valuable information to the monetary authority in determining the intermediate targets of monetary policy for financial development. The main objectives of this study are to examine the long run equilibrium relationship between the financial development and economic growth, to examine long run coefficients and short run dynamics in the financial development and economic growth function and to examine the causality between financial development and economic growth. This chapter is the concluding chapter of the present study. The first part summarizes the findings from the study. The second part draws some conclusions. The third part lists some recommendations that can be made from the conclusions of the study.

5.1 Summary of the Findings:

The main purpose of this study has been to test the relationship between financial development and economic growth, in Nepal empirically and examine the causality between them. To conduct the empirical test ARDL approach has been selected. Based on the ARDL to cointegration approach, data span from 1975 to 2011 and output derived using Eviews 4.1, following conclusion has been derived:

1. There is long relationship among real GDP, broad money supply, loans and advances and total assets. In other words there is cointegration among these variables.

2. In long run, total assets of commercial banks proxied for financial development has significant influence on real GDP proxied for economic growth.

3. In short run dynamics, LOA has found significant relation with RGDP. Whereas BMS has significant effect on the real GDP with its first lag, implying that the current BMS would still affect on the real GDP in the next year. The loans and advances would affect the real GDP on the same year. But the TA is found insignificant.

4. The result of ECM is significant at 5% reflecting the significant relation to achieve the equilibrium in short run. The coefficient of ECM is 29.17% which implies that deviation from the long term growth rate in RGDP is corrected by the following year by 29.17%.

5. The result of recursive residuals tested by using cumulative sum (CUSUM) and cumulative sum of square (CUSUMSQ) also shows that short run and long run coefficients in ECM are stable.

6. Granger causality shows that economic growth is influenced by the financial development which is the reverse result of our hypothesis. The main purpose of this study is to identify the effect of financial development on economic growth but this test results that real GDP influenced on LOA and total assets which is reversed result.

5.2 Conclusions:

1. In long run real GDP is influenced by total assets of commercial banks. It is due to the fact that when the total assets of commercial banks increases, its effect reflects on two sides. On the one side, it increases the physical strength of commercial banks and on the other side; it increases the financial property of banks which increases the entrepreneurial confidence of commercial banks. Thus the banks are more interested to invest on productive sectors rather than unproductive sector. As a result real GDP increases in long run.

2. In short run, broad money supply has significant effects on real GDP with its first lag, implying that the current BMS would still affect in the real GDP in the next year. It is because current year real GDP is influenced just by change in price level and that price level is influenced by BMS of the same year. Therefore current BMS only affect on the nominal GDP. Thus the current BMS influences on real GDP only in next year where the price level is normalized at that year.

Thus in long run total assets of commercial banks has significant influence on real GDP. In the result, it has been found that the LOA of the commercial banks do have significant effect on real GDP, in the long run. It looks like LOA are invested on unproductive sector. It may be due to a lack of proper management of financial infrastructure, lack of financial literacy and less participation of general people to the banking sector.

5.3 Recommendations:

From the conclusion of the study, the following recommendation can be made:

1. Since the total assets of commercial banks has long run relationship with real GDP but in causality test real GDP influence on TA. It signifies that there is almost zero influence of financial sector on economic growth, in Nepal. Moreover, in short run LOA and first lag of BMS influence on RGDP. In this scenario, government should have to worry about the actual performance of financial sector herein Nepal. To escape from this worry, government should a system that helps to enhance proper management of financial infrastructures. Besides this a system should be developed to guarantee a productive loaning out of the financial institutions.
2. At this present international situation financial development is the most important indicator for representing the economic growth of a country. Through this research, we can say that the financial development has not significantly contributed to the economic growth in Nepal due to the poor quality of institutions, weak infrastructures etc. It may also be due to shift of resources from productive sectors to unproductive sectors. To get back from the derail situation, government need to make consultation with experts so that to reform the financial sector and increase its role on economic growth. Furthermore, to achieve the desired benefits of financial development, efforts should be devoted to deepening financial sector by restricting government involvement in financial system, investing in human resources, enhancing competition, and improving the quality of institutions.

Finally, concerned authority should try to find the reasons behind the shortcoming of the financial sector and its limited role in economic development by conducting research work.

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Appendix - A
Table Prepared by Pesaran and Shin in 1999.

Table CI(i) Case I: No intercept and no trend

	0.100		0.050		0.025		0.010		Mean		Variance	
k	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**
0	3.00	3.00	4.20	4.20	5.47	5.47	7.17	7.17	1.16	1.16	2.32	2.32
1	2.44	3.28	3.15	4.11	3.88	4.92	4.81	6.02	1.08	1.54	1.08	1.73
2	2.17	3.19	2.72	3.83	3.22	4.50	3.88	5.30	1.05	1.69	0.70	1.27
3	2.01	3.10	2.45	3.63	2.87	4.16	3.42	4.84	1.04	1.77	0.52	0.99
4	1.90	3.01	2.26	3.48	2.62	3.90	3.07	4.44	1.03	1.81	0.41	0.80
5	1.81	2.93	2.14	3.34	2.44	3.71	2.82	4.21	1.02	1.84	0.34	0.67
6	1.75	2.87	2.04	3.24	2.32	3.59	2.66	4.05	1.02	1.86	0.29	0.58
7	1.70	2.83	1.97	3.18	2.22	3.49	2.54	3.91	1.02	1.88	0.26	0.51
8	1.66	2.79	1.91	3.11	2.15	3.40	2.45	3.79	1.02	1.89	0.23	0.46
9	1.63	2.75	1.86	3.05	2.08	3.33	2.34	3.68	1.02	1.90	0.20	0.41
10	1.60	2.72	1.82	2.99	2.02	3.27	2.26	3.60	1.02	1.91	0.19	0.37

Table CI. Asymptotic critical value bounds for the *F*-statistic. Testing for the existence of a levels relationship.

Table CI(ii) Case II: Restricted intercept and no trend

	0.100		0.050		0.025		0.010		Mean		Variance	
k	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**
0	3.80	3.80	4.60	4.60	5.39	5.39	6.44	6.44	2.03	2.03	1.77	1.77
1	3.02	3.51	3.62	4.16	4.18	4.79	4.94	5.58	1.69	2.02	1.01	1.25
2	2.63	3.35	3.10	3.87	3.55	4.38	4.13	5.00	1.52	2.02	0.69	0.96
3	2.37	3.20	2.79	3.67	3.15	4.08	3.65	4.66	1.41	2.02	0.52	0.78
4	2.20	3.09	2.56	3.49	2.88	3.87	3.29	4.37	1.34	2.01	0.42	0.65
5	2.08	3.00	2.39	3.38	2.70	3.73	3.06	4.15	1.29	2.00	0.35	0.56
6	1.99	2.94	2.27	3.28	2.55	3.61	2.88	3.99	1.26	2.00	0.30	0.49
7	1.92	2.89	2.17	3.21	2.43	3.51	2.73	3.90	1.23	2.01	0.26	0.44
8	1.85	2.85	2.11	3.15	2.33	3.42	2.62	3.77	1.21	2.01	0.23	0.40
9	1.80	2.80	2.04	3.08	2.24	3.35	2.50	3.68	1.19	2.01	0.21	0.36
10	1.76	2.77	1.98	3.04	2.18	3.28	2.41	3.61	1.17	2.00	0.19	0.33

Table CI(iii) Case III: Unrestricted intercept and no trend

	0.100		0.050		0.025		0.010		Mean		Variance	
k	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**
0	6.58	6.58	8.21	8.21	9.80	9.80	11.79	11.79	3.05	3.05	7.07	7.07
1	4.04	4.78	4.94	5.73	5.77	6.68	6.84	7.84	2.03	2.52	2.28	2.89
2	3.17	4.14	3.79	4.85	4.41	5.52	5.15	6.36	1.69	2.35	1.23	1.77
3	2.72	3.77	3.23	4.35	3.69	4.89	4.29	5.61	1.51	2.26	0.82	1.27
4	2.45	3.52	2.86	4.01	3.25	4.49	3.74	5.06	1.41	2.21	0.60	0.98
5	2.26	3.35	2.62	3.79	2.96	4.18	3.41	4.68	1.34	2.17	0.48	0.79
6	2.12	3.23	2.45	3.61	2.75	3.99	3.15	4.43	1.29	2.14	0.39	0.66
7	2.03	3.13	2.32	3.50	2.60	3.84	2.96	4.26	1.26	2.13	0.33	0.58
8	1.95	3.06	2.22	3.39	2.48	3.70	2.79	4.10	1.23	2.12	0.29	0.51
9	1.88	2.99	2.14	3.30	2.37	3.60	2.65	3.97	1.21	2.10	0.25	0.45
10	1.83	2.94	2.06	3.24	2.28	3.50	2.54	3.86	1.19	2.09	0.23	0.41

Table CI(iv) Case IV: Unrestricted intercept and restricted trend

	0.100		0.050		0.025		0.010		Mean		Variance	
k	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**
0	5.37	5.37	6.29	6.29	7.14	7.14	8.26	8.26	3.17	3.17	2.68	2.68
1	4.05	4.49	4.68	5.15	5.30	5.83	6.10	6.73	2.45	2.77	1.41	1.65
2	3.38	4.02	3.88	4.61	4.37	5.16	4.99	5.85	2.09	2.57	0.92	1.20
3	2.97	3.74	3.38	4.23	3.80	4.68	4.30	5.23	1.87	2.45	0.67	0.93
4	2.68	3.53	3.05	3.97	3.40	4.36	3.81	4.92	1.72	2.37	0.51	0.76
5	2.49	3.38	2.81	3.76	3.11	4.13	3.50	4.63	1.62	2.31	0.42	0.64
6	2.33	3.25	2.63	3.62	2.90	3.94	3.27	4.39	1.54	2.27	0.35	0.55
7	2.22	3.17	2.50	3.50	2.76	3.81	3.07	4.23	1.48	2.24	0.31	0.49
8	2.13	3.09	2.38	3.41	2.62	3.70	2.93	4.06	1.44	2.22	0.27	0.44
9	2.05	3.02	2.30	3.33	2.52	3.60	2.79	3.93	1.40	2.20	0.24	0.40
10	1.98	2.97	2.21	3.25	2.42	3.52	2.68	3.84	1.36	2.18	0.22	0.36

Table CI(v) Case V: Unrestricted intercept and unrestricted trend

	0.100		0.050		0.025		0.010		Mean		Variance	
k	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**
0	9.81	9.81	11.64	11.64	13.36	13.36	15.73	15.73	5.33	5.33	11.35	11.35
1	5.59	6.26	6.56	7.30	7.46	8.27	8.74	9.63	3.17	3.64	3.33	3.91
2	4.19	5.06	4.87	5.85	5.49	6.59	6.34	7.52	2.44	3.09	1.70	2.23
3	3.47	4.45	4.01	5.07	4.52	5.62	5.17	6.36	2.08	2.81	1.08	1.51
4	3.03	4.06	3.47	4.57	3.89	5.07	4.40	5.72	1.86	2.64	0.77	1.14
5	2.75	3.79	3.12	4.25	3.47	4.67	3.93	5.23	1.72	2.53	0.59	0.91
6	2.53	3.59	2.87	4.00	3.19	4.38	3.60	4.90	1.62	2.45	0.48	0.75
7	2.38	3.45	2.69	3.83	2.98	4.16	3.34	4.63	1.54	2.39	0.40	0.64
8	2.26	3.34	2.55	3.68	2.82	4.02	3.15	4.43	1.48	2.35	0.34	0.56
9	2.16	3.24	2.43	3.56	2.67	3.87	2.97	4.24	1.43	2.31	0.30	0.49
10	2.07	3.16	2.33	3.46	2.56	3.76	2.84	4.10	1.40	2.28	0.26	0.44

Table CII(i): Case I: No intercept and no trend

	0.100		0.050		0.025		0.010		Mean		Variance	
k	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**
0	−1.62	−1.62	−1.95	−1.95	−2.24	−2.24	−2.58	−2.58	−0.42	−0.42	0.98	0.98
1	−1.62	−2.28	−1.95	−2.60	−2.24	−2.90	−2.58	−3.22	−0.42	−0.98	0.98	1.12
2	−1.62	−2.68	−1.95	−3.02	−2.24	−3.31	−2.58	−3.66	−0.42	−1.39	0.98	1.12
3	−1.62	−3.00	−1.95	−3.33	−2.24	−3.64	−2.58	−3.97	−0.42	−1.71	0.98	1.09
4	−1.62	−3.26	−1.95	−3.60	−2.24	−3.89	−2.58	−4.23	−0.42	−1.98	0.98	1.07
5	−1.62	−3.49	−1.95	−3.83	−2.24	−4.12	−2.58	−4.44	−0.42	−2.22	0.98	1.05
6	−1.62	−3.70	−1.95	−4.04	−2.24	−4.34	−2.58	−4.67	−0.42	−2.43	0.98	1.04
7	−1.62	−3.90	−1.95	−4.23	−2.24	−4.54	−2.58	−4.88	−0.42	−2.63	0.98	1.04
8	−1.62	−4.09	−1.95	−4.43	−2.24	−4.72	−2.58	−5.07	−0.42	−2.81	0.98	1.04
9	−1.62	−4.26	−1.95	−4.61	−2.24	−4.89	−2.58	−5.25	−0.42	−2.98	0.98	1.04
10	−1.62	−4.42	−1.95	−4.76	−2.24	−5.06	−2.58	−5.44	−0.42	−3.15	0.98	1.03

Table CII. Asymptotic critical value bounds of the *t*-statistic. Testing for the existence of a levels relationship

Table CII(iii) Case III: Unrestricted intercept and no trend

	0.100		0.050		0.025		0.010		Mean		Variance	
k	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**
0	−2.57	−2.57	−2.86	−2.86	−3.13	−3.13	−3.43	−3.43	−1.53	−1.53	0.72	0.71
1	−2.57	−2.91	−2.86	−3.22	−3.13	−3.50	−3.43	−3.82	−1.53	−1.80	0.72	0.81
2	−2.57	−3.21	−2.86	−3.53	−3.13	−3.80	−3.43	−4.10	−1.53	−2.04	0.72	0.86
3	−2.57	−3.46	−2.86	−3.78	−3.13	−4.05	−3.43	−4.37	−1.53	−2.26	0.72	0.89
4	−2.57	−3.66	−2.86	−3.99	−3.13	−4.26	−3.43	−4.60	−1.53	−2.47	0.72	0.91
5	−2.57	−3.86	−2.86	−4.19	−3.13	−4.46	−3.43	−4.79	−1.53	−2.65	0.72	0.92
6	−2.57	−4.04	−2.86	−4.38	−3.13	−4.66	−3.43	−4.99	−1.53	−2.83	0.72	0.93
7	−2.57	−4.23	−2.86	−4.57	−3.13	−4.85	−3.43	−5.19	−1.53	−3.00	0.72	0.94
8	−2.57	−4.40	−2.86	−4.72	−3.13	−5.02	−3.43	−5.37	−1.53	−3.16	0.72	0.96
9	−2.57	−4.56	−2.86	−4.88	−3.13	−5.18	−3.42	−5.54	−1.53	−3.31	0.72	0.96
10	−2.57	−4.69	−2.86	−5.03	−3.13	−5.34	−3.43	−5.68	−1.53	−3.46	0.72	0.96

Table CII(v) Case V: Unrestricted intercept and unrestricted trend

	0.100		0.050		0.025		0.010		Mean		Variance	
k	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**
0	−3.13	−3.13	−3.41	−3.41	−3.65	−3.66	−3.96	−3.97	−2.18	−2.18	0.57	0.57
1	−3.13	−3.40	−3.41	−3.69	−3.65	−3.96	−3.96	−4.26	−2.18	−2.37	0.57	0.67
2	−3.13	−3.63	−3.41	−3.95	−3.65	−4.20	−3.96	−4.53	−2.18	−2.55	0.57	0.74

Table CII(v) Case V: Unrestricted intercept and unrestricted trend

	0.100		0.050		0.025		0.010		Mean		Variance	
k	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**	***I*(0)**	***I*(1)**
3	−3.13	−3.84	−3.41	−4.16	−3.65	−4.42	−3.96	−4.73	−2.18	−2.72	0.57	0.79
4	−3.13	−4.04	−3.41	−4.36	−3.65	−4.62	−3.96	−4.96	−2.18	−2.89	0.57	0.82
5	−3.13	−4.21	−3.41	−4.52	−3.65	−4.79	−3.96	−5.13	−2.18	−3.04	0.57	0.85
6	−3.13	−4.37	−3.41	−4.69	−3.65	−4.96	−3.96	−5.31	−2.18	−3.20	0.57	0.87
7	−3.13	−4.53	−3.41	−4.85	−3.65	−5.14	−3.96	−5.49	−2.18	−3.34	0.57	0.88
8	−3.13	−4.68	−3.41	−5.01	−3.65	−5.30	−3.96	−5.65	−2.18	−3.49	0.57	0.90
9	−3.13	−4.82	−3.41	−5.15	−3.65	−5.44	−3.96	−5.79	−2.18	−3.62	0.57	0.91
10	−3.13	−4.96	−3.41	−5.29	−3.65	−5.59	−3.96	−5.94	−2.18	−3.75	0.57	0.92

Appendix - B:

Lag Length Selection of D(lnRGDP), D(lnBMS), D(lnLOA) and D(lnTA)

Real GDP

VAR Lag Order Selection Criteria						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	78.08636	NA*	0.000343*	-5.139090*	-5.092384*	-5.124148*
1	78.18743	0.188671	0.000365	-5.079162	-4.985749	-5.049278
2	79.07623	1.599850	0.000367	-5.071749	-4.931629	-5.026923
3	80.97424	3.289868	0.000346	-5.131616	-4.944789	-5.071848
4	81.82538	1.418569	0.000350	-5.121692	-4.888159	-5.046983
5	81.82538	9.31E-06	0.000375	-5.055026	-4.774786	-4.965374
6	81.94417	0.182136	0.000399	-4.996278	-4.669332	-4.891685

Broad Money Supply

VAR Lag Order Selection Criteria						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	46.67741	NA	0.002786	-3.045160	-2.998454*	-3.030219
1	47.03033	0.658788	0.002910	-3.002022	-2.908609	-2.972138
2	49.35402	4.182649*	0.002665	-3.090268	-2.950148	-3.045443
3	50.30900	1.655295	0.002676	-3.087267	-2.900440	-3.027499
4	51.96994	2.768239	0.002564*	-3.131330*	-2.897797	-3.056620*
5	52.00803	0.060934	0.002741	-3.067202	-2.786962	-2.977551
6	52.16435	0.239696	0.002909	-3.010957	-2.684011	-2.906364

Loan Advances of Commercial Banks

VAR Lag Order Selection Criteria						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	35.15091	NA*	0.006009*	-2.276727*	-2.230021*	-2.261786*
1	35.61184	0.860397	0.006229	-2.240789	-2.147376	-2.210906
2	35.75546	0.258511	0.006599	-2.183697	-2.043577	-2.138872
3	35.83516	0.138153	0.007023	-2.122344	-1.935518	-2.062577
4	36.65283	1.362784	0.007119	-2.110189	-1.876656	-2.035479
5	36.79812	0.232459	0.007554	-2.053208	-1.772968	-1.963557
6	36.94275	0.221771	0.008024	-1.996183	-1.669237	-1.891591

Total Assets of Commercial Banks

VAR Lag Order Selection Criteria						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	38.65852	NA*	0.004756*	-2.510568*	-2.463862*	-2.495626*
1	38.94715	0.538772	0.004987	-2.463143	-2.369730	-2.433260
2	40.10141	2.077664	0.004939	-2.473427	-2.333307	-2.428602
3	40.16185	0.104761	0.005263	-2.410790	-2.223963	-2.351022
4	40.83437	1.120872	0.005387	-2.388958	-2.155425	-2.314249
5	40.85437	0.032005	0.005765	-2.323625	-2.043385	-2.233974
6	43.24461	3.665031	0.005272	-2.416307	-2.089361	-2.311715

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion