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I hereby declare that this work has been done by me and has not been submitted elsewhere.

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ABSTRACT

Despite the growing literatures that examined the relationship between financial developments and growth of any economy, there is scarceness in the empirical studies that examine the influence of bank credit on economic performance or growth at sectorial level of any country. Therefore, this study came to examine the effect and relationship between bank credit allocation to Agriculture, Industry, Service, Export and to the whole economic sectors independently and Real GDP in Ethiopia at different using time series data for the period that span from 1980 to 2015.

The paper examines whether a long-run relationship between bank credit allocation to these sectors and economic growth measured by Real GDP exist in Ethiopia. It employs Vector Error Correction Model (VECM) approach to assess how bank credit allocation to these sectors contributes to growth. It further used the granger causality test so as to find the direction of causality between bank credit allocation to these sectors and economic growth.

The findings support the existence of feedback effect or bi-directional causality between Total bank credit to the economy and Real GDP.

Moreover, the empirical results point out that the efficiency of the bank credit facilities in major economic sectors at level and lags has an important role in the Ethiopian economic growth both in short- and long-runs. This shows that there is a need to enhance the role of financial sector for different economic sectors by adopting more appropriate macroeconomic policies.

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List of Acronyms and Abbreviations

ADF	Augmented Dickey-Fuller
AIC	Akaike Information Criteria
CBE	Commercial Bank of Ethiopia
CFA	Bank Credit for Agriculture sector
CFI	Bank Credit for Industry sector
CFS	Bank Credit for Service sector
CFX	Bank Credit for Export sector
DF	Dickey Fuller
DW	Durbin-Watson test
LM	The Lagrange multiplier test
ECM	Error Correction Model
EPRDF	Ethiopian People's Revolutionary Democratic Front
FPE	Final Predication Error
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
GTP	Growth and Transformation Plan
HQIC	Hannan-Quinn Information Criteria
LGDPCON	Logarithm of real GDP
LOUTSTOTAL	Logarithm of total outstanding credit for the economy
LOUTSAGRI	Logarithm of outstanding credit for the agriculture sector
LOUTSINDU	Logarithm of outstanding credit for the industry sector
LOUTSSERV	Logarithm of outstanding credit for the service sector

LOUTSEXP	Logarithm of outstanding credit for export
IMF	International Monetary Fund
MoFC	Ministry of Finance and Economic Cooperation
MFI	Micro Finance Institutions
NBE	National Bank of Ethiopia
OLS	Ordinary List Squares
RGDP	Real Gross Domestic Product
SACCO	Saving and Credit Cooperatives
SIC	Schwarz Information Criteria
SSA	Sub-Sahara Africa
SVAR	Structural Vector Auto Regressive
TGE	Transitional Government of Ethiopia
USD	United States Dollar
VAR	Vector Auto Regressive
VEC	Vector Error Correction Model

CHAPTER ONE

INTRODUCTION

1.1 Background

Economic growth is one of the major objectives of macroeconomic policy. It is the crucial means of uplifting living standards as well as achieving economic development. Economists define economic growth from various perspectives. Some economists view that it is an increase in the national income or the level of production of goods and services by a country over a certain period of time. Generally economic growth is defined as an increase in gross domestic product. Therefore, gross domestic product (GDP) is considered as proxy of economic growth in the study. Credit is the aggregate amount of funds provided by commercial banks to individuals, business organizations/industries and government for consumption and investment purposes. Individuals obtain credit for both consumption and investment purposes, business organizations/industries borrow loans to invest in plant and machinery where as government borrows loans to spend for recurrent as well as capital purposes. More specifically, credit is understood as the provision of resources such as granting a loan by the creditor/lender to the debtor/borrower where the debtor does not reimburse the lender immediately, thereby generating a debt, and instead arranges either to repay or return those resources at a later date (Mishra at all, 2009).

Credit is considered as a key to economic growth especially in developing countries as it lubricates the economy. Therefore, the role of bank credit in economic growth has been accepted by many researchers as various economic agents are able to invest money in various investment opportunities. Economic growth has been one of the major macroeconomic objectives of the government of Ethiopia. National Bank of Ethiopia (NBE) considers that monetary policy should also support growth. NBE always directs commercial banks to flow their credit to productive sector. Credit channel of monetary policy is considered very important and effective in Ethiopia. In this channel, money supply is expected to affect real variables through the means of bank balance sheet and availability of credit. A large body of evidence suggests that financial sector development plays a huge role in economic development. Okwo (2012) examined the effect of

bank credit to the private sector on economic growth in Nigeria and found that bank credit to private sectors has a statistical strong positive relationship with GDP as expected.

Bank credit to private sector promotes economic growth through capital accumulation and technological progress by increasing the savings rate, mobilizing and pooling savings, producing information about investment, facilitating and encouraging the inflows of foreign capital, as well as optimizing the allocation of capital (World Bank, 2013). One of the major indicators for measuring financial development of a country is private sector credit to GDP ratio. The role of credit provided by banks to private sector is considered more efficient to support economic growth rather than the credit provided to government.

Bank credit has significant role in economic growth. Especially in developing countries like Ethiopia, it caters resource need for economic growth. Hence, NBE and the government have adopted many policies and programs to increase economic growth through the use of bank credit. National Bank of Ethiopia has been seen to be playing a leading role to determine the proportion of bank loans and advances to productive sectors (agriculture, energy, tourism, Manufacturing, export). The main objective of this provision is to stimulate economic growth in the country. However, the relationship between commercial bank credit sectors and economic growth has not yet been assessed properly in the Ethiopia context. In this regard, this study attempts to fulfill the gap.

Regarding Ethiopia's financial industry structure, the sector consists of 18 banks (2 public banks and 16 private banks), 14 private insurance companies, 1 public insurance company, 31 microfinance institutions and over 8200 Saving and Credit Cooperatives (SACCOs) in both rural 3 and urban areas. In the financial sector of Ethiopia the Banking sector is dominant accounting for over 80% of the total assets of the financial sector (Getnet, 2014).

In Ethiopia, bank lending has gone through different stages. During the pre- reform period; credit was highly regulated to be consistent with the government's plan and financial requirements. In the post-liberalization period different and successive liberalization policy and credit policy reforms emerged through the termination of discriminatory interest rate and preferential sector lending modalities and reduction of credit controls (Tsigab, 2014).

During the Post-liberalization period, supply of bank credit, starting from a low base had grown remarkably. According to total new loans disbursed by the banking sector reached 59.9billion in 2013/14, indicating above 500% increase to the level of loan disbursement in 2004/052 .The average annual rate of growth of new loan disbursement by the banking sector over 2008/09 – 2013/14 period was 25%. 3 However, compared to GDP, private sector credit to GDP declined from 15.4 percent in 2003/04 to 10.9 percent in 2013/14, and remained below the SSA averages for the period reviewed (World Bank, 2015). Moreover, empirical studies done on the demand side of credit also point out the need to enhance access to credit as less than 10 percent of the households have access to formal credit (Getnet, 2014). Therefore, financial sector need to grow to satisfy the credit demand of the growing economy of the country and consideration of credit supply drivers of banks in Ethiopia is crucial.

In this regard, the proposed study will investigate empirically the effects of commercial banks credit allocation to major economic sectors (agriculture, Industry, service and export) on economic growth from supply side perspectives. Generally speaking, the overall goal of this research is to investigate the causalities and relationship between commercial banks' credit and economic growth in Ethiopia.

1.2. Statement of the Problem

The Ethiopian financial system, which is dominated by the banking sector, has gone through several changes in the past two decades. The financial sector was a highly regulated one prior to the outset of structural reforms in 1992. At that time all of the banks were government owned, interest rates completely regulated, a substantial portion of the credit was earmarked for priority sectors, and there was a flourishing unorganized market for credit. Under the Derg regime (1774-75 to 1990-91) all privately owned financial institutions including three commercial banks, thirteen insurance companies and two non-bank financial intermediaries were nationalized on January 1, 1975 (Harvey13, 1996). The NBE continued its functions as a central bank, although the directives of the planning system now circumscribed its activities. The NBE fixed both deposit and loan rates (both of which were set at very low levels), administered the allocation of foreign exchange (all of which had to be surrendered to NBE), and directly financed the fiscal deficit (NBE 14, 1996b).

By allocating credit and foreign exchange in favors of the state sector, NBE constituted a powerful tool for imposing state-led development. Credit to the private sector fell from nearly 100 per cent of total bank credit under the monarchy to only 40 per cent under the Derg(Di Antonio15, 1988). The Agriculture and Industrial Development Bank (known today as the Development Bank of Ethiopia) allocated 68 per cent of its resources to State farms. State banks undertook little in the way of any financial or economic analysis of prospective projects. Since loan collateral was not required from state-owned enterprises (SOEs) and the government implicitly covered losses by fiscal subventions, state banks developed very little capacity to appraise the riskiness of their balance sheets. Moreover, the inefficiency of the state financial system manifested itself in excess liquidity; the ratio of liquid reserves to Commercial Bank of Ethiopia's (CBE's) total net deposits averaged 25 per cent during this time (IMF16, 1999b).

In recent years, the loan disbursement shows a declining trend in Ethiopia. For instance, bank loan data for the first half of 2009 show that the average private bank has provided only about 177 million Birr in loans over the six month period—equivalent to new loans of just 30 million Birr per month (NBE, 2010). Despite this trend, the government of Ethiopia stressed that the Growth and transformation plan (GTP) to be implemented in the last five years (i.e. from 2010-11 to 2014-15) hoped to rely heavily on domestic savings that can be channeled to the main economic sectors through bank credit.

However, little information is available about the activities of the banking industry and how they affect the economy where they operate. Specifically, the impact of bank credit on economic growth and the direction of causality between the two have attracted little attention from researchers in Ethiopia. The position of the country makes it somehow important to see the contribution of the banking sector in stimulating growth within the economy. Hence, the optimism of the government to relays heavily on domestic savings during the GTP motivates us to address questions such as - to what extent bank credit has been supporting in enhancing economic growth thus far, through which channel/sector/s/ does bank credit affects economic growth; and what is the direction of causality between bank credit in Ethiopia using Ordinary list square (OLS) method co integration approach and Granger-causality test. Thus, this thesis attempts to fill such gap and stimulate ideas within this relatively under researched areas using time series data for the period 1980 to 2015.

1.2.1 Research Questions

The study critically investigates the following research questions regarding the link between sectorial allocation bank credit and economic growth in Ethiopia.

1. Does sectorial allocation of commercial bank credit enhance economic growth?
2. Through which major sectors of the economy does it affect Ethiopian economic growth?
3. How significant is the effects of sectorial allocation of commercial bank credits to affect economic growth in the short- and long runs?
4. From which side the causality relationship originate in Ethiopian context? Is it from commercial bank credit to economy growth? Or vise verse? Or is it Bi-directional to each other?

1.3 Objective of the Study

1.3.1 General Objective

As previously stated, Credit provisions is a crucial function of banks and accounts for a significant share in their operational activities. Therefore, in light of these facts the objective of the paper will be to empirically investigate the impact of commercial credit allocation to major sectors on the growth of Ethiopia economy based on the ordinary list square linear model. To this end, annual time series data for the period 1980 to 2015 will be used for empirical tests.

1.3.2 Specific Objectives

Specifically, the study aims to;

- Discuss the trends of Commercial banks credits to various Economic sectors and GDP growth in Ethiopia based on historical data's,
- Identify and determine to what extent commercial bank credit has been supporting to enhance economic growth so far and through which sector/s/ does it do so, and
- Examine the direction of causality between commercial banks credit and gross domestic product growth in Ethiopia.

1.4 Methodology of the Study

In this study, we used the Co-integrated Vector Error correction model (ECM) approach to identify the relationship between financial development and economic growth. The use of co-integrated VAR model help the study account for spurious correlation, and endogeneity bias as it is designed for non-stationary time series and requires no endo-exogeneous division of variables when compared to simultaneous equations. VAR method allows feedback and dynamic interrelationship across all the variables in the system and appears to be highly competitive with the large-scale macro econometric models in forecasting and policy analysis (Rahman, 2004).

1.5 Scope of the Study

The study examine the direction of causality between commercial banks credit and real gross domestic product growth, and tried to identify relative significance of existing relationship between the GDP growth and commercial banks credit allocations to various sectors selected as independent variables using data from the period of 1980 to 2015 GC to final give some policy recommendations.

1.6 Significance of the Study

The study is designed to examine the direction of causality between commercial banks credit and real gross domestic product, and tried to identify relative significance of existing relationship between the GDP growth and commercial banks credit allocations to sectors selected as independent variables. Hence, the findings of the study are tremendously beneficial for academic purpose, policy makers and managements of Banks. It also helps for researchers who conduct researches on related topics as further reference.

1.7 Limitations of the Study

The study utilized data of thirty five (35) years in the regression analysis due to absence in the availability data for more periods. In addition to this including total bank credit to Agriculture sector, total bank credit to Industry sector, total bank credit to service sector, total bank credit to Export, and Total bank credit to the Economy as only independent variables to determine output growth the country's other limitation of the study.

1.8 Organization of the Paper

This paper is organized into six chapters. Following the introduction part, chapter two presents the review of related theoretical and empirical literature regarding Bank credit and economic growth. Chapter three gives insight on the model specification and methodology employed. Chapter four presents empirical results and its interpretation, and finally chapter five provides conclusion and policy implications based on the findings.

CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical review

Though the role of finance in economic growth is well known to economists, the issue has been neglected for a long time. It was only during 1970s the importance of credit and finance was rediscovered and emphasized by economists. Hence, the role of financial development and bank credit availability in economic growth has been investigated extensively by researchers.

It is argued that the role of financial institutions in developed countries is very different from the one they play in developing countries (Arestis and Basu 3, 2008).

According to them, financial development may hamper economic growth for two reasons. Firstly, deeper financial markets and strengthened regulation of financial institutions help to enhance saving and investment opportunities by offering a wider variety of financial instruments to channel savings and also by providing more security to investors. However, financial development is also often associated with an increased availability of credit for consumption through relaxing domestic liquidity constraints.

Even then there are still some researchers' claim that there is no relationship between financial development and economic growth for some countries (Bloch and Tang 4, 2003). The controversy rooted from the causality and mechanisms by which financial development foster economic growth.

Although how money affects the economy is a matter of debate among economists, there is a general consensus that money, by serving its three uses: a medium of exchange, a unit of account, and a store of wealth, plays a major role in an economy.

For instance, regarding the uses of money, Friedman 5 (1968:12) argues that "…, money is only a machine, but it is extraordinarily efficient machine. Without it, we could not have begun to attain the astounding growth in output and level of living we have experienced in the past two centuries-any more than we could have done so without those other marvelous machines "

The basic function of banks and financial institution in an economy is to mobilize the surpluses of the income earners with the propensity to save and channel it for investment purpose. When they reach the banks or other financial institution the money from the surplus earners become loanable funds. One source financial investment is therefore loanable funds, which is assessed through the banks or other money lending financial institutions. Thus, the banks and financial institution mobilize the savings (i.e. surpluses of income earners who consume less than their total current income) and convert them into loanable funds and channel them to investors who may borrow to finance their projects (Ibid 6).

Banks are the main financial intermediaries that the average person interacts with most frequently. A person who needs a loan to buy a house or car usually obtains it from a local bank. Most people keep a large proportion of their financial wealth in banks in the form of checking accounts, savings account or other various specialized financial product. Financial intermediation is an important activity in the economy because it allows funds to be channeled from people who might otherwise not put them to productive use to people who will. In this way financial intermediation helps to promote a more efficient and dynamic economy. According to Gershenkron 7 (1962) banks would more effectively finance industrial expansion than any other form of financing in developing economies. Moreover, financial intermediaries, particularly banks mobilize savings for investment purposes. They act as intermediaries between, ultimate save-lenders and ultimate borrower-spenders. They help to bridge the gap between borrowers and lenders by creating a market in two type of security, one for the lender and the other for the borrower.

Keynesians postulate that the impact of money in an economy depends on the ability of money to influence interest rate, rate of interest to influence demand for investment fund and for investment fund to influence national income. In line with this, the Harrod-Dommar postulates that changes in national income depend linearly on change in capital stock or investment if financed out of domestic savings. In short, the Harrod-Domar growth model postulates that economic growth will proceed at the rate which society can mobilize domestic savings resources coupled with the productivity of the investment (Somoye 8, 2006). The creation of a pool of investment fund is the objective of bank financial intermediation. Banks through credit creation

provide a pool of investment funds for borrowers. But the ability of banks to create credit to a large extent depends on the development of a nation's banking system.

FitzGerald 9 (2006) argued that financial systems serve five broad functions. First, they produce information ex ante about possible investments. Second, they mobilize and pool savings and allocate capital. Third, they monitor investments and exert corporate governance after providing finance. Fourth, they facilitate the trading, diversification and management of risk. Fifth, they ease the exchange of goods and services. While all financial systems provide these financial functions, and each of these functions can be expected to have an impact on economic growth, there are large differences in how well they are provided. There are three basic characteristics of financial systems that are now regarded as capturing the impact of these five functions on economic growth: (i) the level of financial intermediation; (ii) the efficiency of financial intermediation; and (iii) the composition of financial intermediation.

First, the level of financial intermediation-the size of financial systems relative to an economy is important for each of the functions listed above. A larger financial system allows the exploitation of economies of scale, as there are significant fixed costs in the operation of financial intermediaries. As more individuals join financial intermediaries, the latter can produce better information with positive implications (an externalities) for growth, a channel emphasized in some of the earlier theoretical models of the finance growth literature (e.g. Greenwood and Jovanovic10, 1990; Bencivenga and Smith11. 1991). A larger financial system can also ease credit constraints: the greater the ability of firms to borrow, the more likely that profitable investment opportunities will not be bypassed because of credit rationing.

A large financial system should also be more effective at allocating capital and monitoring the use of funds as there are significant economies of scale in this function.

Greater availability of financing can also increase the resilience of the economy to external shocks, helping to smooth consumption and investment patterns. More generally, a financial system plays an important function in transforming and reallocating risk in an economy. Besides cross-sectional risk diversification, a larger financial system may improve inter-temporal risk sharing (Allen and Gale12, 1997). By expanding a financial system to more individuals there

will be a better allocation of risks, which can in turn boost investment activity in both physical and human capital, leading to higher growth rates.

Second, the efficiency of financial intermediation: the channels linking the size of the financial system and growth effectively assume a high quality of financial intermediation. The efficiency of financial systems, however, cannot be taken for granted, especially as information gathering is one of their key functions. Asymmetric information, externalities in financial markets and imperfect competition (for example, as a result of fixed costs) can lead to sub-optimal levels of financing and investment, an inefficient allocation of capital, or have other undesirable consequences such as bank runs, fraud or illiquidity which are detrimental for economic growth. Some of these market imperfections may be best addressed through appropriate oversight by a public body but the legal and institutional background (including competition policy) may also foster the efficiency of financial markets and hence contribute to economic growth (Stiglitz and Weiss 13, 1981).

Third, the composition of financial intermediation: two important shifts in the composition of financial intermediation relate to the maturity of financing available and the growth of capital markets and institutional investors such as pension funds and insurance companies. The maturity of loans and bonds may affect the extent to which certain investments may be profitably exploited. On the other hand, the replacement of banks by markets appears to be a result of changes in the cost of intermediation.

FitzGerald 14 (2006) argued that there is no specific advantage to banks and hence if liquid equity markets exist, all agents will save through equities as they offer higher long-term returns. Indeed, the earliest corporate finance models even suggested the irrelevance of the choice of financing for company's investment decisions.

One potential channel for the composition of financial intermediation to affect the efficiency with which firms allocate resources is through its impact on corporate governance. There are, however, no theoretical models that assess the role of markets as opposed to banks in boosting steady-state growth through their impact on corporate governance. Indeed, many researchers have observed the limited corporate governance capability afforded by markets, either because of

diffused shareholdings - which lead to managerial discretion - or because of the excessive power often exerted by controlling owners - which can distort corporate decisions (Ibid 15).

A large theoretical and empirical literature on financial development and economic growth has established that finance has a positive, statistically significant, and economically large causal effect on economic growth and its sources (Levine16, 2005). Theoretically, this effect arises through several channels which are summarized by him into five categories. The financial system increases the rate of economic growth as it: (1) produces information ex ante about possible investments and allocates capital; (2) monitors investments and exerts corporate governance after providing finance; (3) facilitates the trading, diversification, and management of risk; (4) mobilizes and pools savings; and (5) eases the exchange of goods and services.

In essence, financial development can be defined as the extent to which the financial system performs these functions well. King and Levine17 (1993a) noted that differences in the quantity and quality of services provided by financial institutions could partly explain why countries grow at different rates. However, the empirical literature that investigates the growth effects of bank lending has focused only on the quantity of services rather than on quality of the services provided by the banking sector. The literature has relied on the assumption made by Goldsmith18 (1969) that the size of the financial system is a good measure of the quantity and quality of functions the financial system provides.

Levine19 (1997) defines liquidity as "the ease and speed with which agents can convert assets into purchasing power at agreed prices" and liquidity risk as the risk that "arises due to the uncertainties associated with converting assets into a medium of exchange." Liquidity may be inhibited by various informational asymmetries as well as transaction costs and financial intermediaries and markets arise to ameliorate these problems. He explains that a system which properly provides liquidity will leave little uncertainty about the timing and settlement of contracts, and contracts will be inexpensive to trade. Furthermore, he argued that financial systems can accomplish five functions to ameliorate information and transactions frictions and contribute to long-run growth. These functions are facilitating risk amelioration; acquiring information about investments and allocating resources; monitoring managers and exerting corporate control; mobilizing savings; and facilitating exchange. These functions facilitate investment and hence higher economic growth.

Drawings on the historical evidence summed by Hicks (1969) to support this claim he also noted that financial development can reduce the cost of acquiring information about firms and managers, and lower the cost of conducting transactions. By providing more accurate information about production technologies and exerting corporate control, financial sector development can enhance resource allocation and accelerate economic growth in the long-run. Similarly, by facilitating risk management, improving the liquidity of financial assets, and reducing trading costs, financial development can encourage investment in high-return activities.

Bencivenga and Smith (1991) formalize these ideas in an insightful model of economic growth. In their model financial institutions emerge to meet the liquidity needs of individual economic agents while allocating a higher proportion of the economy's savings toward long-term investments compared to the case of financial autarky. The model adopts the Diamond and Dybvig 22 (1983) framework of an economy populated by agents who are uncertain about their future liquidity needs at the time they make capital allocation decisions. This framework is incorporated into a growth model featuring capital investment externalities where production depends on firms' individual capital levels as well as the societal capital level, as in Romer(1986). Economic growth is enhanced by the presence of financial institutions since they allocate a greater proportion of the economy's savings to long-term, high productivity projects.

In particular, there are two savings assets: one is a liquid asset that matures earlier but returns less of the consumption good than an illiquid asset. The higher return on the illiquid asset captures the idea of the slow production cycle of high productivity investments, as well as the long gestation periods in capital production, as discussed by Kydland and Prescott24 (1982). However, if the illiquid asset is liquidated before it matures the liquidation value is lower than the return on the liquid asset.

Individuals' preferences over consumption are modeled as in Diamond and Dybvig25 (1983) so that agents may experience a liquidity need in any period with some probability. If agents have invested a portion of their savings in the long-term assets and are faced with such liquidity need, agents liquidate their holdings of the long-term asset. They consume the amount available after liquidation, plus the proceeds from their short term investments. Consumption is lower compared to the case when the entire savings are allocated to the low-return but liquid asset (i.e., short-term investments).

In this environment, agents invest a large proportion of their savings in the liquid asset reducing the funds available for the high productivity illiquid capital. Financial institutions emerge as a group of individual investors who pool their savings. The financial institution can meet the liquidity needs of its individual members by keeping reserves invested in the liquid asset. However, the financial institutions can keep a smaller fraction of the total savings in liquid assets compared to the case of financial autarky when individual agents allocate their savings between liquid and illiquid assets.

By the law of large numbers, the need for liquidity is predictable on the aggregate level so the financial institution can keep reserves only in the amount necessary to meet that aggregate liquidity need. Therefore, with financial institutions, a greater portion of the savings is allocated to the long-term illiquid assets raising economic growth.

This is only a simplified and concise explanation of the results in Bencivenga and Smith26 (1991), as the paper pursues a number of additional avenues and provides additional interesting results. When savings are allowed to vary with or without banks the theoretical results will be ambiguous. As the income and substitution effects are working in the opposite direction, increased liquidity risk amelioration may decrease savings.

Jappelli and Pagano27 (1994) show that increasing liquidity can cause saving rates to fall enough to decrease equilibrium growth. Even when savings fall with the presence of financial intermediaries, the overall effect on growth can be positive if the intermediaries devote a higher portion of (smaller) savings to long-term credit, i.e., if long-term credit is greater under intermediaries than under autarky, despite overall credit being higher under autarky. In addition, empirical results that look at the impact of financial intermediation on savings have shown that financial intermediation has little or no impact on savings rates. Therefore, the assumption of financial intermediaries having no impact on savings is in line with the empirical work that shows no economically strong and statistically significant impact.

Building on Bencivenga and Smith (1991), Greenwood and Smith28 (1997) showed that the financial intermediation provided by banks is necessarily growth enhancing, while in the original model it was growth enhancing under some weak assumptions. Furthermore, they noted that "new technologies could be employed only by 'tying up' large-scale investments in illiquid

capital for long period." By providing liquidity in an effective way the financial sector can promote investment in innovation, capital accumulation, and growth.

Noting that production processes can take a long time, be uncertain, and subject to shocks, Holmstrom and Triole 29 (1998) argued that access to credit during production reduces the risk of premature liquidation and increases the incentives for investing in longer gestation, higher-return projects. Their model, however, does not provide a formal link between liquidity provision and economic growth. In contrast, Aghion et. al30 (2005) show that innovation and long-run growth will be enhanced in an economy that experiences macroeconomic shocks but firms have access to credit during the entire production process. Their predictions are confirmed empirically by showing that financial development reduces the adverse growth effects of macroeconomic volatility. However, they do not investigate data on the maturity of credits. Despite the convincing arguments discussed above, the notion that long-term credit is good for growth is not universally accepted. Sissoko31 (2006) combines the monetary and the financial role of intermediaries into a growth model with the division of labor. The model allows agents to buy and sell a cash-in-advance constraint which gives rise to growth enhancing short-term credit. The model predicts that short-term credit increases growth, but the author does not tests this prediction for "lack of data on credit maturity."

Other theoretical work where short-term lending is growth-enhancing is the signaling framework of Flannery (1986). That is, firms that are not concerned with reevaluation by the credit markets (good firms) will borrow short-term, while firms that fear reevaluation (bad firms) will want to borrow long-term. Therefore, short-term credit could have a positive effect on growth as more short-term credit implies more efficient investments. However, this holds if there is no direct communication between borrower and lender, and signaling is the only form of communication. Still in the signaling framework, Titman (1992) introduces a more realistic setting (uncertain interest rate and financial distress cost) which leads good firms to a pooling long-term equilibrium, despite their wish to borrow short-term.

There are other theories that argue that long-term credit can increase economic growth by decreasing the likelihood of financial crises. Ennis and Keister (2003) present a model where long-term credit is beneficial for both growth and "crisis prevention." The authors construct an endogenous growth model where bank runs affect capital stock and output permanently. Their

model is similar to Bencivenga and Smith as the consumers have similar utility and banks can choose between similar investment opportunities. If banks keep their portfolio more illiquid, this raises the expected payoff to investors and induces them to wait until the long-term projects are completed. This lowers the probability of a run. As a result, the authors note that in their model there is "no tradeoff between growth and stability… [as] less liquid portfolios bring higher growth with fewer bank runs."

The literature on financial liberalization encourages free competition among banks as the way forward to achieve economic growth. However, it has largely overlooked the possibility that endogenous constraints in the credit market, such as imperfect information, could be a significant obstacle to efficient credit allocation even when assuming that banks are free from interest rate ceilings. Stiglitz35 (2000) was the first to consider the importance of banks in allocating credit efficiently, particularly to new and innovative investments. A high risk premium would only encourage the riskier borrowers, as the higher the risk the higher the expected return from investment. The expected return of the borrowers is an increasing function of the riskiness of their projects. This fact would discourage less risky investments from taking place, although they could be more productive (selection effect). Safe borrowers, which deal with banks only, will be left with no other choice. At times of high interest rates, investors would favour investments with a high probability of default (incentive effect). Reducing opportunities to innovate will have a negative impact on economic growth in the long run.

King and Levine36 (1993b) using different measures of bank development for several countries found that banking sector development can spur economic growth in the long run. Jayratne and Strahan37 (1996) also shows that when individual states in USA relaxed interstate branching restrictions bank lending quality increased significantly leading to higher growth. Government restrictions on banking systems through interest ceilings on deposits and high reserve requirements create a shortage of funds and reduce the efficiency of capital. Government ownership of banks is another form of intervention in financial systems which may have adverse impact on financial development.

Privatizing government owned banks can enhance credit allocation and thereby increase quantity and quality of investment Demetriades and Andrianova38 (2004).

Ball and Mankiw40 (1995) indicate that higher inflation necessarily raises inflation uncertainty. Higher inflation uncertainty increases the riskiness of all credits and therefore even previously 'high quality borrowers' get treated as the risky ones. To assure that credits are paid back banks may resort to more severe credit rationing. Therefore, inflation may have different impact on financial depth depending on whether initial rate of inflation is high or low. A rise of initially low inflation may not lead to detrimental consequences for financial activity, whereas a rise in the rate of inflation that is initially high may substantially depress activity on financial markets and entail reduction in financial depth.

The relationship between financial development and economic growth has extensively been studied by researchers especially for many developing countries. In general, three possible relationships can exist between financial development and economic growth: *finance-led growth, growth driven finance, and the two-way causal relationship* that is termed *feedback*. Each relationship is discussed in turn with empirical evidence provided.

2.1.1 Finance-led growth: The finance-led growth hypothesis postulates that financial development plays a major role in economic growth. The hypothesis contends that financial development has a stimulating impact on the economy. Several channels through which financial development promotes growth in the economy include efficient allocation of capital, mobilization of savings through attractive instruments, lowering of cost of information gathering and presenting among others. Essentially, an efficient financial sector is seen as purveyor of limited credit resources from the surplus units to the deficits. Through this process the financial sector helps to promote efficient allocation of resources. Proponents of the supply side hypothesis who provided empirical evidence include among others (1997), King and Levine 41 (1993a), Levine 42, Rajan and Zingales 43 (1998); Darrat 44 (1999); Luintel and Khan 45 (1999); Arestis et.al 46 (2001); Jalilian and Kirkpatrick 47 (2002); Bhattacharya and Sivasubramanian 48 (2003); Abu Bader and Abu Qarn 49 (2008); and Habibullah and End 50, (2006).

It is argued by the supply leading proponents that to support and enhance economic growth, bank credit is a critical vehicle to create productive capacities and may generate new technologies. Therefore, financial repression was blamed for low level of economic growth and liberal economists suggested that abolishing interest rate control was a necessary policy both in

developed and developing countries. They also suggested to improve and to deepen financial structure to have a stabilized and strong economy.

According to Disbudak51 (2010), the first attempt was the 'Volcker Shock' in the US on this issue, and then all countries implemented similar policies. The reasoning of implementing liberal policies in financial markets rooted from two different strands: The first is the Schumpeterian view and the second is the McKinnon and Shaw hypothesis.

According to Schumpeter, banks channel savings to firms and entrepreneurs who offer feasible and profitable investment projects. By doing so, banks and financial institutions may affect economic growth and development. However, one should note that increased saving is not necessary in this view; supplying and allocating available savings more efficiently to firms and entrepreneurs might also spur economic growth (King and Levine 52, 1993a; Bloch and Tang 53, 2003).

McKinnon (1973)54 and Shaw55 (1973) changed the discourse and emphasized the role of increased savings and capital accumulation in economic growth. Abolishing financial repression and having more efficient financial market would result in higher economic growth rates in average for all countries (Greenwood and Jovanovic 56, 1990).

For the advocates of demand following approach, financial institutions have largely been emerged within the process of industrialization. The process of industrialization and economic growth increase the demand for finance, and many entrepreneurs recognized that there was an opportunity to make a profit from the intermediation between savers and investors or between lenders and borrowers. This in turn, led to the growth of varieties of financial institutions (Arestis and Basu57, 2008).

They argued that financial development may hamper economic growth for two reasons.

Firstly, deeper financial markets and strengthened regulation of financial institutions help to enhance saving and investment opportunities by offering a wider variety of financial instruments to channel savings and also by providing more security to investors.

However, financial development is also often associated with an increased availability of credit for consumption through relaxing domestic liquidity constraints.

2.1.2 Growth-driven Finance: In contrast to the finance - led growth hypothesis, proponents of the growth-driven finance of demand leading hypothesis have argued that increase in growth generally leads to increased financial development. In the opinion of Robinson58 (1952), it seems to be the case that where enterprises lead finance follows. Kuznets59 (1955) equally states that financial markets begin to grow as the economy approaches the intermediate stage of growth process and develop once the economy becomes matured. Dell'Ariccia and Marquez60 (2006) argument is that high economic growth generates demand for some categories of financial instruments and arrangement and that financial market effectively respond to these demands and change.

2.1.3 Feedback (Bi-directional): The most interesting scenarios suggest a two way causal relationship between finance and growth. Proponents of the feedback hypothesis postulate two way relationships between financial development and economic growth.

This means that financial market develops as a consequence of economic growth which in turn feeds back as a stimulant to real growth. Several studies have equally noted this type of feedback. The pioneer of this hypothesis is Patrick61 (1966). He makes a distinction between 'supply-leading' and 'demand following' responses. The demand following approach states that lack of financial growth is a symptom of a lack of demand for financial services. Namely, it is the real sector of the economy that determines the level of financial development. On the other hand, the supply-leading approach argues that the financial sector precedes the real sector and induces economic growth by channeling scarce resources from savers to investors. In general, it is believed that the supply-leading response where the development of the financial sector is expected to precede the development of the real sector. Other empirical studies that are consistent with the bi-directional causality response are the study by Greenwood and Jovanovic62 (1990); Wood63 (1993); Greenwood and Smith64 (1997); Al-Yousif65 (2002); and Demetriades and Hussein66 (1996).

Patrick67 (1966) also postulated the stage of development hypothesis. At the early stage, causality runs from finance to growth, but at later stages causality runs from growth to finance. In the early stage of economic development, finance causes growth by inducing real per capita capital formation. Later on, the economy is in the growth stage and there will be increasing

demand for financial services, which induces an expansion in the financial sector as well as the real sector. This implies causality from growth to finance.

Federici and Francesco68 (2009) classified the existing literature into three strands. According to the first one, more developed financial systems are able to absorb shocks, reducing the length of macroeconomic cycles. The second line of research analyzes how financial imperfections influence output. This approach develops an "overlapping generation costly state verification" model in which the agency costs are inversely related to the borrower's net worth. The third strand of literature studies the way financial level development affects long-term economic performances.

Aghion and Bolton 69 (1997) developed a model of growth and income inequalities in the presence of asymmetrical information. They show that moral hazard with no collateral to access bank credit on the part of the borrower is the main source of the emergence of persistent income inequalities. Therefore, financial sector development that eliminates transactions and information costs will allow poor and middle-class borrowers to obtain more bank credit, thus improving the production efficiency of the economy.

The financial intermediaries although regulated, still determine the strategies for allocating funds, and as such they play a significant role in determining the type of investment activities, the level of employment generation, and the distribution of income (Gross71, 2001). The availability of credit function optimistically allows the realization of this role which is often essential and significant for the growth of an economy. Arguably, better functioning credit system tends to reduce the transaction costs involved in the process of financial intermediation. Efficient credit system minimizes the problems of asymmetric information such as adverse selection and moral hazard between borrowers and lenders which often prevent optimal allocation of resources, through screening and monitoring of potential borrowers, information gathering and special contract design. As a consequence economies of scale are enjoyed and this is a precondition of economic growth. Conversely, a low level of financial development pulled by inefficient credit system distorts economic growth.

Beck et. al72 (2000) noted that financial development might influence growth via improvements in technology (through better allocation of savings) or via a more rapid capital accumulation (by increasing domestic savings rates and attracting foreign capital).

They suggest that financial development can foster economic growth by raising saving, improving allocative efficiency of loanable funds, and promoting capital accumulation.

In addition, a long series of contemporary empirical studies show that a range of financial indicators is robustly and positively correlated with economic growth. Advocates of financial liberalization assert that financial development leads to financial deepening and improved access to credit for previously excluded savers and borrowers. The supply of credit for a given level of deposits increases owing to reduction in reserves requirements.

A rise in the interest rates that typically follows financial liberalization increases savings, thus resulting in more loanable funds being available to the previously disadvantaged.

Moreover, banks tend to extend more credit to traditionally marginalized segments of the population as a result of increased competition owing to removal of barriers to entry.

Tsuru73 (2000) also explained the finance-growth link by arguing that financial development can promote economic growth via its positive impact on capital productivity or the efficiency of financial systems in converting financial resources into real investment. However, its effect on the saving rate is ambiguous and could affect the growth rate negatively. In net terms, the impact on welfare is likely to be positive, since increased efficiency of investment in the long term can offset any reduction in the propensity to save.

In the same manner Jalilian and Kirkpatrick 75 (2002) also argued that financial services boost overall growth (saving mobilization, risk management, and facilitation of transaction), increasing the supply of credit and other financial services that can be accessed by the poor and the previously marginalized will enhance the income growth of the poor and consequently reduce poverty.

In these regards, Khan and Senhadji76 (2000) also argued that the fundamental frictions that give rise to financial intermediaries are either a technological or an incentive nature. The former prevents individuals from access to economies of scale, while the latter occurs because

information is costly and asymmetrically distributed across agents in world where contracts are incomplete because contingencies can be spelled out. Hence, according to them financial intermediaries relax these restrictions by: (i) facilitating the trading, hedging, diversifying, and pooling of risk; (ii) efficiently allocating resources; (iii) monitoring managers and exerting corporate control;(iv) mobilizing savings; and (v) facilitating the exchange of goods and services. In sum, financial system facilitates the allocation of resources over space and time.

Levine77 (2002) emphasizes the critical importance of the banking system in economic growth and highlight circumstances when banks can actively spur innovation and future growth by identifying and funding productive investments. In modern economy, banks and stock markets constitute a major part of the financial system.

Although they may perform different roles in the process of economic development, their uniqueness is hardly emphasized within the framework of economic growth. The development of stock markets is necessary to achieve full efficiency of capital allocation if the government is to liberalize the financial system. While banks finance only well established, safe borrowers, stock markets can finance risky, productive and innovative investment projects. As far as physical accumulation is concerned, both stock markets and banks provide sources of external financing for firms. For the purpose of resource allocation, they both create information to guide the allocation of resources. They differ only in the way the information is transmitted.

According to Caldero´n and Liu78 (2003), the literature usually defines financial development as the improvement in quantity, quality, and efficiency of financial intermediary services. This process involves the combination of many activities and institutions. Moreover, the direction of causality between financial deepening and economic growth is crucial because it has different implications for development policies.

Hence, one could argue that, only in the case of supply-leading, policies should aim to financial sector liberalization; whereas in the case of demand-following, more emphasis should be placed on other growth-enhancing policies.

A theoretical approach to crises pioneered by Aghion et. al79 (2003) claim that countries with an intermediate financial development are subject to output and prices instabilities. The mechanism underlying is as follows: suppose that output increases; given the financial constraints,

entrepreneurs can expand their investments, because they can now offer more collateral to lenders, reinforcing the expansionary phase. At the same time, however, the increase of domestic prices generates a depreciation of the exchange rate. Because of the lower firms' net worth for the presence of external debt in their books, investment and output decrease; the following appreciation of the exchange rate make the economy re-entering in the lending boom. Not only the system is subject to boom and bust phase, but it can experience currency crisis, either because of "bad policy" (as predicted by first generation models) or because of "bad markets" (second generation models).

The reasons for which the level of financial development matters is that in a very financially constrained economy the level of investments and output does not increase very much in response of changes in collateral value. On the other side, the level of investments in countries with a very strong financial system is not so much affected by collateral value. One of the papers that have studied recently how changes in the value of collateral affect business cycle fluctuations is that of Krishnamurthy 80 (2003).

Edirisuriya81 (2004) noted that the broad idea of implementing financial sector reforms is to enhance economic growth while improving financial market efficiencies to generate more benefits to the general public. According to him, most of the leading international financial markets including the United States, Great Britain, Japan, Australia and other European countries have introduced financial reforms in order to improve financial market efficiencies and competitiveness and to provide a better service to consumers and enhance economic growth. This process is now being implemented in the emerging markets of the developing world. Major financial market reforms are concentrated on the banking sector in comparison to other sectors of the financial services industry. Apart from banking, sectors such as equity markets, capital markets, electronic finance and rural and microfinance sectors have been touched by financial reforms.

Examples from other countries show that reformed economic policies combined with free movement of capital have changed the financial and economic landscape in a noticeable way. For example, empirical evidence from many countries suggests that in particular, financial market reforms have helped in transforming economic behavior significantly (King and Levine82, 1993a). When compared to the financial markets effects in the developed countries

however, these new policy initiatives have not fully impacted in emerging market countries as expected. Sri Lanka has also been experiencing mixed impacts due to financial reforms but these impacts have not been comprehensively examined.

In a similar fashion, Balogun83 (2007) also noted that there is a consensus in the literature that at the heart of economic reforms is the need to address a two-fold task: restructure or get policy incentives right as well as restructure key implementation institutions. Financial sector reforms is that aspect of economic reforms which focus mainly on restructuring financial sector institutions (regulators and operators) via institutional and policy reforms. As part of the financial sector, banking sector reforms is that aspect which focuses mainly on getting incentives right for the banking sector to take the lead role in empowering the private sector to contribute more to economic growth.

A fundamental question examined in the literature is whether there exists a meaningful effect of financial development on economic growth. The relationship between financial development (bank credit is usually used as a proxy) and economic growth involves analytically important and critical policy issues of great relevance. The causality between bank credit and economic growth may run in various directions, depending on how the economists view the working of the economic system at macro level. In a world of almost perfect capital mobility, it is important to know the relationship between bank credit and economic growth follow sound macroeconomic policies. Inflation is used as a control variable in the economic growth and financial development studies. The relationship between inflation and bank credit is complex and it is argued that there is an inflation threshold in the relationship between bank credit and inflation and this threshold can be regarded as an optimum rate of inflation with respect to financial development. Therefore, some researchers suggest that it should be a target for monetary authorities (Vazakidis and Adamopoulos84, 2009). However, it is widely accepted that inflation is harmful for economic growth.

Another explanation also suggested by Dell'Ariccia and Marquez85 (2006) is that credit expansions tend to be pro-cyclical (i.e., rates of growth in GDP tends to induce a high rate of growth in credit). Usually, if in the "good times" banks relax their criteria and lend to both good and bad projects, then when the "bad times" arrive most loans become non-performing and the source of credit dries up, rationing out even good projects.

DFID86 (2004) identified the following channels through which access to credit affects household welfare outcomes. The availability of credit and saving facilities can allow the poor to build up funds in a safe place over time to facilitate the financing of larger future expenditure or investment. In addition, this accumulation of funds allows for the growth of assets and reserves that can be used to maintain levels of consumption during episodes of unexpected fluctuations in income. Savings mobilization also generates an opportunity for re-lending back the money into the community. The new and expanded access to credit not only can reinforce productive assets of the poor through investment in new technologies that enhance productivity but also can lead to expansion of small businesses.

Diagne and Zeller87 (2001) discussed how access to credit could affect agricultural households. They argue that while returns on crops are received after the crops are harvested, the periods of crop planting and vegetative growth entail expenditure on food and non-food items. Therefore, access to credit will not only allow poor farm households with no savings to purchase essential consumer items and production inputs, but will also reduce the opportunity costs of capital-intensive assets, thus encouraging the adoption of labour-saving, higher yielding technologies and increasing labour, productivity and land yield. The availability of credit can diminish the susceptibility of the poor to shocks when savings are nonexistent and therefore increase their risk-bearing ability and alter their risk-coping strategies.

According to Eswaran and Kotwal88 (1990), the mere knowledge that credit will be accessible to smooth consumption against income shocks if a potentially profitable yet risky investment should end up badly, can make the household more willing to take on more risky investment projects or technologies. Such behavior will intensify the utilization of productivity-enhancing new technologies. Moreover, DFID89 (2004) noted that wider access to financial services and credit is more likely to reduce the proportion of low-return and low-risk assets (such as jewellery) used by the poor as a way to store valuables, and allow them to invest in higher risk, yet higher return, assets that will lead to income enhancement.

Nevertheless, the poor in developing countries frequently do not gain continuing and reliable direct access to formal sources of financial services, and are compelled to depend as an alternative on a limited choice of typically intermittent, shorter in duration, and more costly informal services. This limits the aptitude of poor people to participate fully in markets and

consequently constrains their ability to contribute to economic growth. In this regard, Beck et. al 90 (2004) claims that the poor depends mainly on informal and/or family relations for capital so that improvements in the formal financial sector mainly help only the rich. This view is also shared by Arestis and Caner91 (2004), who state that "financial liberalization that expands the formal sector at the detriment of the informal sector can hurt the poor in a big way in view of the fact that the poor operate mainly in the informal sector".

The reasons why the poor in developing countries have little access to credit and other financial service are summarized by Holden and Prokopenko92 (2001). First, macroeconomic instability and the deficiencies in regulation and supervision of financial institutions might lead to lower demand for deposit facilities. In addition, the supply of these facilities may be insufficient owing to high fixed costs and low economies of scale associated with opening bank branches in remote rural areas. The second reason may be a consequence of the regulation and supervision of financial institutions. While, on the one hand, in some countries exceptionally liberal licensing policies might lead to a large number of weak financial institutions, on the other hand, very restrictive policies may reduce competition. The third reason is difficulty in credit risk management.

In addition, DFID34 (2004) highlights the problems caused by imperfect information (moral hazard and adverse selection). This problem in developed countries is somewhat alleviated through the use of credit assessment mechanisms, and the use of collateral. However, in developing countries, potential borrowers are incapable of presenting viable collateral. Therefore, the informal sector, through the use of social collateral, can overcome some of these problems. Nevertheless, earlier study by Matin et.al94 (1999) pointed out other reasons, such as the high transaction costs faced by small borrowers, patronage, arbitrariness and corrupt practices. This failure of the formal financial sector in serving the poor has given rise to innovations that led to the development of micro financing. However, while micro financing institutions play a role in providing financial services to the poor, they cannot mobilize funds on a large scale in the same way that formal financial institutions can.

Savings can be discouraged as more credit becomes available, particularly credit for consumption. The association between interest rates and savings is ambiguous theoretically. The income effect produced by higher interest rates may be positive or negative depending whether

the saver is a net wealth holder or a net debtor. The positive income effect of an increase in interest rates for a net wealth-holder may run in the opposite direction to the substitution effect that induces a cut in current consumption. The empirical evidence on the effects of interest rates on savings has proven to be inconclusive (Solimano and Gutierrez 95, 2008). Secondly, profit opportunities in the productive sector may cause financial institutions to seek more profitable areas in unproductive areas. Thus, while credit to private sector increasing, economic growth may decrease in an economy. As a result, some of the researches on financial development have found an ambiguous effect of financial variables on economic growth.

2.2 Empirical Review

There is quite extensive empirical literature on the relationship between financial development and economic growth. The empirical studies on the impact of bank credit on economic growth has not reached a consensus and remained controversial. These studies can be divided into two groups in terms of their results. These results are influenced by the technique and the data employed. The studies used time-series for a specific country in general generate contradictory results with those of the cross country studies.

One of the most influential studies on the subject is King and Levine108 (1993a), which shows a strong positive link between financial development and economic growth in a multivariate setting. They also show that financial development has predictive power for future growth and interpret this finding as evidence for a casual relationship that run from financial development to economic growth. The study covers a cross-section of 80 countries during the period 1960-1989 and uses four measures of the level of financial development. The first is liquid liabilities of banks and non bank financial institutions as a share of GDP, which measures the size of financial intermediaries. The second is the ratio of bank credit to the sum of bank and central bank credit, which measures the degree to which banks versus the central bank allocate. The third is the ratio of private credit to domestic credit and the fort is private credit to GDP ratio. The last two indicators measure the extent to which the banking system channel fund to the private sector. They provide evidence that that financial sector development, proxied by the ratio of bank credit granted to the private sector to GDP, affects economic growth both through the improvement of investment productivity (better allocation of capital) and through higher investment level. Their claim is that banking sector development can spur economic growth in the long-run are also

supported by the findings of De Gregorio and Guidotti 109 (1995), who consider that financial deepening affects growth through a combination of the two effects but with more importance for the efficiency effect.

With same line of argument, De Gregorio and Guidotti (1995) examined the empirical relationship between financial development and economic growth; conclude that, by and large, financial development leads to improved growth. In contrast, financial sector distortions reduce the rate of economic growth by reducing the rate of innovation. The study, therefore, concludes that financial systems are important for productivity, growth, and economic development (King and Levine, 1993).

Furthermore, Rajan and Zingales (1998) have been investigated whether financial development facilitates economic growth by scrutinizing the rationale that financial development reduces the cost of external finance to firms. The result of their study suggests that financial development has a substantial supportive influence on the rate of economic growth. Specifically, the results indicate that industrial sectors that have relatively greater need for external finance develop disproportionately faster in countries with more developed financial markets.

Regarding supply-leading hypothesis, Choe and Moosa (1999), studied the relationship between the development of financial systems and economic growth in Korea, conclude that financial development generally leads to economic growth, and that financial intermediaries are more important than capital markets in this relationship.

Other empirical studies, which conclude that financial development provides a significant contribution to growth, include Xu (2000), amongst others. Xu (2000) finds sufficient evidence for the finance-led growth hypothesis (supply-leading response) while using a multivariate VAR model. Similarly, Habibullah and Eng (2006), examined the causal relationship between financial development and economic growth in Asian countries and the study result support for the finance-led growth, thus giving support to the old Schumpeterian hypothesis and Patrick's supply-leading hypothesis.

Moreover, Crichton and De Silva (1989), while examining the progress of financial intermediation resulting from economic growth in Trinidad and Tobago, find that there is a definite positive correlation between economic growth and financial development, at least during

the period 1973–82. However, the study concludes that 'while changes in the real sector clearly impacted on the financial system, it is not clear to what extent financial intermediaries may have in turn aided the growth process through their ability to allocate savings efficiently to the most productive sectors of the economy.

In relation to demand-following hypothesis, Favara (2003) conducted the panel estimation technique and reported that relationship between financial development and economic growth is at best weak. To him, there is no indication that finance spurs economic growth, rather for some specifications, the relationship is puzzlingly negative. Therefore, the effect of financial development on economic growth is ambiguous and not robust to alternative dynamic specifications. He attributed to the fact that financial development does not have a first order effect on economic growth; the link between them is not linear and if the dynamic specification and slope heterogeneity across countries are taken into account, the effect is negative.

Consistent with this, Mushin & Eric (2000) conducted a research on Turkey they further lends credence to this postulation. According to their study, when bank deposit, private sector credit or domestic credit ratios are alternatively used as proxy for financial development; causality runs from economic growth to financial development. They therefore concluded that growth seems to lead financial sector development.

In similar manner, Waqabaca (2004), whereas examined the relationship between financial development and economic growth in Fiji, finds a positive relationship between financial development and economic growth - but with the causation running from economic growth to financial development. Also, Güryay and Şafakli (2007) examines the relationship between financial development and economic growth in Northern Cyprus from 1986 to 2004 by employing Ordinary Least Square Estimation Method (OLS). The result showed that there is a negligible positive effect of financial development on economic growth. On the other hand Granger causality test showed that financial development does not cause economic growth, whereas economic growth was found to cause development of financial intermediaries.

Aurangzeb (2012) studied the contributions of banking sectors on the economic growth in Pakistan, he used deposit, investment, advances, profitability and interest earning of the commercial banks for the period of 2001 to 2010. The statistical result of his study shows that

deposit, investment, loan and advances, profitability and interest earning were all significant with positive impact on the economic growth of the Pakistan. Moreover, the granger causality test of his study confirmed the bidirectional causal relationship of profitability, deposit and loan and advance with economic growth of the country, while unidirectional causal relationship of investment and interest earning was found with economic growth. He therefore, recommended in his study to support the commercial banks by the policy maker because the banking industry was contributing to the economic development of the country.

Similarly, Fadare (2010) empirically identifies the effect of banking sector reforms on economic growth in Nigeria by using the data 1999 - 2009. Variables used for the study are interest rate margins, parallel market premiums, total banking sector credit to the private sector, inflation rate, inflation rate lagged by one year, size of banking sector capital and cash reserve ratios. Results indicate that the relationship between economic growth and other exogenous variables of interest rate margins, parallel market premiums, total banking sector credit to the private sector, inflation rate and cash reserve ratio show the negative and insignificant.

What is more, Ali (2012) empirically investigates the relationship between Banking Sector Development and Economic Growth in Lebanon over the period of 1992-2011. The variables being used for the study were deposits, banking sector size (i.e. assets), interest rate spread, credit to local private sector, and concentration. The statistical result of his study shows that both deposit growth and credit to local private sector impact significantly economic growth. Moreover, the results provide support for the demand-following hypothesis regarding the link between financial sector and economic development in Lebanon.

As well, Jaiyeoba et Al (2013) studied the impact of commercial banks on Malaysian economic development, the study covered 10 commercial banks and for the period of six years, from 2007 to 2012. Variables used for the study are profitability, loan and advances, assets and deposits. The statistical result of their study shows that the profitability and loan and advances have positive and significant contributions to the Malaysian economic development, while commercial banks deposit and asset does not have significant contribution to the Malaysian economic development.

While, Alex Ehimare (2012) investigated the role of banks in capital formation and economic growth and found that the commercial banks have significant role to play in capital formation in the Nigerian economy. This implies that commercial banks have the potential to increase the nation's capital formation through their activities. The commercial banks also have vital roles to play in the nation's economic growth. The results also show that commercial banks deposit liabilities only have immediate impact on capital formation and not on economic growth.
However, the research findings support the notion that commercial banks are agents of both capital formation and economic growth of the country.

The dynamic relationship between finance and growth has been investigated using the Granger-causality test and the results indicate the existence of a long-term stable relationship between financial development and per capita real output.

In Ethiopian context, Roman (2012) examined whether a long-run relationship between financial development and economic growth exist in Ethiopia. Co-integrated Vector Autoregressive (CVAR) approach has been employed to assess how the financial sector contributes to growth. The study further used the granger causality test so as to find the direction of causality between financial development and economic growth. So, the findings supported that the existence of a uni-directional causality from economic growth to financial development. The empirical evidence, in addition, shows the presence of positive and significant long-run relationship between financial development and economic growth and an insignificant effect in the short-run.
In conclusion, although evidence from empirical work support the fact that both finance and real output are positively related to each other, the relationship is country specific and one should not extrapolate one country's experience to another. Based on this assertion, the proposed research will examine the causal relationship that exists between finance (proxies by commercial bank credit) and Economy growth in Ethiopia.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Description of the study Area

Ethiopia is the oldest independent country that is found in the Horn of Africa covering an area of 437,600 square mile. She is bounded on the northeast by Eritrea and Djibouti, on the east and southeast by Somalia, on the southwest by Kenya, and on the west and northwest by Sudan. The population of Ethiopia (2017 estimate) is 100,613,986 yielding an overall density of 230 per square mile (Wikipedia). The country is divided into nine regional state administrations, one for each of its main ethnic groups. Addis Ababa is Ethiopia's capital and the largest city. The resources of Ethiopia are primarily agricultural. A variety of mineral deposits exist; iron, copper, petroleum, salt, potash, gold, and platinum are the principal ones that have been commercially exploited.

Economically, Ethiopia is one of the world's poorest nations, with a real per-capita gross domestic product (GDP) of USD 418 a year in 2015 (NBE 2014/15 annual Report). The health of the Ethiopian economy hangs on the earnings of the agricultural sector, which rise and fall depending on rainfall. Ethiopia is therefore heavily dependent on funding from foreign donors.

The Ethiopian economy continued to register a notable growth since 2004/5. In FY 2014/15, the real GDP grew by 10.2 percent relative to 11.2 percent growth target set in the first GTP for the fiscal year. The growth of the economy has also been remarkable compared to the 4.4 percent growth estimated for Sub - Saharan Africa in 2015 (World Economic Outlook Update, July 2015).

This impressive growth was mainly attributed to service sector (10.2 percent), agricultural sector (6.4 percent) and industrial sector (21.6 percent). Nominal GDP per capita went up to USD 691 from USD 639.6 and real per capita GDP to USD 418 against the preceding year. Generally, the Ethiopian economy recorded 10.1 percent average growth rate per annum during the GTP period (2010/11-2014/15). The Ethiopian economy is projected to grow by 11 percent in FY 2015/16 in

contrast to 3.8 and 5.1 percent growth by IMF for the world and SSA respectively (World Economic Outlook Update, July 2015).

In FY 2014/15, ***the agricultural sector*** depicted a moderate growth rate of 6.4 percent mainly due to 7.2 percent increase in crop production , in general and 7.5 percent expansion in grain crop production in particular. The total grain production reached 270.4 million quintals, of which cereal production accounted for 87.3 percent while pulses and oil seeds comprised 12.7 percent. Cereals and oilseeds production went up by 9.4 and 6.9 percent over the preceding year owing to the 3 and 4.9 percent expansion in cultivated land area respectively. In contrast, the production of pulses declined by 6.5 percent while cultivated land area contracted by 10.6 percent during the same period. The total land cultivated for crop production expanded slightly by 1.2 percent to 12.6 million hectares, of which cereals production covered 80.8 percent while pulses and oil seeds covered 12.4 and 6.8 percent, respectively. The growth in agricultural output was mainly attributed to improved productivity supported by favorable and conducive agricultural development policies and better productive safety net programs. The share of agriculture in GDP in F.Y 2014/15 went down to 38.8 percent from 40.1 percent a year earlier. Likewise, the sector's contribution to GDP growth rate rose to 24.5 percent compared with 22.3 percent last year.

Industrial sector showed a 21.6 percent growth; over the previous year and accounted for 15.2 percent of GDP. The sector contributed 29.4 percent to the overall economic growth during the fiscal year. This indicates that despite its rapid growth relative to agriculture and service sectors, the share of industrial sector in GDP was very low. Calling for enhanced investment in manufacturing sector taking into account the country's competitive advantage. Manufacturing sector increased by 15.8 percent and constituted about 31.8 percent of industrial output growth and 4.6 percent of real GDP growth. Construction industry, on the other hand, contributed more than half (56.1 percent) to industrial sector growth and 8.5 percent to GDP growth. This implies that construction sector is currently the leading industry due to expansion in construction of roads, railways, dams and residential houses. Meanwhile, electricity & water and mining & quarrying contributed 6.5 and 5.6 percent to industrial growth, respectively.

Service sector has also become relatively a dominant sector in Ethiopia since it overtook the agricultural sector in 2010/11. In 2014/15, its growth rate was 10.2 percent; and its share in GDP rose to about 46.6 percent. Its contribution to GDP growth was about 46.1 percent in the same period. The significant contribution of the sector to GDP was gripping due to the expansion of whole sale and retail trade services which expanded by 9.9 percent followed by real estate, renting and business activities (4.1 percent), hotels and restaurants (11.3 percent), transport and communication (10.3 percent) and public administration and defense (10.7 percent) (NBE 2014/15 annual Report).

3.2 Type and sources of data

The proposed study utilizes secondary data from the period 1980 to 2015. Its obtained from data base of National Bank of Ethiopia (NBE).

3.3 Model Specification

The model to be used in the study will be a single bank credit – economic growth model with predictor variables linearly in the functional form as follows:

$$\mathbf{GDP = TBC + CFA + CFI + CFS + CFX}$$

Where:

GDP = Gross Domestic Product

TBC = Total Bank Credit

CFA = Bank Credit for Agriculture sector

CFI = Bank Credit for Industry sector

CFS = Bank Credit for Service sector

CFX = Bank Credit for Export sector

Recasting equation (1), into the econometric form gives:

$$\mathbf{GDP}_t = \beta_0 + \beta_1 \mathbf{TBC}_t + \beta_2 1\ \mathbf{CFA}_t + \beta_3\ \mathbf{CFI}_t + \beta_4\ \mathbf{CFS}_t + \beta_5\ \mathbf{CFX}_t + \varepsilon_t$$

$$(+) \qquad (+) \qquad (+) \qquad (+) \qquad (+)$$

Where, **β0**, is the intercepts, while **β1, β2, β3, β4,** and **β5** are Coefficients of the independent variables (the slopes), and ε_t is the error term in time t.

3.4Description of Variables:

In the above model while Total Bank Credit (TBC), Bank Credit for Agriculture sector, Bank Credit for Industry sector, Bank Credit for Service sector, Bank Credit for Export sector represented by **TBC**, **CFA, CFI, CFS,** and **CFX,** respectively, are independent variables with predicted positive signs**,** Gross Domestic Product represented by GDP proxy by logarithm of real GDP (lgdpcon) in the model is the only dependent variable of the model**.**

Gross Domestic Product: GDP represents Rate of growth of aggregate goods and service production in the country. It is defined as a positive change in the national income or the level of production of goods and services by a country over a certain period of time. This is often measured in terms of the level of production within the economy. Logarithm of real GDP (LGDPCON*)* used as proxy of this dependent variable of the model.

Loans and advances: De Gregorio and Guidotti (1995) state that loan and advances as percent of GDP has an advantage over monetary aggregates measures, because it represents more accurately the actual volume of funds channeled into the private sector and thus, is more directly linked to investment and economic growth. A higher ratio is an indication of greater financial intermediation development. This ratio indicates the importance of the role played by the financial sector, especially the deposit money banks, in the financing of the economy (Levine, 2003); it also measures the activity of financial intermediaries in one of their primary function of channeling savings to investors. These indicators are commonly referred to and used in the literature (e.g. Aziakpono, 2003; King and Levine, 1993; Hakeem, 2009); this informed the choice of these measures in this study. Therefore,

Total Bank Credit: Represents aggregate loans and advances offered to various sectors by Commercial banks. Logarithm of total outstanding credit for the economy (LOUTSTOTAL) used as proxy of the variable.

Bank Credit for Agriculture sector: Represents aggregate loans and advances offered for broad categories of Agriculture sector by Commercial banks. Logarithm of outstanding credit for the agriculture sector (LOUTSAGRI) used as proxy of the variable.

Bank Credit for Industry sector: Represents aggregate loans and advances offered for broad categories of Industrial sector by Commercial banks. Logarithm of outstanding credit for the industry sector (LOUTSINDU) used as proxy of the variable.

Bank Credit for Service sector: Represents aggregate loans and advances offered for broad categories of Service sector by Commercial banks. Logarithm of outstanding credit for the service sector (LOUTSSERV) used as proxy of the variable.

Bank Credit for Exports: Export is one of the factors, considered even in the traditional Keynesian theory that can facilitate economic growth. Empirical studies have confirmed that export positively affects economic growth (Marin 1992; Vohra 2001). In the proposed study Bank Credit for Exports, therefore, represents Aggregate loans and advances offered for broad range of Export sector by Commercial banks. Logarithm of outstanding credit for export (LOUTSEXP) used as proxy of the variable.

3.5. Estimation Techniques

Some of the methods available to evaluate the time series characteristics of variable are Dickey Fuller (DF) and Augmented Dickey Fuller (ADF) tests. These tests are basically required to ascertained the number of times a variable has to be differenced (order to integration) to arrive at stationary. A series is said to be integrated of order **k** if become stationary after differencing it K times. In this study, ADF test is used to identify the existence of the unit root and the order of integration of a variable for reasons that if a sample AR(1) DF model is used , when in fact X_t follow an AR(p) process, the error term will be auto correlated to compensate for the misspecification of the dynamic structure of Xe auto correlated errors will invalidate the use of the DF distributions, which are based on the assumptions that Ut is white noise(Gujarati).

Here we have to realize that if there is a possibility to regress non-stationary variable against other non-stationary variables in levels, if they are co-integrated. This will help us to utilize the long run information embodied in the integrated variables.

The co-integration test will be carried out using Engle-Granger two step procedures. The procedure is done as follows. First, run OLS (Ordinary least square) regression in the level and then, save the residual and test whether it has unit root based on ADF test. 'If the error term is stationary, we say that the variables are co-integrated.

Once it is asserted that the variables are co-integrated, the error term of this relationship will be used to construct a dynamic error correction model, which captures the long run as well as short run dynamics of the models. This enables us to analyze the impulse response of GDP Growth to stimulus in the explanatory variables in the dynamic setting (Gujarati). Augmented Dickey Fuller (ADF) test will be employed to assess the time series properties of the variables considered in this study.

3.6 Vector Auto Regressive and Vector Error Correction Models

In structural equation approach, the equation of model is basically using economic theory to model the behavioral relationship among the variables of interest. Unfortunately, economic theory is not often rich enough to provide a dynamic specification that identifies all of these relationships. Estimation and inference are complicated by the fact that endogenous variables may appear on both the left and right sides of the equations in the model. However the VAR (Vector Auto Regressive) approach sidesteps the need for structural modeling by treating every variable as endogenous in the system as a function of the lagged values of all endogenous variables in the system.

A VAR describes the dynamic evolution of a number of variables from their common history. The use of co integrated VAR model helps account for spurious correlation and exogenity bias as it is designed for non-stationary times-series and requires no endo-exogeneous division of variables. It allows feedback and dynamic interrelationship across all the variables in the system and appears to be highly competitive with the large-scale macroeconometric models in forecasting and policy analysis (Rahman, 2004). The General VAR system of equations can be specified as:

$$\Delta yt = \quad \alpha o + A1\Delta yt - 1 + A2\,\Delta yt - 2 + ... + Akyt - k + \varepsilon t \quad \ldots\ldots\ldots (3.1)$$

where Yt is an nx1 vector that contains n variables in the system. αo is an nx1 vector of constants and A1 upto An are nxn vector of white noise process, with mean zero and covariance Σ.

Since there are only lagged values of the endogenous variables appearing on the right-hand side of the equations, simultaneity is not an issue and OLS (Ordinary Least Squares) yields consistent estimates. The forecasts obtained by the VAR method are better than those obtained from the more complex simultaneous-equation models.

Classifying variables as endogenous and exogenous as well as imposing some arbitrary restrictions on the parameters to insure identification are not required when we use VAR models, like a reduced form, a VAR is always identified (Gujarati, 2004). He further emphasized that VARs provide a more systematic approach to imposing restrictions and could lead one to capture empirical regularities which remain hidden to standard procedures. Before estimating the VAR,

$$\Delta yt = \alpha\, o + \Pi yt - 1 + \Gamma 1 \Delta yt - 1 + \Gamma\, 2\, \Delta yt - 2 + ... + \Gamma k - 1 \Delta yt - k + 1 + \varepsilon\, t \text{ -------} (3.2)$$

we have to decide the maximum lag lengths, K to generate the white noise of error terms. This can be done based on the Akaike information criteria (AIC) or Schwarz (SIC).

Since time-series variables have been widely noted to be non-stationary, the results that are obtained from the level VAR are spurious3 and misleading (Mukhopadhyay and Pradhan, 2010). Moreover, utilizing properly differenced variables in the VAR may lead to model mis-specification if the level variables share the long run relationship or are cointegrated. In this case the VAR should be written in a VECM (Vector Error Correction Model) form as indicated below. Note that When two variables are trending over time, a regression of one on the other could have a high R^2 even if the two are totally unrelated.

The formation of the VECM treats all variables as potentially endogenous. Each variable, expressed in its first difference, is specified to respond to changes in other variables as well as to the deviation of the variables under consideration from the long run equilibrium path (Mukhopadhyay & Pradhan, 2010).

In order to capture both the short and long-run relationships in the model the study uses Vector Error Correction Model (VECM) which can be specified as

Where $\Gamma = -(Aj+1 + \ldots + Ak)$, $j = 1,.....k-1$ and $\pi = -I+A1+A2+A3+\ldots+Ak$

The VEC specification restricts the long-run behavior of the endogenous variables to converge to their cointegrating relationships while allowing a wide range of short-run dynamics. The cointegration term is known as the error correction term since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments.

Estimation of non-stationary data will cause spurious regression problems in that the least square estimators of the intercept and slope coefficients are not consistent (Wooldridge, 2000). In order to have non-spurious estimation outcome, we need to apply both unit root test and cointegration analysis as they are the basic components of time series characteristics.

3.7 Econometric Procedure

3.7.1 Unit Root Test

There are two models which have been frequently used to characterize non-stationarity:

1. The Random Walk model with drift

$$Yt = \mu + Yt - 1 + \mu\, t \quad \text{---------- (3.3)}$$

2. The Deterministic trend process

$$yt = \alpha + \beta\, t + \mu t \quad \text{---------- (3.4)}$$

The first case is known as stochastic non-stationarity. If $\Delta\, yt = yt - yt - 1$ and $Lyt = yt - 1$

So $(1 - L)\, yt = yt - Lyt = yt - yt - 1$

If we subtract $yt - 1$from equation (1) we get $\Delta\, yt = \mu + \mu\, t.$

This process is known as differencing. A stochastic process is said to be integrated of order d, I(d), if it can be transformed to a stationary process by differencing (d) times. The second case is known as deterministic non-stationarity and what is required is detrending (Harris, 1995). In order to test for the existence of a unit root in time series, we use the popular tests: Dickey-Fuller (ADF) test. Dickey and Fuller (1976) tested the null hypothesis that

$\varphi = 1$ in $yt = \varphi\, yt - 1 + \mu\, t$ against the one sided alternative $\phi < 1$ so Ho:- series contains a unit root and H1:- series is stationary.

$\Delta\, yt = \psi\, yt - 1 + \mu\, t$ so that $\varphi = 1$ a test of is equivalent to a test of $\psi = 0$ since $\varphi - 1 = \psi$

$$\Delta yt = \psi\, yt - 1 + \sum_{i=1}^{p} \alpha\, i \Delta yt - i + \mu\, t \quad \text{---------- (3.5)}$$

Where Yt is variable of interest, t is time trend and p is lag length.

The ADF test can be biased towards accepting the null hypothesis of unit root in the series if the series exhibits significant structural breaks (Harris, 1995). Therefore, the data should be first tested for the existence of structural breaks. Differencing may lead to a considerable loss of long run properties of the data. So it is appropriate to develop a statistical tool which is suited for capturing long-run relations between non-stationary variables in a right manner. Engle and Granger (1987) developed the theory of cointegration relation so as to provide a solution for this problem.

3.7.2 Co-integration Analysis

The idea of cointegration is to take care of the non-stationarity of the variables and confirm whether there exists a long-run equilibrium relationship. The m x 1 series Yt is cointegrated if Yt is I(1) yet there exists , m x r, of rank r, such that $Z_r = \beta' Y_r$. The r vectors in β are called the cointegration vectors.

Even if individual series are non-stationary, i.e, are I(1) series, if there exists a linear combination of these I(1) series in the regression equation and is non-stationary, then the regression is not a spurious regression. The economic interpretation of co integration is that if two or more series are linked to form an equilibrium relationship in the long run, then tough the series becomes non stationary they will move closely together overtime and the difference among them becomes stationary (Harris, 1995).

There are two ways of testing the existence of cointegration, the Engel-Granger or EG approach and the Johansen approach.

A. The Engel-Granger Approach

Engel and Granger (1987) proposed a testing procedure for the null hypothesis that there is no co-integration relation and, therefore, the residual process is non-stationary against the alternative of co-integration, the process is stationary. It requires running a regression and testing for unit root in the residual. This can be done using the ADF test on the OLS residuals, applying appropriate critical values. If the unit root hypothesis is rejected, the hypothesis of no cointegration is also rejected. In this case the static regression gives consistent estimates of the cointegration vector. In the second stage, we could combine the error term with the first

difference of the variable to estimate the final model which is called the error correction model (ECM).

This shows the deviation from equilibrum position and how an adjustment towards the equilibrum is made by combining both the long-run and short-run versions of the model in one regression.

According to Alemayehu *et al*., (2011), the basic problems with this approach are:

1. The residual based test tends to lack power because it does not exploit all the available information about the dynamic relationship of the variables
2. There is no unique vector when we have more than two variables in an equation
3. It is possible to have more than one cointegration relationship between the variables

For these reason the study applies the alternative approach; the Johansen Approach proposed by Johansen (1988).

B. The Johansen Approach

This approach allows us to estimate and test for the presence of multiple cointegration relationships. In this method there is no a priory separation of variables into endogenous and exogenous variables. The VAR model is formulatd to determine cointegrating vector in Johansen procedure, following Davidson and Mckinnon (1999).

$$Yt = \lambda 1\ yt - 1 + \lambda\ 2\ yt - 2 + ... + \lambda\ pyt - p + \psi\ Zt + \varepsilon\ t \text{ ---------- } (3.6)$$

Where is a vector of (nX1) non stationary I(1) variables, Zt a vector of (mX1) , λi (i=1,.....,p) and εt is a vector of white noise error term. t y

The relationship among the cointegrated variables is tested using the VECM which avoids arbitrary selection of dependent and independent variables.

The VECM describes how variables are adjusted towards the long-run equilibrium state. The coefficients of the error-correction terms, indicate the proportion by which the long-run disequilibrium in the dependent variables is corrected in the short-term period.

Johansen represented Ho: ʊ =ə β’ and ə and β are (mxr) matrices where the rows of β’ are the r cointegrating vectors while the matrix represents the coefficient of speed of adjustment. This approach enables us to determine the number of cointegrating vectors and estimate the

cointegrating vectors. According to Enders (1995), the number of cointegrating vector can be identified based on:

$$\lambda\, trace\,(ro) = -T \sum_{i=ro+1}^{\omega} \hat{}\ln(1-\lambda i) \quad \text{----------(3.7)}$$

Where λ is the characterisitcs root and T is the number of observations.

Ho: $r \leq ro$ and Ha: $ro < r \leq m$

The null hypothesis under this test is that the number of distinct cointegration vector is less than or equal to ro against the general alternative.

$\lambda \max(\gamma o) = -T \ln(1 - \lambda\ \gamma o + 1)$ ----------(3.8)

Ho: r ≤ ro r = r ≤ ro + 1

Lack of cointegration between variables suggests that there exist no long-run relationship between them.

3.7.3 Granger Causality Test

VAR models themselves do not allow us to make statement about causal relationships so the study uses Granger Causality Test. The concept of granger causality relates to whether one variable can help improve the forecast of another. A variable Y is said to be caused by a variable X if Y can be predicted better from past values of both Y and X than from past values of Y alone. Granger causality tests are tests of forecast capacity, i.e, to what extent does one series contain information about the other series? It is more of an indicator of precedence than a real causal identification.

CHAPTER FOUR

EMPRICAL RESULTS and DISCUSSION

This chapter analyses the relationship between Bank credit to Agricultural, Industry, Service, Export and cumulative of all other sectors and economic growth using annual data from 1980-2015 in Ethiopia. Before we go to the direct estimation of the model, we need to first employ the unit root test to check whether the time-series is stationary or not. After identifying the optimal lag length, the presence of the co-integrating vectors is tested using the Johansen procedure. Further the granger causality test is employed to find the direction of causality between Bank credit to Agricultural, Industry, Service, Export and cumulative of all other sectors and economic growth. The long-run and short-run relationship is also identified followed by the volatility test.

4.1 Unit Root Test Result

This test can be done using the Augmented Dickey-Fuller (ADF) unit root tests. The ADF test is an extension of the Dickey-Fuller test because the regression has been augmented with the lagged changes. When the ADF test statistics is larger than the critical value in absolute terms, the null hypothesis of unit root is rejected, and if the ADF test statistics is less than the critical value in absolute terms, we fail to reject the null hypothesis. Table (1) shows the results of ADF test for unit root at level, first and the second differences where all variables are presented in logarithmic forms.

Table 1: Represent Unit Root tests

Variables	**Augmented Dickey Fuller(ADF) Test**		
	Level	**1st Difference**	**2nd Difference**
LGDPCON	3.190800**	-1.737179**	-9.641758*
LOUTSTOTAL	2.300408*	-5.332686*	-3.473588*
LOUTSAGRI	-0.317091	-4.819970*	-6.906214*
LOUTSINDU	3.876932*	-3.097003*	-4.011710*
LOUTSSERV	-0.106157	-3.732303*	-7.142523*
LOUTSEXP	0.564721	-5.898548*	-11.14425*

- *, ** refer to the rejection of the null hypothesis 5% and 10% at the level of significances.

Source: Own Computation using EVIEWS 8 software

Where LGDPCON is Gross Domestic Product at constant price, LOUTSTOTAL is Total Bank Credit, LOUTSAGRI is Bank Credit for Agriculture sector, LOUTSINDU is Bank Credit for Industry sector, LOUTSSERV is Bank Credit for Service sector, and LOUTSEXP is Bank Credit for Export sector where all variables are in logarithmic forms.

The results of the tests indicate for Bank Credit for Agriculture sector (LOUTSAGRI), Bank Credit for Service sector (LOUTSSERV), and Bank Credit for Export sector (LOUTSEXP) of the series in levels cannot be rejected for the null hypothesis at 10% and 5% level of significance, but for the first and second differences we reject the null hypothesis at 5% level of significance. Therefore we can conclude that all time-series for the variables under study are integrated of order one I(1).

4.2 Johansen Co-integration Results

In order to evaluate the CVAR model the next step is to test for the existence of long-run relationship among the variables. Lack of co-integartion between variables suggests the existsance of no long-run relationship between them. Hence, the Johansen co-integartion method is applied. However, before applying this test, it is necessary to determine the appropriate lag length and check the stability of the VAR. The lag length is selected according to Final Prediction Error (FPE), Akaike Information Criterion (AIC), Hannan-Quinn Information Criterion (HQIC) and Schwarz Information Criterion (SIC). The more lags we include, the more initial values we lose.

Table 2; VAR Lag order selection Criteria

VAR Lag Order Selection Criteria
Endogenous variables: LGDPCON LOUTSAGRI LOUTSEXP LOUTSINDU LOUTSSERV LOUTSTOTAL
Exogenous variables: C
Date: 03/27/17 Time: 15:49
Sample: 1 37
Included observations: 33

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-22.38051	NA	2.25e-07	1.720031	1.992123	1.811582
1	144.2260	262.5314	8.54e-11	-6.195513	-4.290867*	-5.554657
2	203.2085	71.49403*	2.67e-11*	-7.588396*	-4.051196	-6.398236*

* 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

Source: Own Computation using EVIEWS 8 software

FPE, AIC and HQ all chose two lag length to be the optimum lag length. The smaller the value of the information criteria, the better the model is. The lag exclusion test confirms the second lag to be the appropriate lag. Hence this study employs the optimal lag length of two for estimation techniques.

The result of testing the number of co-integrating vectors is shown in table (5.4). If the test statistics is greater than the critical values, the null hypothesis that there exists r cointegrating vectors against the alternative hypothesis that there are r+1 (for λtrace) or more than r (for λmax) is rejected. It can be concluded that there is a long-run relationship among the variables.

In our model dependent variable is LGDPCON while, LOUTSTOTAL, LOUTSAGRI, LOUTSINDU, LOUTSSERV, and LOUTSEXP are independent variables. And we have three hypotheses according to the Johansen test. "The first null hypothesis declares that there are no co-integration vectors through study variables, the second alternative hypothesis declares that the number of co-integration vectors is less than or equal to one and the third one hypothesis is that: co-integration vectors are at most two". Batarseh, A. & Ananzeh, I (2015).

Table 3: Johansen Co integration tests

Date: 03/25/17 Time: 19:17
Sample (adjusted): 4 36
Included observations: 33 after adjustments
Trend assumption: Linear deterministic trend
Series: LGDPCON LOUTSAGRI LOUTSEXP LOUTSINDU LOUTSSERV LOUTSTOTAL
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.749405	163.6814	95.75366	0.0000
At most 1 *	0.691512	118.0122	69.81889	0.0000
At most 2 *	0.614320	79.20181	47.85613	0.0000
At most 3 *	0.593078	47.76111	29.79707	0.0002
At most 4 *	0.302309	18.08974	15.49471	0.0199
At most 5 *	0.171547	6.210456	3.841466	0.0127

Trace test indicates 6 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.749405	45.66929	40.07757	0.0106
At most 1 *	0.691512	38.81035	33.87687	0.0119
At most 2 *	0.614320	31.44069	27.58434	0.0152
At most 3 *	0.593078	29.67137	21.13162	0.0025
At most 4	0.302309	11.87928	14.26460	0.1153
At most 5 *	0.171547	6.210456	3.841466	0.0127

Max-eigenvalue test indicates 4 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Own Computation using EVIEWS 8 software

It can be seen from the table 3 that the unrestricted cointegration rank test (Trace) shows five cointegrating vectors at the 5% critical value in the system while the unrestricted cointegration rank test (Maximum Eigenvalue) shows four co-integrating vectors in the system, even though occasionally, the trace and the maximum Eigen value test statistics yield conflicting results. In such a case the trace statistics is more robust than the maximum Eigen value statistics in testing for co-integration (Luintel & Khan, 1999). Thus based on trace and maximum Eigenvalue

statistics results we can conclude that there *exists meaningful long run relationship between the variables under consideration*.

4.3 Error Correction Model (ECM) Results

The Error correction Model (ECM) helping us recognize the long run and short run Granger causality, long run relationship through the study variables is represented by the Error Correction Model.

Table 4 reports the results of level equation and ECM. In our paper we run the test for different lag level until 2 lags, and we can see the short term co-efficient in this table. Short term co-efficient of LOUTSINDU and LOUTSEXP at α levels are not statistically significant, but short term co-efficient for one year lag of LOUTSAGRI and two year lag of LOUTSSERV with negative signs are significant at 10% levels. Furthermore, one year lag of LOUTSTOTAL at 5% level is statistically significant which means that if LOUTSTOTAL increases by 1%, LGDPCON of Ethiopian economy increases by 35.23% in the short term in the short term.

Table 4: Vector Error Correction Model estimates

Vector Error Correction Estimates
Date: 03/24/17 Time: 23:13
Sample (adjusted): 5 36
Included observations: 32 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LGDPCON(-1)	1.000000
LOUTSAGRI(-1)	-1.209518 (0.20142) [-6.00501]
LOUTSEXP(-1)	0.897286 (0.26730) [3.35680]
LOUTSINDU(-1)	1.905213 (0.33330) [5.71624]
LOUTSSERV(-1)	-2.021862 (0.31319) [-6.45572]
LOUTSTOTAL(-1)	-0.401975 (0.58195) [-0.69074]
C	-5.813867

Error Correction:	D(LGDPCON)	D(LOUTSAG...	D(LOUTSEXP)	D(LOUTSIN...	D(LOUTSSE...	D(LOUTSTO...
CointEq1	0.039910 (0.03597) [1.10939]	0.313299 (0.26455) [1.18426]	0.011028 (0.12964) [0.08506]	9.01E-05 (0.06192) [0.00146]	0.520676 (0.08766) [5.93982]	0.196779 (0.11147) [1.76530]
D(LGDPCON(-1))	0.097660 (0.23357) [0.41811]	0.187760 (1.71767) [0.10931]	-0.157254 (0.84171) [-0.18683]	-0.048123 (0.40201) [-0.11971]	1.306296 (0.56914) [2.29520]	-0.446531 (0.72375) [-0.61697]

D(LGDPCON(-2))	0.309141	4.436172	0.965418	1.290725	0.937664	2.066271
	(0.26414)	(1.94243)	(0.95185)	(0.45461)	(0.64361)	(0.81845)
	[1.17038]	[2.28383]	[1.01425]	[2.83920]	[1.45687]	[2.52462]
D(LOUTSAGRI(-1))	-0.069312	0.251904	-0.134794	-0.101037	0.068628	-0.003274
	(0.04202)	(0.30900)	(0.15142)	(0.07232)	(0.10239)	(0.13020)
	[-1.64951]	[0.81521]	[-0.89019]	[-1.39709]	[0.67028]	[-0.02515]
D(LOUTSAGRI(-2))	-0.007516	-0.546778	0.108239	-0.195505	0.348825	0.002171
	(0.03732)	(0.27443)	(0.13448)	(0.06423)	(0.09093)	(0.11563)
	[-0.20140]	[-1.99239]	[0.80486]	[-3.04389]	[3.83610]	[0.01878]
D(LOUTSEXP(-1))	0.018060	0.180867	-0.058104	0.115473	-0.031623	-0.124985
	(0.05062)	(0.37227)	(0.18243)	(0.08713)	(0.12335)	(0.15686)
	[0.35675]	[0.48584]	[-0.31851]	[1.32534]	[-0.25637]	[-0.79680]
D(LOUTSEXP(-2))	0.043990	-0.088515	0.052373	0.145207	0.252262	0.263706
	(0.05227)	(0.38438)	(0.18836)	(0.08996)	(0.12736)	(0.16196)
	[0.84160]	[-0.23028]	[0.27805]	[1.61412]	[1.98066]	[1.62822]
D(LOUTSINDU(-1))	0.008965	-0.801685	0.559488	0.371604	-1.077263	-0.174593
	(0.12987)	(0.95501)	(0.46798)	(0.22351)	(0.31644)	(0.40240)
	[0.06903]	[-0.83945]	[1.19553]	[1.66257]	[-3.40435]	[-0.43388]
D(LOUTSINDU(-2))	-0.166149	-0.386934	0.140440	-0.027793	-1.008876	-0.408208
	(0.14463)	(1.06359)	(0.52119)	(0.24892)	(0.35242)	(0.44815)
	[-1.14878]	[-0.36380]	[0.26946]	[-0.11165]	[-2.86274]	[-0.91088]
D(LOUTSSERV(-1))	-0.083409	-1.007843	0.399887	-0.079333	0.302975	0.030792
	(0.05846)	(0.42988)	(0.21065)	(0.10061)	(0.14244)	(0.18113)
	[-1.42687]	[-2.34450]	[1.89832]	[-0.78853]	[2.12708]	[0.17000]
D(LOUTSSERV(-2))	-0.133266	-0.239865	-0.255521	-0.322244	-0.080014	-0.161922
	(0.06590)	(0.48464)	(0.23749)	(0.11343)	(0.16058)	(0.20421)
	[-2.02215]	[-0.49493]	[-1.07593]	[-2.84101]	[-0.49827]	[-0.79294]
D(LOUTSTOTAL(-1))	0.352307	0.468480	0.125875	0.289760	1.024810	0.468277
	(0.08979)	(0.66028)	(0.32356)	(0.15453)	(0.21878)	(0.27821)
	[3.92381]	[0.70952]	[0.38903]	[1.87507]	[4.68419]	[1.68317]

D(LOUTSSERV(-2))	-0.133266	-0.239865	-0.255521	-0.322244	-0.080014	-0.161922
	(0.06590)	(0.48464)	(0.23749)	(0.11343)	(0.16058)	(0.20421)
	[-2.02215]	[-0.49493]	[-1.07593]	[-2.84101]	[-0.49827]	[-0.79294]
D(LOUTSTOTAL(-1))	0.352307	0.468480	0.125875	0.289760	1.024810	0.468277
	(0.08979)	(0.66028)	(0.32356)	(0.15453)	(0.21878)	(0.27821)
	[3.92381]	[0.70952]	[0.38903]	[1.87507]	[4.68419]	[1.68317]
D(LOUTSTOTAL(-2))	0.145439	1.119659	-0.732393	0.100302	-0.007903	0.142522
	(0.09096)	(0.66893)	(0.32780)	(0.15656)	(0.22165)	(0.28186)
	[1.59887]	[1.67381]	[-2.23429]	[0.64068]	[-0.03566]	[0.50566]
C	0.024142	0.035742	0.051971	0.040499	0.112614	0.061478
	(0.01812)	(0.13324)	(0.06529)	(0.03118)	(0.04415)	(0.05614)
	[1.33248]	[0.26826]	[0.79601]	[1.29877]	[2.55089]	[1.09511]

R-squared	0.592636	0.499461	0.529572	0.708448	0.841852	0.504595
Adj. R-squared	0.298429	0.137960	0.189818	0.497882	0.727634	0.146802
Sum sq. resids	0.049397	2.671316	0.641466	0.146322	0.293283	0.474262
S.E. equation	0.052386	0.385236	0.188778	0.090161	0.127646	0.162320
F-statistic	2.014350	1.381631	1.558693	3.364502	7.370563	1.410299
Log likelihood	58.17173	-5.675398	17.14973	40.79683	29.67161	21.98167
Akaike AIC	-2.760733	1.229712	-0.196858	-1.674802	-0.979476	-0.498854
Schwarz SC	-2.119474	1.870972	0.444402	-1.033542	-0.338216	0.142405
Mean dependent	0.055703	0.098614	0.144579	0.163076	0.146088	0.134158
S.D. dependent	0.062543	0.414918	0.209729	0.127238	0.244585	0.175731

Determinant resid covariance (dof adj.)	5.10E-12
Determinant resid covariance	1.62E-13
Log likelihood	198.8144
Akaike information criterion	-6.800902
Schwarz criterion	-2.678520

Dependent Variable: D(LGDPCON)
Method: Least Squares
Date: 03/24/17 Time: 23:23
Sample (adjusted): 5 37
Included observations: 33 after adjustments
D(LGDPCON) = C(1)*(LGDPCON(-1) - 1.20951786182*LOUTSAGRI(-1) + 0.897285577971*LOUTSEXP(-1) + 1.90521315154*LOUTSINDU(-1) - 2.02186150769*LOUTSSERV(-1) - 0.401974652656*LOUTSTOTAL(-1) - 5.81386679795) + C(2)*D(LGDPCON(-1)) + C(3)*D(LGDPCON(-2)) + C(4)*D(LOUTSAGRI(-1)) + C(5)*D(LOUTSAGRI(-2)) + C(6) *D(LOUTSEXP(-1)) + C(7)*D(LOUTSEXP(-2)) + C(8)*D(LOUTSINDU(-1)) + C(9)*D(LOUTSINDU(-2)) + C(10)*D(LOUTSSERV(-1)) + C(11) *D(LOUTSSERV(-2)) + C(12)*D(LOUTSTOTAL(-1)) + C(13) *D(LOUTSTOTAL(-2)) + C(14)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.034535	0.034354	1.005283	0.3274
C(2)	0.100973	0.229716	0.439556	0.6652
C(3)	0.272546	0.253315	1.075920	0.2954
C(4)	-0.072647	0.040998	-1.771944	0.0924
C(5)	-0.007179	0.036707	-0.195562	0.8470
C(6)	0.019434	0.049752	0.390622	0.7004
C(7)	0.043490	0.051413	0.845895	0.4081
C(8)	0.024410	0.125396	0.194664	0.8477
C(9)	-0.163121	0.142198	-1.147141	0.2656
C(10)	-0.086699	0.057269	-1.513886	0.1465
C(11)	-0.128200	0.064334	-1.992714	0.0609
C(12)	0.343565	0.087238	3.938249	0.0009
C(13)	0.137050	0.088495	1.548676	0.1380
C(14)	0.024131	0.017823	1.353893	0.1917

R-squared	0.584860	Mean dependent var	0.056224
Adjusted R-squared	0.300817	S.D. dependent var	0.061630
S.E. of regression	0.051534	Akaike info criterion	-2.796751
Sum squared resid	0.050458	Schwarz criterion	-2.161869
Log likelihood	60.14639	Hannan-Quinn criter.	-2.583132
F-statistic	2.059056	Durbin-Watson stat	1.773909
Prob(F-statistic)	0.074171		

Source: Own Computation using EVIEWS 8 software

Table 4 reports that ECT is 3.991 %, positively and statistically significant at 5% level, figure 0.03991 display that the short run values of LGDPCON converging to its long run Equilibrium steady state path level by 3.991 % adjustment speed every year through the LOUTSINDU and LOUTSEXP contributions.

4.4 The results of Granger Causality Tests

After the process of analyzing the co-integration and ECM, and our results supports that co - integration vectors found between the variables, so this time we must run the Causality Test. In this section, we employ the Pair-wise granger causality between GDP and Total bank Credit to all sectors of the economy. The estimated F-statistics of the causality test is reported in table (5). As can be seen from the table below, we fail to accept the null hypothesis that Total bank Credit to all sectors in the economy does not cause LGDPCON, and LGDPCON does not granger cause Total bank Credit to all sectors, respectively, at 5% and 10% levels of significance. However, we fail to reject the null hypothesis that LGDPCON does not granger cause Total bank Credit to all sectors of the economy at 5% levels of significance. Therefore it is shown that granger causality runs one way from Total bank Credit to all sectors (LGDPCON) to LGDPCON and not the other way at 5% significance: Hence, causality is uni-directional from Total bank Credit to all sectors of the economy to Real GDP.

Also in Table 4, the bidirectional causality observed among variables of Total bank credit to all sectors (LGDPCON) to Real GDP (LGDPCON), and Real GDP (LGDPCON) to total bank credit to all sectors (LGDPCON) at 5%, and 10% levels of significances, respectively.

Table 4 reports the outcomes of the test, the outcomes presents that there is a Uni-directional causality running from LGDPCON to LOUTSAGRI, from LOUTSSERV to LOUTSAGRI, and from LOUTSINDU to LOUTSEXP for the rests of variables included in the model.

Table 5: Pairwise Granger Causality Tests

Pairwise Granger Causality Tests
Date: 03/25/17 Time: 22:25
Sample: 1 37
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LOUTSAGRI does not Granger Cause LGDPCON	33	0.21597	0.8071
LGDPCON does not Granger Cause LOUTSAGRI		4.37337	0.0222
LOUTSEXP does not Granger Cause LGDPCON	33	0.72187	0.4947
LGDPCON does not Granger Cause LOUTSEXP		3.23211	0.0546
LOUTSINDU does not Granger Cause LGDPCON	33	0.64687	0.5313
LGDPCON does not Granger Cause LOUTSINDU		1.99165	0.1553
LOUTSSERV does not Granger Cause LGDPCON	33	0.16147	0.8517
LGDPCON does not Granger Cause LOUTSSERV		0.93506	0.4045
LOUTSTOTAL does not Granger Cause LGDPCON	33	5.11658	0.0128
LGDPCON does not Granger Cause LOUTSTOTAL		2.83688	0.0755
LOUTSEXP does not Granger Cause LOUTSAGRI	33	1.78161	0.1869
LOUTSAGRI does not Granger Cause LOUTSEXP		0.81849	0.4514
LOUTSINDU does not Granger Cause LOUTSAGRI	33	2.20141	0.1294
LOUTSAGRI does not Granger Cause LOUTSINDU		0.07850	0.9247
LOUTSSERV does not Granger Cause LOUTSAGRI	33	3.58835	0.0410
LOUTSAGRI does not Granger Cause LOUTSSERV		0.99751	0.3815
LOUTSTOTAL does not Granger Cause LOUTSAGRI	33	2.71434	0.0837
LOUTSAGRI does not Granger Cause LOUTSTOTAL		0.77349	0.4710
LOUTSINDU does not Granger Cause LOUTSEXP	33	4.34418	0.0227
LOUTSEXP does not Granger Cause LOUTSINDU		0.51317	0.6041
LOUTSSERV does not Granger Cause LOUTSEXP	33	0.88966	0.4221
LOUTSEXP does not Granger Cause LOUTSSERV		3.12431	0.0596

LOUTSTOTAL does not Granger Cause LOUTSEXP	33	1.28449	0.2926
LOUTSEXP does not Granger Cause LOUTSTOTAL		6.11060	0.0063
LOUTSSERV does not Granger Cause LOUTSINDU	33	1.00035	0.3805
LOUTSINDU does not Granger Cause LOUTSSERV		3.79922	0.0347
LOUTSTOTAL does not Granger Cause LOUTSINDU	33	0.23185	0.7946
LOUTSINDU does not Granger Cause LOUTSTOTAL		4.74369	0.0168
LOUTSTOTAL does not Granger Cause LOUTSSERV	33	2.13961	0.1365
LOUTSSERV does not Granger Cause LOUTSTOTAL		1.65823	0.2086

Source: Own Computation using EVIEWS 8 software

Our finding is in consistent with the findings of Haile Kibret and Kassahun (2011) who had employed data of Ethiopia from 1972-2010 to find the link between financial development and economic growth. They indicated the bi-directional causality between financial development and economic growth in Ethiopia using liquid liability as an indicator of financial development. Our findings are believed to be in alignments with these studies despite methodological difference and the financial development indicators utilized. Other empirical studies that are consistent with the bi-directional causality response are the study by Greenwood and Jovanovic62 (1990); Wood63 (1993); Greenwood and Smith64 (1997); Al-Yousif65 (2002); and Demetriades and Hussein66 (1996)

4.5 Diagnostic Tests

Diagnostics test are usually undertaken to detect model misspecification and as a guide for model improvement. These tests include serial correlation, heteroscedasticity and normality tests.

4.5.1 Serial correlation test

The serial correlation test can be done using the Durbin-watson test (DW) or the lagrange multiplier (LM) test. It helps to identify the relationship that may exist between the current value of the regression residuals and lagged values. The study used the LM test to investigate serial correlation. The null-hypothesis of the LM test that the residuals are not serially correlated is accepted at 5% level of significance (see table 6 below).

Table 6: VEC Residual Serial correlation LM table

VEC Residual Serial Correlation LM T...
Null Hypothesis: no serial correlation ...
Date: 03/27/17 Time: 19:01
Sample: 1 37
Included observations: 32

Lags	LM-Stat	Prob
1	44.48856	0.1567
2	40.82781	0.2666
3	51.92551	0.0417
4	26.27868	0.8826
5	48.73152	0.0764
6	42.66575	0.2063
7	29.29586	0.7780
8	21.85180	0.9695
9	45.00657	0.1443
10	30.37591	0.7327
11	33.76341	0.5754
12	35.14795	0.5089

Probs from chi-square with 36 df.

Source: Own Computation using EVIEWS 8 software

4.5.2 Normality test

The Jarque-Bera normality test is used to see whether the regression errors are normally distributed. The null-hypothesis that the residuals are normal is failed to reject in this particular study, which mean that the model regression residual is normally distributed. (See Table 7 below).

Table 7: VEC Residual Normality Tests

VEC Residual Normality Tests
Orthogonalization: Cholesky (Lutkepohl)
Null Hypothesis: residuals are multivariate normal
Date: 03/27/17 Time: 19:15
Sample: 1 37
Included observations: 32

Component	Skewness	Chi-sq	df	Prob.
1	0.433795	1.003615	1	0.3164
2	-0.609818	1.983347	1	0.1590
3	-0.573779	1.755855	1	0.1851
4	0.592417	1.871777	1	0.1713
5	0.190728	0.194011	1	0.6596
6	-0.440231	1.033617	1	0.3093
Joint		7.842221	6	0.2499

Component	Kurtosis	Chi-sq	df	Prob.
1	2.878572	0.019660	1	0.8885
2	4.798297	4.311830	1	0.0378
3	3.730207	0.710936	1	0.3991
4	3.320672	0.137108	1	0.7112
5	3.390373	0.203188	1	0.6522
6	4.122210	1.679139	1	0.1950
Joint		7.061861	6	0.3152

Component	Jarque-Bera	df	Prob.
1	1.023274	2	0.5995
2	6.295177	2	0.0430
3	2.466790	2	0.2913
4	2.008885	2	0.3662
5	0.397199	2	0.8199
6	2.712756	2	0.2576
Joint	14.90408	12	0.2467

VEC Residual Normality Tests
Orthogonalization: Cholesky (Lutkepohl)
Null Hypothesis: residuals are multivariate normal
Date: 03/27/17 Time: 19:15
Sample: 1 37
Included observations: 32

Component	Skewness	Chi-sq	df	Prob.
1	0.433795	1.003615	1	0.3164
2	-0.609818	1.983347	1	0.1590
3	-0.573779	1.755855	1	0.1851
4	0.592417	1.871777	1	0.1713
5	0.190728	0.194011	1	0.6596
6	-0.440231	1.033617	1	0.3093
Joint		7.842221	6	0.2499

Component	Kurtosis	Chi-sq	df	Prob.
1	2.878572	0.019660	1	0.8885
2	4.798297	4.311830	1	0.0378
3	3.730207	0.710936	1	0.3991
4	3.320672	0.137108	1	0.7112
5	3.390373	0.203188	1	0.6522
6	4.122210	1.679139	1	0.1950
Joint		7.061861	6	0.3152

Component	Jarque-Bera	df	Prob.
1	1.023274	2	0.5995
2	6.295177	2	0.0430
3	2.466790	2	0.2913
4	2.008885	2	0.3662
5	0.397199	2	0.8199
6	2.712756	2	0.2576
Joint	14.90408	12	0.2467

Source: Own Computation using EVIEWS 8 software

4.5.3 Hetreroscedasticity Test

The hetreroscedasticity test helps to identify whether the variance of the errors in the model are constant or not. The null-hypothesis of the test is that the errors are homoscedastic and independent of the repressor' and that there is no problem of misspecification. The null-hypothesis that the residuals are homosecdasic is accepted at 5% significance level (see Table 8 below).

Table 8: VEC Residual Heteroskedasticity Tests

VEC Residual Heteroskedasticity Tests: No Cross Terms (only levels and squares)
Date: 03/27/17 Time: 19:25
Sample: 1 37
Included observations: 32

Joint test:

Chi-sq	df	Prob.
557.1011	546	0.3617

Individual components:

Dependent	R-squared	F(26,5)	Prob.	Chi-sq(26)	Prob.
res1*res1	0.749043	0.573989	0.8397	23.96937	0.5777
res2*res2	0.966596	5.564800	0.0322	30.93109	0.2308
res3*res3	0.867405	1.258029	0.4368	27.75695	0.3705
res4*res4	0.929780	2.546339	0.1507	29.75296	0.2780
res5*res5	0.869656	1.283079	0.4264	27.82899	0.3669
res6*res6	0.917845	2.148488	0.2017	29.37105	0.2945
res2*res1	0.873837	1.331969	0.4070	27.96278	0.3603
res3*res1	0.958234	4.412075	0.0524	30.66348	0.2410
res3*res2	0.811808	0.829562	0.6657	25.97786	0.4643
res4*res1	0.742838	0.555500	0.8521	23.77082	0.5891
res4*res2	0.840383	1.012500	0.5558	26.89226	0.4150
res4*res3	0.787235	0.711543	0.7449	25.19152	0.5082
res5*res1	0.770446	0.645438	0.7906	24.65428	0.5386
res5*res2	0.932349	2.650352	0.1404	29.83518	0.2745
res5*res3	0.915841	2.092750	0.2106	29.30692	0.2973
res5*res4	0.844632	1.045451	0.5379	27.02824	0.4079
res6*res1	0.883785	1.462447	0.3601	28.28111	0.3448
res6*res2	0.975632	7.699505	0.0158	31.22022	0.2202
res6*res3	0.958014	4.387997	0.0530	30.65645	0.2413
res6*res4	0.807555	0.806980	0.6805	25.84177	0.4718
res6*res5	0.902081	1.771636	0.2737	28.86659	0.3172

Source: Own Computation using EVIEWS 8 software

4.6 Estimation of long-run coefficients

From table 9 below the calculated value of the F-statistic (368.2373) significant at 1% level of significance. This implies that there exists long-run relationship among study variables.

Table 9: Estimated long-run model coefficient using ARDL approach

Dependent Variable: LGDPCON
Method: Least Squares
Date: 03/28/17 Time: 09:16
Sample (adjusted): 4 36
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.933100	0.290529	27.30568	0.0000
LOUTSAGRI	0.065828	0.034253	1.921796	0.0677
LOUTSAGRI(-2)	0.081655	0.034825	2.344758	0.0285
LOUTSEXP(-2)	-0.165840	0.054983	-3.016192	0.0064
LOUTSINDU	0.221388	0.080533	2.749048	0.0117
LOUTSINDU(-2)	-0.232514	0.108079	-2.151337	0.0427
LOUTSSERV	0.203720	0.067504	3.017888	0.0063
LOUTSSERV(-1)	-0.077708	0.084160	-0.923334	0.3659
LOUTSSERV(-2)	0.064466	0.067065	0.961261	0.3469
LOUTSTOTAL	0.136776	0.095613	1.430517	0.1666
LOUTSTOTAL(-2)	0.172794	0.085315	2.025374	0.0551

R-squared	0.994061	Mean dependent var	12.31798
Adjusted R-squared	0.991362	S.D. dependent var	0.575956
S.E. of regression	0.053531	Akaike info criterion	-2.755904
Sum squared resid	0.063043	Schwarz criterion	-2.257068
Log likelihood	56.47241	Hannan-Quinn criter.	-2.588061
F-statistic	368.2373	Durbin-Watson stat	1.776534
Prob(F-statistic)	0.000000		

Source: Own Computation using EVIEWS 8 software

The impact of each variable is discussed in turn below. Table 9 shows that the t-value of at *level and two year lagged Credit to Agriculture sector affects Real GDP positively and statistically significant at 10% and 5%, respectively, in the long-run*. Last two year allocation of *Credit to Agriculture sector* affects the performance of GDP positively in the long-run. If the two year lagged volume of *Credit to Agriculture sector* increase by 1 percent, it has a power to increase Real GDP by 0.082 percent in the long-run, cetris peribus. Similarly, a 1percent increase in the volume of *Credit to Agriculture sector* enhances the performance of real GDP positively by 0.065 percent in the long-run. So the result support the expected sign put forth at the stage of model specification.

On other hand, two period lagged value of Credit to Export, Credit to Industry sector at level, two period lagged Credit to Industry sector, Credit to Service sector at level, and, two period lagged of Total Credit to all sectors in the economy are statistically significant, therefore, increment in one percentage of these variables uplift real GDP by -0.166%, 0.22%, -0.23%,

0.204%, and 0.17%, respectively. In these cases the sign of two periods lagged values of Credit to Export and two periods lagged of Total Credit to all sectors is negative unlike the expected positive sign during model formulation.

4.7 Estimation of Short-run coefficients

From table 10 below the calculated value of the F-statistic (4.568178) significant at 5% level of significance. This implies that there exists long-run relationship among study variables.

Table 10: Estimated short-run model coefficient using ARDL approach

Dependent Variable: DLGDPCON
Method: Least Squares
Date: 03/28/17 Time: 09:51
Sample (adjusted): 5 36
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002534	0.013623	0.185994	0.8547
DLOUTSAGRI	0.032621	0.030389	1.073454	0.2981
DLOUTSAGRI(-1)	-0.053513	0.023822	-2.246387	0.0383
DLOUTSAGRI(-2)	0.013305	0.033144	0.401419	0.6931
DLOUTSEXP	0.031075	0.050374	0.616882	0.5455
DLOUTSEXP(-1)	0.023625	0.038551	0.612840	0.5481
DLOUTSINDU	0.135936	0.086269	1.575718	0.1335
DLOUTSINDU(-2)	-0.160817	0.081284	-1.978460	0.0643
DLOUTSSERV	0.090614	0.043058	2.104477	0.0505
DLOUTSSERV(-1)	-0.097343	0.053866	-1.807135	0.0885
DLOUTSSERV(-2)	-0.079602	0.039005	-2.040830	0.0571
DLOUTSTOTAL	0.086600	0.068222	1.269384	0.2214
DLOUTSTOTAL(-1)	0.203174	0.059457	3.417141	0.0033
DLOUTSTOTAL(-2)	0.179587	0.071505	2.511517	0.0224
ECM(-1)	-0.450924	0.203301	-2.218010	0.0405

R-squared	0.790005	Mean dependent var	0.055703
Adjusted R-squared	0.617069	S.D. dependent var	0.062543
S.E. of regression	0.038702	Akaike info criterion	-3.360859
Sum squared resid	0.025464	Schwarz criterion	-2.673795
Log likelihood	68.77374	Hannan-Quinn criter.	-3.133116
F-statistic	4.568178	Durbin-Watson stat	1.501359
Prob(F-statistic)	0.001956		

Source: Own Computation using EVIEWS 8 software

For the short-run dynamics equation (4) was estimated, most of the results are similar in both long-run and short-run. However, in short-run some difference exists. Credit to Agriculture sector at level and at two period lags, Credit to Export at level and lags, Credit to Industry sector

at level and at lags, and Total bank credit to the economy in general at level do not significantly influence Real GDP in short-run.

Nevertheless, the t-value of our short run analysis on the above table shows one year lagged volume of Credit to Agriculture sector, one years lagged volume of Total Credit, and two year lagged volume of Total Credit to all sectors in the economy are statistically significant at 5% level, and increment in one percent of these variables increases real GDP by -0.053%, 0.203%, and 0.179%, respectively. On the other hand two years lagged volume of Credit to Industry sector, volume of Credit to Service sector at level, at one year lags, and at two years lags are statistically significant at 10% level, so increment in one percent of these variables increases real GDP by -0.161%, 0.090%, and -0.097%, respectively *in the short-run* assuming all other things remain constant.

The insignificant coefficients of these variables in the short-run might be due to the time lag of the contribution of the various sectors to economic growth showing the underdevelopment of the financial sector in the short-run. But from the long-run point of view, some of these variables are highly significant indicating the importance of financial development for long-run economic growth. This finding is in line with the theory of Schumpeter which emphasized the role of financial development especially role of credit allocation on the economic growth of a country.

Finally, the result of error correction model is given in table 10 above demonstrate that the lagged error correction term ECMt-1 is negative and highly significant as expected. Its coefficient of ECMt-1 (-0.4509) shows a rapid adjustment process and dictates that the disequilibrium of the previous period shocks is adjusted in to long-run equilibrium. Therefore we can say that when a shock occurs in the system each year, about 45.09% of it will be adjusted towards its long-run equilibrium. For full adjustment to take place it needs almost 2.2 years which shows relatively faster process.

Finally, this study performs a number of diagnostic tests to the ECM. The results of those diagnostic tests proofed that the model has not serial correlation and heteroskedasticity (ARCH effect), the residual is normally distributed and the model has no omitted variables and the functional form of the model is well specified.

CHAPTER FIVE

SUMMARY, CONCLUSION & RECOMMENDATIONS

5.1 Summary of Findings

The financial sector of Ethiopia is basically characterized and dominated by state owned the banking system with slow development process. Commercial banks remain dominant in the banking system in terms of their shares of total assets and deposit liabilities. A major component of their total credits to the economic sector are still on the increase in spite of the major constraints placed by the government regulations, institutional constraints and other macroeconomic factors. Financial development indicators such as the ratio of credit to GDP and broad money to GDP further indicate the underdevelopment of the financial sector. Moreover, a substantial gap between saving and investment, which the Ethiopian financial sector is unable to bridge, has led to foreign borrowing to finance investments. Some previous studies regarding determinants of bank credit in Ethiopia mainly focused on demand side factors. This study is an endeavor to examine empirically effects of bank credit allocation to various sectors on real GDP in Ethiopian economy from supply side.

So that this paper came to study the relation between bank credits for different sectors and economic growth through employing different advanced Methodologies of Vector Error correction model (VECM), and Granger Causality Test, and using yearly time-series data for the period 1980/81 – 2014/15 to examine the short- and long-run relationships between output and Bank credit to sectors credit in Ethiopia

The empirical analysis indicated that variables that determine bank credit for different sectors and Real GDP (LGDPCON) present a unit root. Once a co integrated relationship among relevant economic variables is established, the results of this study report for a long run relationship could be inferred between LGDPCON and its Explanatory variables of total bank credit for the economy (TBC) proxy by logarithm of total outstanding credit for the economy(LOUTSTOTAL), credit for Agriculture sector(CFA) proxy by logarithm of outstanding credit for the agriculture sector(LOUTSAGRI), credit for Industry sector(CFI) proxy by logarithm of outstanding credit for the industry sector(LOUTSINDU), credit for service

sector(CFS) proxy by logarithm of outstanding credit for the service sector(LOUTSSERV), and credit for export(CFX) proxy by logarithm of outstanding credit for export(LOUTSEXP) in the country. So we can suggest that TBC, CFA, CFI, CFS, and CFX are in the long term equilibrium relationship with the economic development in Ethiopia.

The Granger causality test report bidirectional causality observed among Total bank credit to all sectors (proxy by loutstotal) and real GDP (proxy by lgdpcon), and vise verse at 5%, and 10% levels of significances, respectively. This finding is consistent with Demetriades and Hussein (1996) feedback hypothesis which postulates Bi-directional causal relationship economic growth and financial development.

Besides the granger causality test the paper also identified the long and short-run relationship between bank credit allocation to various sectors and real GDP in Ethiopian economy. As per the empirical analysis, in the long run, level, and two year lag values of Credit to Agriculture sector affects Real GDP positively and statistically significant at 10%, and 5%, respectively. If the two year lagged volume of *Credit to Agriculture sector* increase by 1 percent, it has a power to increase Real GDP by 0.082 percent in the long-run, ceteris paribus. Similarly, a 1percent increase in the volume of *Credit to Agriculture sector* enhances the performance of real GDP positively by 0.065 percent in the long-run. So the result support the expected sign put forth at the stage of model specification.

On other hand, two period lagged value of Credit to Export, Credit to Industry sector at level, two period lagged Credit to Industry sector, Credit to Service sector at level, and, two period lagged of Total Credit to all sectors in the economy are statistically significant, therefore, increment in one percentage of these variables uplift real GDP by -0.166%, 0.22%, -0.23%, 0.204%, and 0.17%, respectively. In these cases the sign of two periods lagged values of Credit to Export and two periods lagged of Total Credit to all sectors is negative unlike the expected positive sign during model formulation.

For the short-run dynamics equation (4) was estimated, most of the results are similar in both long-run and short-run. However, in short-run some difference exists. Credit to Agriculture sector at level and at two period lags, Credit to Export at level and lags, Credit to Industry sector

at level and at lags, and Total bank credit to the economy in general at level do not significantly influence Real GDP in short-run.

Regarding short run analysis results one year lagged volume of Credit to Agriculture sector, one years lagged volume of Total Credit, and two year lagged volume of Total Credit to all sectors in the economy are statistically significant at 5% level, and increment in one percent of these variables increases real GDP by -0.053%, 0.203%, and 0.179%, respectively. On the other hand two years lagged volume of Credit to Industry sector, volume of Credit to Service sector at level, at one year lags, and at two years lags are statistically significant at 10% level, so increment in one percent of these variables increases real GDP by -0.161%, 0.090%, and -0.097%, respectively *in the short-run* assuming all other things remain constant.

The insignificant coefficients of these variables in the short-run might be due to the time lag of the contribution of the various sectors to economic growth showing the underdevelopment of the financial sector in the short-run. But from the long-run point of view, some of these variables are highly significant indicating the importance of financial development for long-run economic growth. This finding is in line with the theory of Schumpeter which emphasized the role of financial development especially role of credit allocation on the economic growth of a country.

5.2. Conclusion

Overall, banking industry has played a positive role in enhancing the growth of the Ethiopian economy despite the underdevelopment of credit and stock markets with no financial depth remains the main obstacles faced this economy. Furthermore, more rehabilitation of the financial sector credits enhances the opportunity for economic growth.

We recommend in this study to bring attention of the government of Ethiopia toward the role of intermediation markets that can reduce financial sector instability that could spoil growth in the future, and we recommend for further study in the future in the same contest.

5.3. Recommendations

Based on the empirical analysis, it is observed that the credit has a long-run impact on the economic growth of Ethiopia. Since Ethiopia financial system credit is dominated by the banking

industry, the financial sector has to deepen by strengthening the banking sector so as to maintain a sustainable economic growth. Banking industry development can be enhanced by having a strong regulatory system that stimulates the private sector as it is the engine of economic growth.

Credit to the private sector has to be given high emphasis in order to boost investment thereby reducing foreign borrowing. Financial constraints that are imposed on the private sector should be relaxed and more focus should be on ways to promote private sector development.

The demand for and supply of credit is totally at imbalance. Therefore, lifting of the closed door policy for foreign/international banks that comes up with big deals of loanable fund and technologies reduce the gap and stimulate Economy growth in return. The other things is providing alternative banking(for instance Islamic banking) credit and financing facilities for those large segment of population un addressed by the existing convention banking system due to their religious, belief and remoteness of the existing banking facilities from their decimal which in turn stimulate economic growth.

On other hand, framing policy guide lines that enhance financial inclusion of citizen as well as reduce degree of highly collateral based or dependent financing so as to encourage entrepreneurs with innovative ideas to get expanded their business or/and implement new proposals as well.

Moreover, it is recommended that efficient allocation of the existing highly scarce credit to top priority sectors having higher multiplier effects and more responsive to the economy in general promotes economic of the country.

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LIST OF APPENDICES

A. VAR Lag Exclusion Wald Test

VAR Lag Exclusion Wald Tests
Date: 03/29/17 Time: 15:06
Sample: 1 37
Included observations: 33

Chi-squared test statistics for lag exclusion:
Numbers in [ ] are p-values

	LGDPCON	LOUTSAGRI	LOUTSEXP	LOUTSIMP	LOUTSINDU	LOUTSSERV	LOUTSTOTAL	Joint
Lag 1	38.20814	34.70734	29.94016	25.31626	41.58592	64.40134	19.78487	282.4841
	[2.77e-06]	[1.27e-05]	[9.74e-05]	[0.000667]	[6.25e-07]	[1.98e-11]	[0.006054]	[0.000000]
Lag 2	6.150245	19.14977	26.42584	6.667331	23.77415	28.74017	18.05990	252.8450
	[0.522320]	[0.007731]	[0.000423]	[0.464319]	[0.001248]	[0.000161]	[0.011703]	[0.000000]
df	7	7	7	7	7	7	7	49

B. Group data of the variables in logarithm form

	LGDPCON	LOUTSAGRI	LOUTSEXP	LOUTSIMP	LOUTSINDU	LOUTSSERV	LOUTSTOTAL
1979/80	11.64216	NA	NA	NA	NA	NA	NA
1980/81	11.65463	6.489053	4.411585	6.015669	6.275327	5.490589	7.708321
1981/82	11.65365	6.694810	4.421247	5.957391	6.345285	5.451468	8.110277
1982/83	11.74963	6.674183	5.148076	5.384954	6.386037	5.822454	7.996284
1983/84	11.68460	6.839262	5.078917	5.360823	6.485093	5.741399	7.746517
1984/85	11.58265	6.964419	5.136974	5.390897	6.562585	5.396804	8.165648
1985/86	11.67706	7.127212	5.349486	4.877485	6.609619	5.598052	8.283873
1986/87	11.80843	7.263330	5.003275	5.520661	6.672033	5.747799	8.400457
1987/88	11.80790	7.410891	5.054333	5.796969	6.881411	6.043108	8.569482
1988/89	11.81130	7.463994	5.461286	5.629059	7.056348	5.708770	8.635118
1989/90	11.85116	7.541577	5.157330	5.690697	7.147559	5.595455	8.280331
1990/91	11.81425	7.568741	5.354698	5.215479	7.185917	5.542048	8.284328
1991/92	11.77665	7.561694	5.692722	5.293807	7.241080	5.730749	8.335168
1992/93	11.88998	7.605989	6.023448	6.292125	7.450080	6.498884	8.610319
1993/94	11.90683	5.739793	6.340536	6.195629	7.518987	7.051856	8.419823
1994/95	11.95919	5.694405	6.592359	6.711740	7.624326	7.603399	8.807397
1995/96	12.06012	6.535967	6.849808	6.989980	8.078874	7.963216	9.141890
1996/97	12.10576	6.810363	6.842790	7.355705	8.225931	8.159632	9.327225
1997/98	12.09123	6.982956	6.914632	7.548767	8.241967	8.180489	9.490393
1998/99	12.14945	7.181972	7.069959	7.623495	8.204562	8.003129	9.615859
1999/00	12.20157	7.121244	6.940513	7.663642	8.208086	8.167795	9.622569
2000/01	12.28132	7.104604	7.007872	7.679575	8.340435	8.133667	9.678367
2001/02	12.29636	7.159681	6.781965	7.672572	8.342966	8.029042	9.664469
2002/03	12.27451	7.092516	6.752621	7.440088	8.446831	7.960662	9.651391
2003/04	12.40178	7.058001	6.850973	7.804537	8.741919	8.098208	9.784141
2004/05	12.51349	7.609981	7.285849	8.054554	8.904838	8.255854	9.987323
2005/06	12.61636	8.136802	7.365623	8.227963	9.165144	8.564134	10.19433
2006/07	12.72482	8.347204	7.755553	8.334688	9.289893	8.834426	10.34505
2007/08	12.82727	8.609079	7.997596	9.130344	9.454563	9.073581	10.62958
2008/09	12.91163	8.701132	8.134233	9.116513	9.666144	9.139506	10.73650
2009/10	13.02987	8.827555	8.544283	9.137404	9.926269	9.235412	10.90947
2010/11	13.15208	9.266273	8.884998	9.287561	10.29927	9.413711	11.21143
2011/12	13.23502	9.750663	9.279922	9.567651	10.73611	9.806651	11.61006
2012/13	13.33561	9.724567	9.270127	9.738807	11.08785	9.943315	11.81916
2013/14	13.43331	9.668714	9.496421	9.866180	11.38017	10.13622	12.03383
2014/15	13.53213	9.829829	9.774591	10.15513	11.60447	10.49725	12.28935
2015/16	13.60502	NA	NA	NA	NA	NA	NA