ST. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

THE IMPACT OF PRIVATE SECTOR CREDIT ON ECONOMIC GROWTH IN ETHIOPIA

BY

MEREMA KAMIL (SGS/0372/2007A)

JUNE, 2018

ADDIS ABABA, ETHIOPIA

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A THESIS SUBMITTED TO ST. MARY'S UNIVERSITY, SCHOOL OF GRADUATE STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF BUSINESS ADMINISTRATION

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EXAMINER APPROVAL SHEET

This is to certify that the thesis prepared by Merema Kamil entitled: 'The Impact Of Private Sector Credit On Economic Growth In Ethiopia' and submitted in partial fulfillment of the requirements for the degree of Masters of Business Administration complies with the regulation of St. Mary University and meets the accepted standards with respect to originality and quality.

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ENDORSEMENT

This thesis has been submitted to St. Mary's University, School of Graduate Studies for examination with my approval as a university advisor.

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DECLARATION

I hereby declare that this thesis is my original work, prepared under the guidance of Prof. BELETE MEBRATU towards the partial fulfillment of the requirements for the Degree of Masters in Business Administration in St. Mary's University. It contains neither material previously published by another person nor that has been accepted for the award of any other degree of the university, except where I have made explicit references to the work of others.

MEREMA KAMIL   --------------------------   ------------------------
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Abstract

This study investigated the impact of bank credit to the private sector on the economic growth in Ethiopia. The sources of data for this research are mainly from secondary sources, but for the purpose of supporting the finding of the research, primary data were used to some extent. The study has applied Johansen co-integration approach, Vector Error Correction Model and Pairwise Granger Causality test using the quarterly time series data for the period of 1989/90-2016/17. Real gross domestic product (GDP) is the dependent variable and proxy for economic growth while bank credit to the private sector (BCPV) is proxy for financial indicator. The stationarity of the variables is tested using the Augmented Dickey-Fuller (ADF) unit root test. All the variables were integrated of order one i.e., I (1).). A major finding is that there is a significant positive relationship between bank credit to the private sector and economic growth. The pairwise granger causality test result indicates a unidirectional causal relationship running from gross domestic product to bank credit to the private sector. The result supports the growth-led finance hypothesis that financial development follows economic growth which is "demand following". Hence, the Government needs to continue to promote the real sector and that would serve to propel economic expansion, and thereby translate into employment and engineer credit growth. From the primary data analysis we can conclude that Access to finance is the main obstacle for private business in Ethiopia particularly, for small and medium enterprises. We recommend that the government has to implement policy measures to improve access to finance.

__Keywords:__ Private sector credit, Bank credit, Economic growth, Cointegration, Causality

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List of Acronyms

ADF   Augmented Dickey-Fuller

AU   African Union

BCPV   Bank Credit to Private Sector

CPI   Consumer Price Index

ECT   Error Correction Term

FTR   Foreign Trade Ratio

GEXP   Government Expenditure

GNP   Gross National Product

GTP   Growth and Transformation Plan

LM   The Lagrange multiplier

NBE   National Bank of Ethiopia

REER   Real Effective Exchange Rate

RGDP   Real Gross Domestic Product

SMEs   Small and Medium Enterprises

SNNPR   Southern Nations Nationalities and People Region

UNECA   United Nations Economic Commission for Africa

VAR   Vector Auto Regressive

VECM   Vector Error Correction Model

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

The role of financial development in economic growth is generally acknowledged in the literature. Economic growth refers to an increase in a country's production or income per capita. It is usually measured by gross domestic product (GDP).The financial sector is crucial in the achievement of sustainable economic growth, since bank credit is considered as a vital means of elevating standards of living, as well as achieving economic development. As Levine (1997), state, a financial system mobilizes and allots savings, supports trade, and allows easier access to investment opportunities. Thus it affects the accumulation of capital and growth. Banks are a vital part of a nation's economy; they play a key role in improving efficiency by facilitating the flows of financial assets from savers to those with investment and consumption needs (borrowers) in the form of credit. The literature on financial economics provides support for the argument that countries with efficient credit systems grow faster while inefficient credit systems bear the risk of bank failure (Kasekende, 2008).

Credit to private sector is very important for the private investment and development in an economy. Domestic banks by financing investments thus play a key role in increasing employment, providing efficiency and productivity and inducing growth in an economy .Deposit mobilization and bank branch expansion are deepening financial intermediation and funding growth-promoting credit (Demirguc-Kunt, 2006). The development of financial sector especially in developing countries is seen as a part of private sector development strategy to stimulate economic growth and reduce poverty by generating local savings which in turn lead to productive investments and a better allocation of resources. (World Bank, 2013).

Businesses and enterprises with adequate financial access have greater potential to grow. The rapid expansion of credits to the public sector and the recent surge in public investment in Ethiopia has prompted renewed research interest regarding the optimal scope of public investment. Ethiopia stands out among low income countries for having a relatively high public investment rate and a relatively low private investment rate.

Hence, private firms appear to be more constrained in terms of access to credit compared to infrastructure. (Ethiopian economic update). The public investment rate in Ethiopia rose from about 5 percent in the early 1990s to 18.6 percent of GDP in 2011, making it the third highest in the world (World Bank, 2013). Credit is the more binding constraint for private firms operating in Ethiopia. Domestic banks mostly finance public sector, and private sector experiences problems in finding credit for its investment. The government needs to pay more attention to alleviate this constraint important to firms. Hence, marginal return to private investment is higher than the marginal return to public infrastructure investment (World Bank 2016).

Evidence from numerous empirical studies suggests that financial sector development plays a huge role in economic development and provide evidence of a positive effect of finance on economic growth (Jayaratne and Strahan 1996; Rajan and Zingales 1998; King and Levin 1993; Abdelraheem 2014). King and Levin (1993) for instance, find a positive effect of finance on economic growth based on cross country growth regressions using data for 77 countries. Using time series analysis Abdelraheem (2014) examined the effect of bank credit to the private sector on economic growth in Saudi Arabia and found that bank credit to private sectors has a statistical strong positive relationship with economic growth (GDP) not only in the short run, but also in the long-run. The work of Demirguc-Kunt and Levin (2008) in a review of the various analytical methods used in finance literature found strong evidence that financial development is important for growth.

Empirical studies linking banking sector developments to real activity using indicators such as bank credit has started growing out of the broad literature documenting the relationship between financial development and economic growth. In developing countries, like Ethiopia, a bank-dominated financial sector, when effective and efficient flow of finance plays a significant role in promoting economic growth. A significant portion of credit in Ethiopia is extended through the banking system, though there are some other institutions such as saving and credit cooperatives and micro finance institutions that provide credit, mainly targeting small and micro enterprises. However, availability of data for the other financial institutions is very limited.

Therefore, in the context of the above discussion, this study focuses on assessing the impact of bank credit to private sector on economic growth in Ethiopia.

1.2 Statement of the Problem

In order to identify the effect of private sector credit on economic growth and explain the relationship between those two factors, a plethora of studies have been carried out in developed and developing parts of the world. Emecheta and Ibe (2014) examined the effect of bank credit to the private sector on economic growth in Nigeria using annual data for the period 1960 to 2011. They found that bank credit to private sectors has a statistical strong positive relationship with GDP as expected. Bhole (2006) argues that the level of development and sophistication of a nation's financial sector serves as an essential index for the assessment of its level of economic growth.

The role of private sector is essential to reduce poverty and attain rapid and sustainable development by enhancing productivity, reducing unemployment and creating competition among workers. However, in Ethiopia, the private sector growth and contribution to the national economy get less attention. Particularly, during the first growth and transformation plan implementation period, private sector development has been neglected and constrained due to limited access to finance as the government was fully mobilizing its effort towards growth enhancing infrastructure developments such as: construction of hydro-power dams, roads, railway and expansion of telecom service. Considering the challenges and opportunities that are learned from the first GTP implementation and by taking the global economic condition into account, the second growth and transformation plan (GTP II) is formulated to realize Ethiopia's vision of becoming lower middle income country by 2025 (National Planning Commission 2016).

In Ethiopia, during the imperial years, the economic system was guided by the principle of the market economy and the government encouraged private investors by providing various incentives. Thus, the share of private sector credit in the economy was more than the public sector. While, during the Derg regime the military government took socialism as a guiding philosophy for economy and the private enterprises were

nationalized and the share of private sector dropped. Since the liberalization of the economy in 1992, the current government was providing various incentive packages to attract domestic and foreign investors.

The financial sector of Ethiopia is mainly consisting of Banks, Insurance companies, and Micro-finance institutions. Though it is a bank-dominated financial sector. The financial system comprises of eighteen banks, (Two state-owned banks of which one development bank, one public and sixteen private commercial banks) at the end of 2017.In terms of ownership, Hundred percent are locally owned because the sector is only open to domestic investors; the financial policy of Ethiopia does not allow foreigners to own and operate banks. The number of branches of the industry increased from 205 in 1990 to 4257 in 2017.

Ethiopia as one of the developing countries still has room to improve its private sector performance. This would be better done when the effect of private sector credit on economic growth of the country is understood. Despite a general awareness of, the relationship between private sector credit and economic growth, there is very limited empirical evidence provided in the literature on Ethiopia context. Demissie, et.al (2012) studied the long-run impact of bank credit on economic growth in Ethiopia via a multivariate Johansen co integration approach using time series data for the period 1971/72-2010/11. They analyzed only the long-run relationship and they didn't study the direction of causality between two factors. In this regard, there is a knowledge gap on the area to be filled in the present study.

1.3 Research Questions

Based on the discussion, the research questions of the study are framed as:

1. Whether bank credit to private sector enhances economic growth in Ethiopia?

2. How significant is the effect of banks credit to affect economic growth in the short- and long runs?

3. Whether there is causality between banks credit to private sector and economic growth?

4. What is the direction of causality between banks credit to private sector and economic growth?

1.4 Research Hypotheses

The following research hypotheses are developed based on theories and past empirical studies related to banking sector credit and economic growth:

H0: Bank credit to private sector has no any impact on economic growth of Ethiopia

H 1: Bank credit to private sector has significant positive impact on economic growth of Ethiopia.

H0: there is no direction of causality between bank credit to private sector and economic growth of Ethiopia.

H2: There is causality between Bank credit to private sector and economic growth of Ethiopia.

1.5 Objective of the Study

The general objective of the study is to investigate the impact of private sector credits provided by banks on economic growth in Ethiopia.

Based on the above general objective, the study has the following specific objectives:

- ❖ To evaluate the relationship between GDP and private sector credit (PSC) in the Ethiopia economy.

- ❖ To Examine the direction of causality between private sector credit (PSC) and economic growth (GDP) in Ethiopia

- ❖ Identify the need for improvements in the current private sector credit policy of Ethiopia.
- ❖ Forward policy recommendations based on the findings of the study.

1.6 Scope of the Study

Although Banks give credit to private and public sectors, this study focused on examining the impact of bank credit to private sector on economic growth in Ethiopia, and doesn't take into account the economic impact of bank credit to public sector. The study covers the period from 1989/90 to 2016/17.

1.7 Limitation of the Study

Even though the research has reached its aims, there were some unavoidable limitations. The study utilized quarterly data in the regression analysis for all variables. However, quarterly data for the dependent variable RGDP was unavailable due to this annual data of RGDP was interpolated to quarterly data using quadratic sum on Eviews 9.0. Another constraint that the researcher faced during the study is time, the time allotted is really too short.

1.8 Significance of the Study

The importance of the study emerges from the fact that credit to private sector play crucial role in sustaining the economic development of a country by enhancing productivity, reducing unemployment and creating competition among workers. As explained in the previous sections, this study is aimed at a broader empirical investigation of impact of private sector credit on economic growth of Ethiopia. In Ethiopia, the presence of little empirical analysis in this context makes this study vital to show the role of the private sector credit in the economy and to help the policy formulation incentive provision to the sector.

The private sector development is widely recognized by the international community as an engine of sustainable and inclusive growth, an avenue to reduce poverty. Thus, the way forward is to encourage private investment, which depends on the availability of private sector credit. Given that there is no capital market in the country and the informal finance sector is limited, identifying the effectiveness of banks in allocating funds mobilized from the surplus economic units to deficits units will help ameliorate impediments to intermediation.

Analyzing and understanding the role of private sector credit on economic growth of Ethiopia is of interest both from a policy and academic point of view. Thus in due course, as policy is concerned, if private sector credit does have a markedly stronger impact on growth, it would further underscore the need to rationalize public sector credit, as well as provide additional support for the private sector to access credit. Moreover, the study will contribute to filling the literature gap and can potentially serve as a stepping stone for further research.

1.9 Organization of the Paper

The study organized into Five chapters; chapter one provides the introduction of the study and it consists of a background of the study, statement of the problem, objective of the study, research questions and hypothesis, Scope and limitation of the study, significance of the study, and organizations of the paper. The second part of the paper discusses an empirical and theoretical review of related literature. The third chapter details data and methodology adopted for the study. Chapter four presents empirical analysis and findings. Finally, chapter Five constitutes the conclusion of the study and gives recommendations based on the findings.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents the existing theories and empirical works related to Private sector credit and economic growth which this study attempts to investigate. It discusses the opposing theoretical arguments and empirical evidences in a way that develop the context for examining the relationship between financial development and economic growth in Ethiopia. It consists of two major parts; the first part reviews theoretical papers. The second part deals with the review of relevant empirical studies.

2.2 Theoretical Review

The reviews of the theoretical literatures are presented organized in terms of their proposed explanations on the relation between financial development and economic growth. The flow of the discussion is structured to start from theories of economic growth and then discuss the finance and growth hypotheses.

2.2.1 Economic Growth Models

Economic growth and development are dynamic processes and thus necessitate dynamic models. Thoughts and theories on economic growth can be traced back to the classical economists of the eighteenth and nineteenth century such as Adam Smith, Robert Malthus, Ricardo and Marx. Until the turn of the twentieth century and long after, economists remained remarkably silent on the issue of growth, with just a few exceptions. After the classical model Harrod-Domar was developed a theory that sets the base for conditions required for long run equilibrium growth. Harrod-Domar model is appreciated as an intermediate step between classical and neoclassical theory. The two types of Growth models: the neoclassical growth model, also known as the exogenous growth model developed by Solow (1956) and Swan (1956) and the new growth theory, also known as the endogenous growth model, pioneered by Romer (1986), Lucas (1988), Barro (1990), and Rebelo (1991) were exploring the flow of economic growth from different point of view for more than three decades. The objectives of these growth theories are identifying a nation's sources of economic growth.

Though there are various theories, as mentioned above, regarding economic growth, in this section we will address the most commonly applied models: the Neoclassical and Endogenous Growth Models.

2.2.1.1 Neoclassical Growth Model

The Neoclassical models of Solow (1956) and Swan (1956) has played the central role in organizing and guiding subsequent aggregate economic research. Solow (1956) and Swan (1956) turn to neoclassical production functions with varying shares of labor and capital inputs. These two approaches provide the first neoclassical model of long run economic growth and mark the starting point for most studies on economic growth up to the present day. The Neoclassical model emphasizes how growth arises from the accumulation of capital. Solow (1956) and Swan (1956) created a simple, convenient, and powerful apparatus for finding the steady-state growth path of a one commodity world. In addition, Swan (1956) demonstrates the importance of technical progress for long-run growth which Solow treated separately in Solow (1957). The Solow-Swan model, technological progress (TP) leads to an increase in income per capita, which, in turn, leads to higher savings and as a consequence to higher investments and to a higher capital stock (per efficient labor unit).

The Solow model focuses on a closed economy where output Q is produced by the factors labor, L, and capital, K. Solow (1956) set out an aggregative, competitive general equilibrium perfect foresight growth model built around three equations: a constant returns to scale production function with smooth substitution and diminishing returns to capital and labor, an equation describing capital accumulation on the assumption of a constant rate of savings (investment) as a fraction of output, and a labor supply function in which labor (population) grows at an exogenously given rate.

Solow assumes factor inputs to be continuously substituted for each other and variably combined. In other words, the Solow model permits continuous substitution between factors of production. The marginal product of each factor varies depending on the amount of the other factor it is combined with. It also assumes diminishing returns to each factor of production, and technology as exogenously determined.

Thus, it implies that if the economy is far below an equilibrium state, factor accumulation would result in output growth at a high rate initially and then at a diminishing rate until it reaches a steady state. The Solow model predicts that different countries will reach different steady- state levels of income per person, depending on their rates of saving and population growth. And it predicts that countries will have different rates of growth, depending on each country's initial deviation from its own steady state. Thus, the assumption of constant, exogenous technological change does not preclude addressing many of the central issues of growth theory.

One might object to the neoclassical mode on the grounds that it does not, in the end, shed light on economic growth. In the steady state of the neoclassical model, all growth is due to advances in technology, but model unravels the mystery of economic growth simply by assuming that there is economic growth (Mankiw 1995). In other words, the neoclassical growth model is criticized on the grounds that it leaves technological growth as an exogenous factor and without technological growth, the model asserts that economic growth will, ultimately, ceases.

2.2.1.2 Endogenous Growth Model

In response to the various failures of the neoclassical model, Romer (1986), Lucas (1988) , and other scholars have developed models in which steady growth can be generated endogenously i.e., can occur without any exogenous technical progress at rates that may depend upon taste and technology parameters and also tax policy. From the neoclassical models endogenous growth theory (new growth theory) has evolved, which tries to model technological progress *and* growth that is, it postulates that long run growth rate can in fact be influenced by economic factors. In this spirit, P. M. Romer (1986) develops a model in which the creation of new knowledge by one firm is assumed to have a positive external effect on the production possibilities of other firms. This non-rivalry of knowledge is further developed by Lucas (1988), who assumes that human capital releases spillovers whereby each producer in an economy benefits from the average level of human capital in the economy.

The endogenous growth model developed by Romer (1986) and Lucas (1988) has focused on the role of human capital from the outset as a main source of increasing returns and divergence in growth rates between developed and underdeveloped countries. The endogenous growth theory, or endogenous technical progress modelization, tries to explain economic (per capita GDP) growth by the accumulation process itself, that is, by the model's intrinsic production factors, without using external, exogenous factors. One of the main predictions of these models is the absence of systematic convergence between economies.

Two mainstreams of endogenous growth theories have emerged, namely those focused on technological change and those mainly concerned with human capital. While the traditional growth theory considered only two factors of production, namely capital and labor, this new growth theory adds a third, technology. Endogenous growth theory focuses on the wider concept of technology, which is expressed through ideas, instead of objects or products. It necessitates a different set of institutional arrangements, like pricing systems, taxation or incentives to ensure the efficient allocation of ideas. These types of models are sometimes called Schumpeterian models because Schumpeter emphasized the importance of temporary monopolistic power over discoveries, as a motivating force for continued innovative processes.

Endogenous growth theory drops the assumption of diminishing marginal returns of neoclassical theory and assumes constant returns to scale at firm levels in line with the assumption of perfect markets. It further assumes positive externalities determine the rate of return of capital. Endogenous growth theories widened the research ambit, by breaking the growth constraint of constant or even decreasing returns and expanding it to perpetual or even accelerating growth. It also renovated, widened and diversified the concepts of technology and of human capital, adding to the spectrum of prospective growth-enhancing variables. The endogenous growth theory postulates that the long-run growth rate of an economy is primarily the result of endogenous factors such as policy measures, human capital, technological innovation, and not external forces.

According to the endogenous growth model, the long-run growth rate depends on the stable environment of business, specifically, government policies and actions on taxation, law and order, provision of infrastructure services, protection of intellectual of property rights, regulation of an international trade, financial markets, and other aspect of the economy. Therefore, long-run growth rate has also been guided by the government (Barro 1997).

Many endogenous growth models have stressed the role of private firms in driving the growth process. This idea is linked to the often held view that too much interference from the government may be detrimental to efficient production and (high) rates of accumulation. This type of thinking hassled economists to empirically analyze the relationship between size of the public sector (e.g. government expenditure to GDP) and economic growth (Rogers 2003).

2.2.1.3 Summary of Growth Models

Economists have been interested in the finance-growth link for a long time. The stronger arguments were made on the fact that finance is important in facilitating economic growth as evident in the theories put forward in the various growth models such as the classical, the neo-classical and the endogenous theory.

Harrod-Domar (1946) classical growth model for a closed economy puts forth that the ratios of national savings and national capital-output stimulate the growth rate of gross national product (GNP). As such, the expansion of new capital stock through investment takes place only when these economies save a portion of their national income. This new investment generated through savings will lead to economic growth.

The second category of growth theories is that of the neo-classical which by considering productivity, capital accumulation, population growth and technological progress, sought to explain long-run economic growth. In Solow's (1956) growth model, the importance of savings and capital investment in promoting economic growth is emphasized.

His premise was that the capacity of the economy can be expanded if society saved part of their resources and used it to build into the future. Another contribution to the

neo-classical growth theory is Goldsmith (1969) who focused on how to transform short-term financial instruments into long-term ones and how long-term financing can result in economic growth.

The approach in this regard builds on the Harrod-Domar model. Goldsmith (1969) noted that liquidity can be generated in the financial system if there are surplus savers (persons who save more than they invest) and borrowers (who want to invest more than they save) so that the surplus is transferred to investors through financial instruments. Goldsmith alluded that the creation of liquidity is critical to the process of economic development.

The most recent addition to the growth literature is the endogenous growth models in which investments in research and development and in physical and human capital are major determinants of economic growth. It contrasts to the neo-classical economics which contends that technological progress and other external factors are the main sources of economic growth. This model posits that financial intermediaries can affect the growth-creation process, as innovation and knowledge are achieved through costly research and development activities, which are usually only possible when external funding is available through the financial system.

2.2.2 Finance and Growth Hypotheses

In analyzing the dynamic relationship or nexus between financial development and economic growth, three main schools of thoughts are used. One focuses on whether the relationship is "supply led", while the other examines if it is "demand following". According to some theories the link is a causal one, but determining how the impact works and the varying factors, all depend on the type of economy and its financial structure.

2.2.2.1 Finance-led Growth

The first hypothesis is that financial development is supply–leading, in the sense that financial development is a causal factor for economic growth. One of the early contributors was Schumpeter (1911) who argued that the services provided by financial intermediaries encourage technological innovation and economic growth.

This was further explored in the pioneering work of McKinnon (1973) and Shaw (1973) which emphasized the importance of having a banking system free from financial restrictions such as interest rate ceilings, high reserve requirements and directed credit programs. They argued that financial repression disrupts both savings and investment, while the liberalization of the financial system allows financial deepening and increases the competition in the financial sector which in turn promotes economic growth. The "supply leading" hypothesis explains that the financial sector, through the use of its various instruments, act as an impetus for production, which suggests that developed countries, with far superior financial systems, will experience more financial growth than developing nations.

2.2.2.2 Growth-led Finance

The second hypothesis is that financial development is demand-following. In contrast to supply–leading, Robinson (1952) argued that financial development follows economic growth; as an economy develops, the demand for financial services increases and as a result more financial institutions, financial instruments and services appear in the market. A similar view was expressed by Kuznets (1955) who suggested that as an economy expands and approaches the intermediate growth stage, the demand for financial services begins to increase. This hypothesis postulates that economic growth is a causal factor for financial development because growth in the real sector stimulates the financial sector, that is, economic activities propel banks to finance enterprises, thus, where enterprises lead, and finance follows (Gurley & Shaw, 1967).

2.2.2.3 Feedback Causality

The third hypothesis is that financial development is bi-directional. In other words, there is a mutual causal relationship between financial development and economic growth. This argument was put forward by Patrick (1966) who showed that given the level of economic development, there is a bidirectional causality between economic growth and financial development. Greenwood and Jonaviich (1990) supported this view by arguing that economic growth provides means for development in the financial sector and the financial sector in turns foster growth by allowing more savings and investment. Harrison et al. (1999) constructed a model in which causality runs both ways between

economic growth and financial sector development. They argued that economic growth increases banking activity and profits, this promotes the entry of more banks and, as a result, the greater availability of banking services reduces the non-physical and physical distance between banks and clients, which in turn, lowers transaction costs and enriches economic growth.

2.2.2.4 Summary of Finance and Growth Hypotheses

Since the introduction of both finance-led growth and growth-led finance hypotheses, the relationship between financial development and economic growth has been subject to the considerable debate in the literature of development and growth. While empirical studies often provide a direct relationship between financial development proxies and growth, much controversy remains about how these results should be interpreted.

There are, at least, four main sources of controversy. First, the selection and measurement of financial development indicators remains as controversial issues among researchers. In general, the indicator has been measured largely by different type of monetary aggregates, which all of these measures have serious problem in interpretation (Gregorio and Guidotti, 1995). Second aspect of controversy involves the causality direction of the financial development and economic growth. While some empirical works find supporting results for finance-led growth and/or growth-led finance, some provide additional evidence for the feedback causality relationship and even others conclude that there is no obvious relationship between financial development indicator and growth. Third controversy is resulting from the use of empirical approaches to the finance-growth hypothesis. The approaches used can be categorized into two groups. The first group focuses on the cross-country studies to test the relationship, while the second group emphasizes the use of regression application that was usually time series predicated. The second group of studies applies various time series techniques such as unit root tests, co-integration procedure, Granger causality test as well as pooled regression and panel data analysis. Finally, the debate concerning the channels by which financial development promotes economic growth is far to be settled.

2.3 Empirical Review

Debate on finance-growth nexus has started since Schumpeter (1911) forwarded the view of the importance of financial sector development for economic growth and there exists a large body of empirical work with regard to the nexus between finance and economic growth. These studies end up with mixed results due to several reasons including the use of variety of estimation techniques and proxies of financial development measures in the analysis. The discussion of the empirical literature is presented into three categories, cross-sectional, panel and time series studies. This will help to track differences on the empirical results attributable to the estimation techniques and proxies of financial development indicators applied.

2.3.1 Evidence from Cross-Sectional Studies

Most of the studies on cross-sectional data have accounted the positive relationship between financial development and economic growth. Goldsmith (1969) using an annual data-set of 35 countries over the period 1860 to 1963 documented a positive correlation between financial development and GDP per capita. De Gregorio and Guidotti (1995) using cross-country data found that financial development, proxied by bank credit to the private sector to GDP, is positively correlated to growth. King and Levine (1993a) using a data-set of 80 countries over the period of 1960–1989 found that financial development is strongly associated with real per capita GDP growth, with the rate of physical capital accumulation, and with the improvements in efficiency with which economies employ physical capital. Similarly, Khan and Senhadji (2000) provided empirical evidence on the relationship between financial development and economic growth using a cross-section of 159 countries (comprising both industrial and developing countries) for the period of 1960 to 1999. The growth equation has been estimated using both pure cross-section sample (by averaging along the time dimension) and five-year average panels (obtained by taking a five-year average of the original data). They concluded that the effect of financial development on growth is positive, the size of the effect varies with different indicators of financial development, estimation method, data frequency and the functional form of relationship.

Roubini and Sala-i-Martin (1992) use a Barro-type growth regression model and analyze the relationship between the financial development and economic growth of having cross-country data for 53 countries over the period 1961-1980. They performed their study theoretically as well as empirically and conclude that the financial repression reduces the productivity of capital and lowers savings, thus hampering growth. The upshot of these theoretical studies is that financial development leads to stronger economic growth.

Greenwood et al. (2013) investigated the impact of financial development on economic development using the cross-country analysis. The results of this study show that financial development explains about 23 percent of cross-country dispersion in output. The analysis suggests that financial intermediation is important for economic development. Deidda (2006) analyzed the interaction between economic and financial development. According to this study, financial development occurs endogenously as the economy reaches a critical threshold of economic development. The results show that when financial development is sustainable, the credit market becomes more competitive and more efficient over time, and this could eventually contribute to economic growth.

The main drawbacks of cross-sectional studies are helpless in discussing integration and cointegration properties data. Moreover, the cross-sectional studies cannot examine the direction of causality between financial development and economic growth.

2.3.2 Evidence from Time Series Data

Wood (1993) investigated the nexus between financial development and economic growth in Barbados using time series data for the period 1946-1990 by applying Hsiao's testing procedure and found that the two variables i.e. the financial development indicator variable which is measured by the ratio of M2 to GDP and the economic growth indictor GDP Granger-causes each other which means their exists a bi-directional causality between financial development and economic growth. Moreover, He tested Patrick's hypothesis that states the supply-leading effect dominates during the early stage of development and as the modern sectors of the economy develop, the

demand-following financial response becomes dominant, and conducted the causality testing on two subsamples. His choice for the subsample was determined largely by developments in the real sector of the economy. However, the empirical results doesn't support for Patrick's hypothesis that the direction of causality between financial development and economic growth changes over the course of economic development.

Chang (2002) provides neither the demand following nor the supply-leading hypothesis for Mainland China. In his study, he uses multivariate VAR models for Mainland China over the period 1987:Q1 to 1999:Q4 to test both the demand-following and supply-leading hypotheses. Based on Johansen co-integration test, the findings indicate that there exists one cointegrating vector among GDP, financial development and the degree of openness of three variables. The results from Granger causality tests based on multivariate error-correction models (ECM) suggest independence between financial development and economic growth.

Nwakanma , Nnamdi, & Omojefe (2014) conducted a study on "bank credits to private sector: potency and relevance in Nigeria's economic growth process for the period between 1981 to 2011 using ARDL model. They found a significant positive long-run relationship between bank credit to private sector and economic growth of Nigeria. However, no significant level of causality was found between Nigeria's real GDP and bank credits to the private sector. Iheanacho (2016) applied auto-regressive distributed lag (ARDL) to examine the impact of financial development on economic growth in Nigeria over the period 1981–2011. The study employed four widely used measures of financial development indicators such as: the domestic bank credit to the private sector divided by GDP, Liquid Liabilities to GDP, and Deposit money bank assets to GDP and Bank deposits to GDP to capture various aspects of the financial sector intermediary activities in Nigeria. The estimated long-run coefficients of the financial development indicators are negative and insignificant. While in the short-run the coefficients of the financial indicators is negative and significant at 5% level. However, the result for control variable (oil price) show that in all the specifications, positive and highly significant in both short-run and long-run, indicating that oil price is the long-run driver of economic growth in Nigeria. The author concluded that the negative but insignificant

long-run effect of financial development on economic growth implies that financial development does not stimulate economic growth in Nigeria. And the significance of the short-run negative effect of financial intermediary development on economic in Nigeria highlights the high degree of inefficiency in resource mobilization and allocation in the Nigerian financial intermediary sector.

Temsina (2014) examined the impact of bank credit on economic growth in Nepal for the period 1975 to 2013. The result from co-integration and vector error correction test shows the positive long run relationship between bank credit private sector and economic growth. Furthermore, the granger causality test shows a uni-directional causality relationship from GDP to private sector credit which is demand-led growth. He concluded that Nepalese economic growth is led by feedback effect from the growth, rather than multiplier effect that of investment.

Bekana (2016) studied the impact of financial sector development on economic growth in Ethiopia using annual time series data from 1981-2013 by applying vector error correction model (VECM). The results shows that the economic growth determinant variables such as: broad money supply, domestic credit to the private sector, government spending, trade openness and inflation rate have positive impact on economic growth only in the short run while trade openness and government spending are found to be significant in the long run. The financial development variable credit to the private sector has a direct relationship with growth only in the short run showing that financial sector development is an essential economic growth driver in Ethiopian economy in the short run and did not reach the minimal level needed to support long run economic growth.

The above-mentioned literature reveals that the time series studies present contradictory results. Some studies find bi-directional causality; others find supply-led or demand–led growth and no causal relationship between financial development and economic growth. Furthermore, the results of time series data are not much consistent because of short length of data set, inappropriate estimation technique and biases brought about by omitted variables.

2.3.3 Evidence from Panel Data

Some Empirical Studies has adopted approach of panel data modeling and examined finance-growth relationship in more than one country. Panel data allows causality relationship to be tested in more efficient way with more observation. Observation number increases considerably because both cross-section and time series data are used in panel data models. Due to this use of panel data has recently become widespread in empirical literature. Levine et al. (2000) used GMM dynamic panel techniques to examine the existence of a causal relationship between financial development and economic growth. Using a panel of 77 countries for the period of 1960-1995, the study finds that higher levels of banking sector development produce faster rates of economic growth. The study concludes that the strong positive relationship between financial development and output growth can be partly explained by the impact of the exogenous components like finance development on economic growth.

Christopoulos and Tsionas (2004) examine the long-run relationship between financial development and economic growth for 10 developing countries using panel cointegration analysis and confirm uni-directional causality that runs from financial development to economic growth. Moreover, they concluded that there is a long-run relationship between financial development and economic growth in 10 developing countries. Apergis et al. (2007) examined the long-run relationship between financial development and economic growth for Fifteen OECD and Fifty non-OECD countries over the period 1975-2000 by using a panel integration and cointegration technique. They used three different financial deepening measures to capture the financial development channels that affect economic growth. The result shows that a long-run equilibrium relation between financial deepening and economic growth. Furthermore, the result from the causality test shows evidence of a bi-directional causality between financial deepening and growth.

Caporale (2009) studied the nexus between financial development and economic growth of ten transition countries from Central and Eastern Europe by estimating a dynamic panel data model and granger causality tests over the period 1994-2007.

They conclude that the development of the banking sector causes growth, while the stock market exerts a limited contribution to the real economy. The Result from Granger causality test suggest that causality runs from financial development, measured as credit to the private sector and the interest rate margin, to economic growth, but not in the opposite direction.

Acaravci et.al (2009) examined the causality between financial development and economic growth in 24 sub-Saharan Africa countries for the period 1975-2005. Using panel co-integration and panel GMM estimation. Evidence from panel co-integration result shows no long-run relationship between financial development and economic growth in sab-Saharan Africa. Moreover, they found a bi-directional causal relationship between the growth of real GDP per capita and the domestic credit provided by the banking sector for the panels of 24 sub-Saharan African countries. They concluded that African countries can accelerate their economic growth by improving their financial systems and *vice versa*. Nzomoi et.al (2012) assessed the impact of private sector credit on sectoral economic performance of Kenya using panel data estimation methodology. The empirical results indicate that access to credit has statistically significant and positive impact on sectoral GDP. They confirmed that overall provision of private sector credit to key economic sectors of the economy holds great potential to promoting sectoral economic growth.

In summary, most of the above reviewed empirical studies support the existence of positive relationship between financial development and economic growth. These studies have used different estimation techniques for analyzing the relationship between financial development and economic growth. Evidence of the reviewed empirical studies shows mixed results such as: "supply led", demand-led or bi-directional causality between financial development and economic growth. In the absence of conclusive theoretical explanation and empirical evidences, it is importance to investigate to which of the arguments the Ethiopian case inclines.

2.4 Conceptual Framework

The overall objective of the study is to investigate the impact of financial development on economic growth in Ethiopia. The conceptual relation and interaction of growth domestic product, bank credit to private sector and other macroeconomic factors can be diagrammatically framed as depicted in figure 1 below. The conceptual frame work is a display of dependent and independent with clearly marked direction of relationship. This identifies the independent and dependent variables being considered in a study and how they relate. The study will be guided by the following conceptual framework which identifies the independent variables as: private sector credit, government expenditure , foreign trade ratio ,   consumer price index and real exchange rate whereas the dependent variable in GDP.

Figure 2.1 Conceptual framework of the interaction between private sector credit and economic growth

Independent variables

Financial Indicator

- Bank Credit to the Private Sector

Macro-economic Indicators

- Government expenditure
- Trade openness
- Consumer price index
- Exchange rate

Dependent Variable

Economic Growth

(RGDP)
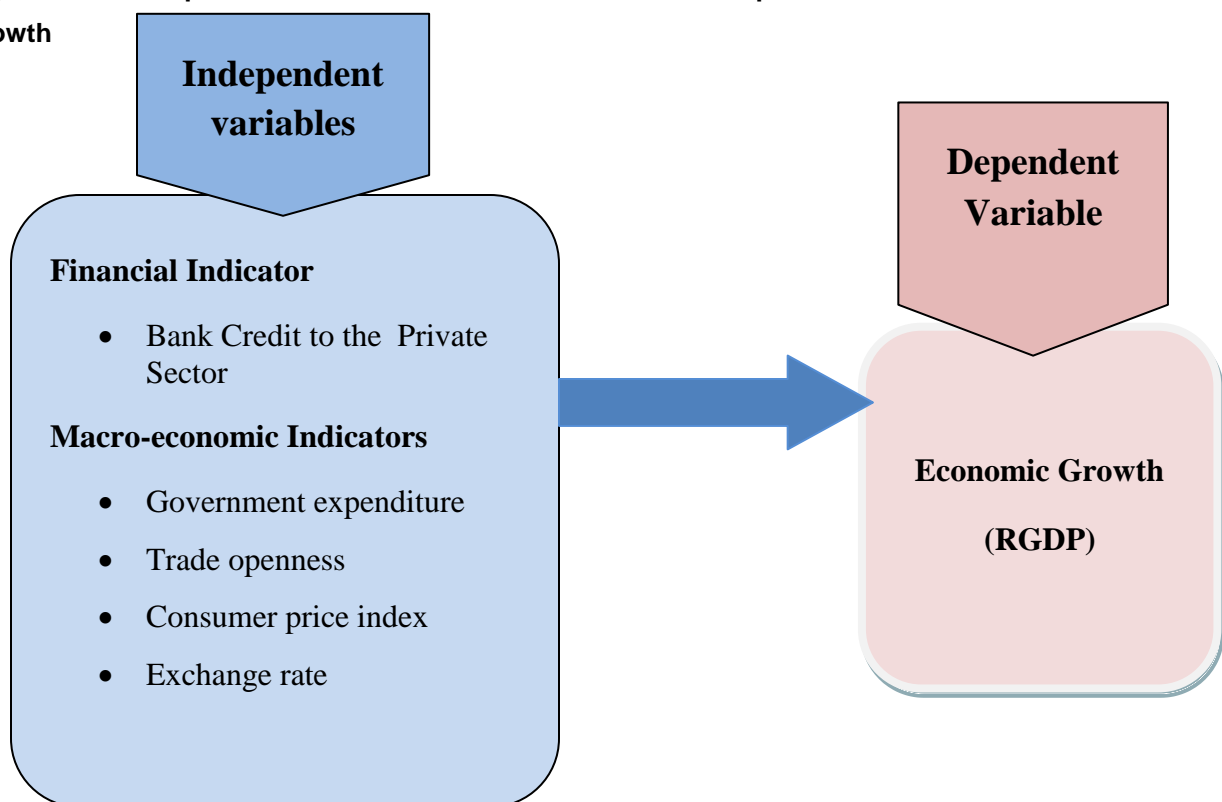
Source: Self-extracted

3. CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The purpose of this chapter is to present the methodologies adopted to carry out the study. The chapter discusses about model specification, measurement and definition of variables used and diagnostic tests to be conducted. Finally, the procedures followed in the estimation of the model are discussed.

3.2 Site of the Study (Description of the Study Area)

Ethiopia is the oldest independent country that is found in the horn of Africa. Apart from a five-year occupation by Mussolini's Italy, it has never been colonized. Ethiopia is a landlocked country bordered by Djibouti, Eritrea, Kenya, Somalia, South Sudan, and Sudan. It has an estimated 2017 population of 104.96 million, which ranks 14th in the world and yielding an overall density of 83 people per square mile (214/square), which ranks 123rd in the world (World Population Review). And it is the second most populous nation in Africa next to Nigeria.

Ethiopia is a Federal Democratic Republic composed of 9 National Regional states: namely Tigray, Afar, Amhara, Oromia, Somali, Benishangul-Gumuz, Southern Nations Nationalities and People Region (SNNPR), Gambella and Harari, and two Administrative states (Addis Ababa City administration and Dire Dawa city council). The largest city and capital of Ethiopia is Addis Ababa, which has an estimated 2017 population of 3.6 million. Addis Ababa is the home of the African Union (AU), the headquarters of the United Nations Economic Commission for Africa (UNECA), and numerous other continental and international organizations.

Economically, Ethiopia is one of the poorest countries in the world, with a GDP per capita income of $863 in a year 2017 (NBE 2016/17 annual Report). However, Ethiopia is one of the fastest growing economies in the world. Ethiopia has continued to register relatively high economic growth over the past decade, with annual average real GDP growth rate of 9.9 % a year from 2012/13 to 2016/17, compared to a regional average of 2.6 %. The service sector continued to dominate the economy as its share in GDP was

about 39.3 percent in 2016/17 showing a decline from 47.3 percent in 2015/16. The share of Agriculture is remained around 36 percent in 2016/17, while the share of industry in GDP rose sharply to 25.6 percent in 2016/17 from 16.7 percent in 2015/16 (NBE 2016/17 annual Report).

3.3 Research Approach

While conducting a research, there are several ways of approaching the problem. The main objective of this study is to investigate the Impact of private sector credit on economic growth in Ethiopia. To achieve this objective, a single parameter may not suffice to come up with the true picture of competitive environment given its complexity. Therefore, the research employed a mixed approach (Qualitative and Quantitative), quantitative research methodology and techniques using an econometric model. And explanatory research design to examine the relationship between the variables stated.

3.4 Source of Data and Collection Methods

The necessary data that used in the study is obtained through both primary and secondary sources. The sources of data for this research are mainly from secondary sources, but for the purpose of supporting the finding of the research, primary data were used to some extent. The secondary data for all variables were obtained from National Bank of Ethiopia (Central bank) which is convenient for the researcher. The study uses a comprehensive quarterly time series data spanning 1989/90:Q1 to 2016/17:Q4 on the following variables: real gross domestic product (RGDP), Bank credit to private sector (BCPV), government expenditure (GEXP), Foreign Trade Ratio (FTR), consumer price index (CPI), and Real effective exchange rate (REER).. The base year for real growth domestic product (RGDP) is 2010/11. All variables are real variables. Primary data was obtained by Interview to support the result from secondary data. The Interview were unstructured and open-ended & they are addressed by two selected government employee; One from Ethiopian Chamber of Commerce and Sectorail Associations ,Ato Million Feleke Director Research and Advocacy and from National Bank of Ethiopia, Director of Monetary and Financial Analysis Directorate.

3.5 Model Specification

Following from our review of the finance–growth literature, the empirical specification to capture the impact of financial development on growth in this study is based on the endogenous growth model ($Y = AKt$) where real aggregate output growth is a function of total factor productivity, real aggregate capital stock (a composite of human and physical capital), savings rate and the efficiency of financial intermediation. Following the studies of Shabri and Majid (2008) as well as Aliero, Abdullahi and Adamu (2013), the following model is adopted to estimate the interrelationships between bank credits to the private sector and Ethiopia's real gross domestic product;

$$Y_t = \beta_0 + \beta_1 Z_t + \beta_2 BC_t + \mu_t \qquad \text{Eq. (3.1)}$$

Where Y is real output (proxied by real GDP); Z denotes a vector of control variables of growth including TGEX – total gross government expenditure (proxied by general government final consumption expenditure); FTR – the level of trade openness of the economy (proxied by the ratio of the sum of exports and imports to GDP ratio); and CPI denoting CPI inflation; REER-real exchange rate BC denotes Bank credit to the private-sector (BCPV) and μt is an error term.

The model to be estimated can be stated as follows:

$$Y = F (X_1, X_2, X_3 \ldots \ldots X_5) \qquad \text{Eq. (3.2)}$$

RGDP = F (BCPV, CPI, GEXP, FTR, NEER)

Using *t* to denote time period the model can be written as follows:

RGDP*t*= F (BCPV*t* + *GEXPt* +*FTRt* +*CPIt* + *REERt)*

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 \qquad \text{Eq. (3.3)}$$

To further decompose the model into its actual variables to be estimated, the equation can be presented as below:-

LnRGDP*t* = β0 + *β1LnBCPVt* + *β4LnGEXPt* + *β5LnFTRt* +*β3LnCPIt* + *β6LnREERt*+ U*t* Eq. (3.4)

Ln= Natural Logarithms

RGDP = Real Gross Domestic Product.

BCPV =Bank Credit to the Private Sector

GEXP= Government expenditure

FTR= Foreign Trade Ratio

CPI= Consumer price Index

REER= Real Effective Exchange Rate

$\beta 0$ = Constant

$\beta 1$, $\beta 2$……. B6 = Coefficients of the explanatory/Independent variables

Ut = Stochastic or error term

3.6 Description and Measurement of Variables

This section explains the variables used as dependent and independent (explanatory) variables in this study. When analyzing the relationship between the private sector credit and the economic growth in Ethiopia, we use widely accepted growth regressions variables. The economic development variable is the real gross domestic product, denoted RGDP. The banking sector development variable is BCPV = the bank credit allocated to the private sector within the total domestic credit.

Several other variables necessary for the correct specification of a growth model is included, knowing that the banking sector is not the only element affecting the development of the real sector in the economy. The definitions/measurements used for these variables are described as follow:

3.6.1 Dependent Variable

Real Gross Domestic Product (RGDP): is the market value of all final goods and services produced in a country in a given time period. 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. Natural logarithm of real GDP Economic growth variable is used as a proxy to measure the overall economic activity In Ethiopia. The base year for RGDP is 2010/11.

3.6.2 Independent Variables

Bank Credit to the Private Sector (BCPV): Private sector credit is defined as credit provided by banks. It indicates the extent of coverage of the banking sector to the size of the required funding from private sector. This is a measure of financial sector activity or the ability of the banking system to provide Finance-led growth. Bank credit to private sector is variable measuring the efficiency of banking sector in turning the savings into a state (credit) where private sector makes use of it. This parameter (BCPV), is not only a criteria measuring development of banking sector but also shows the opportunities of new establishments in benefiting fiscal system through the bank (Baltagi et al., 2009). According to Levine et al. (2000) financial systems that transfer more credit for private sector than public sector activate more savings. Herwartz and Walle (2014) suggest that this parameter (PSC) is more effective in measuring financial intermediation activity with regards to its exclusion of credits granted to public sector by the central bank. This variable is expected to have a positive impact on the economic growth according to the literature on the association between economic growth and financial development.

Government Expenditure: (GEXP): refers to expenses incurred by the government for the maintenance of itself and provision of public goods, services and works needed to foster or promote economic growth and improve the welfare of people in the society. This variable controls for the role of the budget spending. It is also particularly adapted to the case of Ethiopia, knowing that the public sector was largely predominant in the first Growth and transformation plan (GTPI). Proxy for fiscal policy.

Foreign Trade Ratio (FTR): This is the measure of the sum of all imports and exports to GDP. It is an indicator of how liberalized and opened an economy is to the rest of the world in terms of trade and other economic activities.

It is used as a measure of trade openness of an economy. It is measured as a ratio of the sum of exports and imports to GDP. TO is included to control for the openness of the economy.

Consumer Price Index (CPI): measures the rate of price inflation (changes in the prices of goods and services) as experienced and perceived by households in their role as consumers. CPI is included to major the effect of macro-economic stability on economic growth of Ethiopia.

Real Effective Exchange Rate (REER): is the weighted average of a country's currency in relation to an index or basket of other major currencies, adjusted for the effects of inflation. REER is used as a proxy for exchange rate policy.

3.7 Estimation Techniques

Estimation of parameters and hypothesis testing using time series data requires an investigation of the data generating process underlying variables at work. This investigation helps to avoid estimating a spurious correlation between variables in a regression, where what actually exist is a correlated time trend rather than a meaningful economic relationship (Granger and Newblod, 1986). A combination of variables that contain a time trend or are non - stationary may lead to spurious correlation. To avoid the problem of spurious correlation due to the presence of non-stationary variables in the regression model, the time series properties of the variables used in the model will be investigated.

3.7.1 Unit Root Test

Time series econometric study is not complete without performing stationarity test on variables used for the study. Regression run on non-stationary time series variables produces spurious results, which are meaningless. Therefore, it is important to make sure that variables are stationary. This means that a stationary time series has three characteristics namely finite mean, variance and auto-covariance over time (Gujarati, 2003).Currently, there are two stationarity tests available to us.

These are (i) the correlogram method and (ii) the unit root method. Among these two, the unit root test method is widely used as formal statistical tests.

In this study we will apply the widely used unit root test method of the Augmented Dicky-Fuller (ADF) test. The ADF test tests the null hypothesis that $\{Y_t\}$ is I(1) against the alternative that it is I(0), assuming that the dynamics in the data have an ARMA structure.

The ADF test is based on estimating the test regression

$$\Delta y_t = \beta'D_t + \phi y_{t-1} + = \sum_{i=1}^{p} \quad \psi_j \Delta y_{t-j} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{Eq. (3.5)}$$

Where D_t is a vector of deterministic terms (constant or constant plus time trend). The plagged difference terms, Δy_{t-j}, are used to approximate the ARMA structure of the errors, and the value of p is set so that the error ε_t is serially uncorrelated. The error term is also assumed to be homoskedastic. The specification of the deterministic terms depends on the assumed behavior of y_t under the alternative hypothesis of trend stationarity. Under the null hypothesis, y_t is I (1) which implies that $\varphi = 1$. 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 Cointegration Analysis

Once variable have been classified as integrated of order I(0),I(1), or I(2) it is possible to set up models that lead to stationary relations among the variables, and where standard inference is possible. The necessary criterion for stationarity among non-stationary variables is called cointegration. Testing for cointegration is necessary step to check if our modeling has empirically meaningful relationships. The concept of cointegration implicitly assumes linearity and symmetry, what means that the adjustment of the deviations towards the long-run equilibrium is made instantaneously at each period and increases or decreases of the deviations are corrected in the same way.

The test of cointegration is basically to establish a long-run stable equilibrium or stationary relationship between non-stationary series. The notion of cointegration is when variables in a hypothesized relationship should not depart from each other in the long-run or if they do diverge in the short-run, the divergence should diminish in the long-run so that the series will be on the same path. There are two ways of testing the existence of cointegration, the Engel-Granger or EG approach and the Johansen approach.

Engle-Granger methodology follows two-step estimations. The first step generates the residuals and the second step employs generated residuals to estimate a regression of first-differenced residuals on lagged residuals. Hence, any possible error from the first step will be carried into second step. The Johansen maximum likelihood methodology circumvents Engle-Granger methodology by estimating and testing for the presence of multiple cointegrating vectors through largest canonical correlations (Bilgili, 1998). The Johansen Cointegration test is preferred because it allows for the easy correction of serial correlation. For these reason the study applies the Johansen Approach.

Johansen's methodology takes its starting point in the Vector Autoregression (VAR) of order p given by

$$Y_t = \mu + \phi_1 y_{t-1} + \ldots + \phi_p y_{t-p} + \varepsilon_t \qquad \text{Eq. (3.6)}$$

Where y_t is an nx1 vector of variables that are integrated of order one commonly denoted I(1) – and ε_t is an nx1 vector of innovations. Johansen proposes two different likelihood ratio tests of the significance of these canonical correlations the trace test and maximum eigenvalue test, shown in equations (3.7) and (3.8) respectively.

$$\Upsilon trace = -T \sum_{i=r+1}^{n} \ln(1 - \lambda i) \qquad \text{Eq. (3.7)}$$

$$\Upsilon_{max} = -T \ln(1 - \lambda_{r+1}) \qquad \text{Eq. (3.8)}$$

Here T is the sample size and λ_i is the i: th largest canonical correlation. The trace test tests the null hypothesis of r cointegrating vectors against the alternative hypothesis of no cointegrating vectors.

The maximum eigenvalue test, on the other hand, tests the null hypothesis of r cointegrating vectors against the alternative hypothesis of 1+r cointegrating vectors.

3.7.3 Vector Error Correction Models (VECM)

A vector error correction (VEC) model is a restricted VAR designed for use with non-stationary series that are known to be cointegrated. The VEC has cointegration relations built into the specification so that it restricts the long-run behavior of the endogenous variables to converge to their cointegrating relationships while allowing for short-run adjustment 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. If non-stationary but I(1) time series are cointegrated, we can run the VECM to examine both the short-run and long –run dynamics of the series.

Conventional ECM for cointegrated series:

$$\Delta y_t = \beta_0 + \Sigma^n_{i=1} + \beta i \, \Delta y_{t-1} + \Sigma^n_{i=0} \delta \, \Delta X_{t-l} + \varphi \, Z_{t-1} + \mu_t \qquad \text{Eq. (3.9)}$$

Z is the ECT and is the OLS residuals from the following long-run cointegrating regression.

$$y_t = \beta_0 + \beta_1 xt + \varepsilon_t$$

and is defined as …………..

$$Z_{t-1} = ECT_{t-1} = y_{t-1} - \beta_0 - \beta_1 xt-1 + \varepsilon_t$$

The term, error-correction relates to the fact that last period deviation from long- run equilibrium (the error) influences the short-run dynamics of the dependent variable.

Thus, the coefficient of ECT, φ, is the speed of adjustment, because it measures the speed at which returns to equilibrium after a change in X. ECT measures the rate of convergence to the long-run equilibrium. We may construct the ECT variable by using the residuals as variables in the VECM estimation. -ve value means the models reverts to a long run equilibrium, +ve means sustained deviation from it.

3.7.4 Granger Causality Test

Granger causality test is widely used in econometric studies to establish the direction of causality between or among variables. This test is normally preferred to other tests because it is very robust. The Granger causality technique was proposed by Granger (1969) and subsequently modified by Toda and Yamamoto (1995). 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. Given two time series variables X_t and Y_t, X_t is said to Granger cause Y_t if Y_t can be better predicted using the histories of both X_t and Y_t than it can by using the history of Y_t alone. This study attempts to establish the direction of causality between RGDP, BCPV, GEXP, FTR, CPI and REERI in Ethiopia.

4. CHAPTER FOUR: ANALYSIS AND RESULTES

The preceding chapter presented the research methods adopted in the study. This chapter presents the descriptive analysis made on the data, estimation results of the equations specified in previous chapter, discussion, interpretation, and hypothesis test results. The first part provides descriptive analyses which include graphical presentation of the dependent variable RGDP and the independent variable BCPV and the relationship between the two variables. The second part presents regression analysis and estimations of the model and the discussion and interpretation thereon.

4.1 Descriptive Analysis

This section presents the descriptive analyses which include the graphical presentation of dependent and independent variables used in this study. The dependent variable used in this study is RGDP while the independent variable is BCPV.

4.1.1 The Status and Trend of Bank Credit to Private Sector in Ethiopia

A significant portion of credit in Ethiopia is provided through the banking system, though there are some institutions such as savings and credit associations and micro finance institutions that provide credit. However, availability of time series data for the mentioned financial institutions is very limited. Therefore, in this study, private sector credit provided by only banks is taken into consideration. Graphically analyzing the simple relation between variables provides insight in to the possible estimation results of the model. Therefore, the relation between the dependent variable (GDP) and Independent variable bank credit to private sector (BCPV) are graphically analyzed and presented below.

The ratio of bank credit to private sector as percentage of nominal GDP depicted in figure 4.1 provides some insight about the relationship of the two variables. The financial sector of Ethiopia witnessed revolutionary changes in 1990s.

Figure 4.1 Credit provided by banking sector to private sector (% GDP) from 1989/90-2016/17
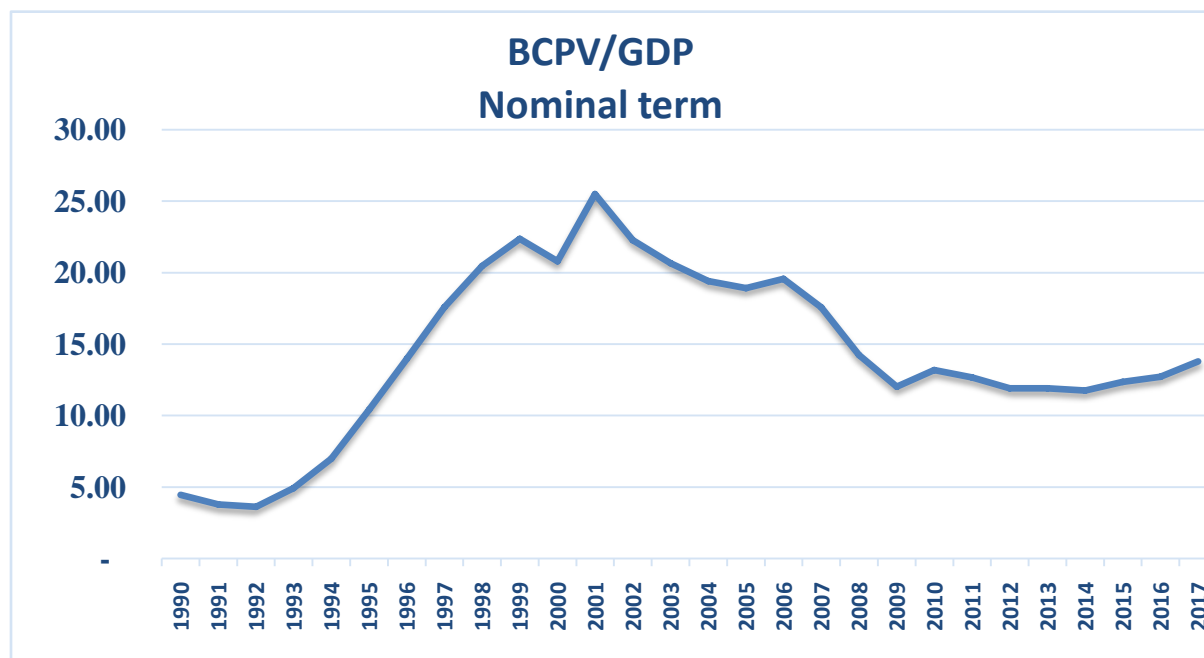
Before the banking reform introduced in Ethiopia, bank credit to private sector as percentage of GDP was showing declining trend as can be seen before 1994, such ratio was very low. Nevertheless, after the banking reform introduced in 1994 the trend shows a mixed result. The banking sector in Ethiopia had been transformed from a highly dominated inefficient state-owned sector to a dynamic private sector. The banking legislation permitted private investment in the banking sector for Ethiopians which had been totally prohibited before the reform. A substantial increase in private sector credit to GDP ratio took place only after implementation of financial liberalization in 1994. From 1994-2001 bank credit to private sector as percentage of GDP was showing an increasing trend, however from 2002 up to 2014 it has been showing a declining trend. On the last three years from 2014 to 2017 the trend is increasing slowly and recorded ratios of 11.76 percent, 12.36 percent, 12.71 percent and 13.79 percent respectively. The banking sector decision to allocate credit to the economy can be influenced by different factors, including unstable political environment of the country, the legal risk, unstable government economic policies and investors own characteristics Imran and Nishat (2012). Hence, in the Ethiopian case it is controversial to say that the financial reform has significant effect on growth of bank credit to private sector.

Figure 4.2 Private sector credit and GDP growth (nominal term) from 1990/91-2016/17

Growth rate of GDP and BCPV
Nominal term
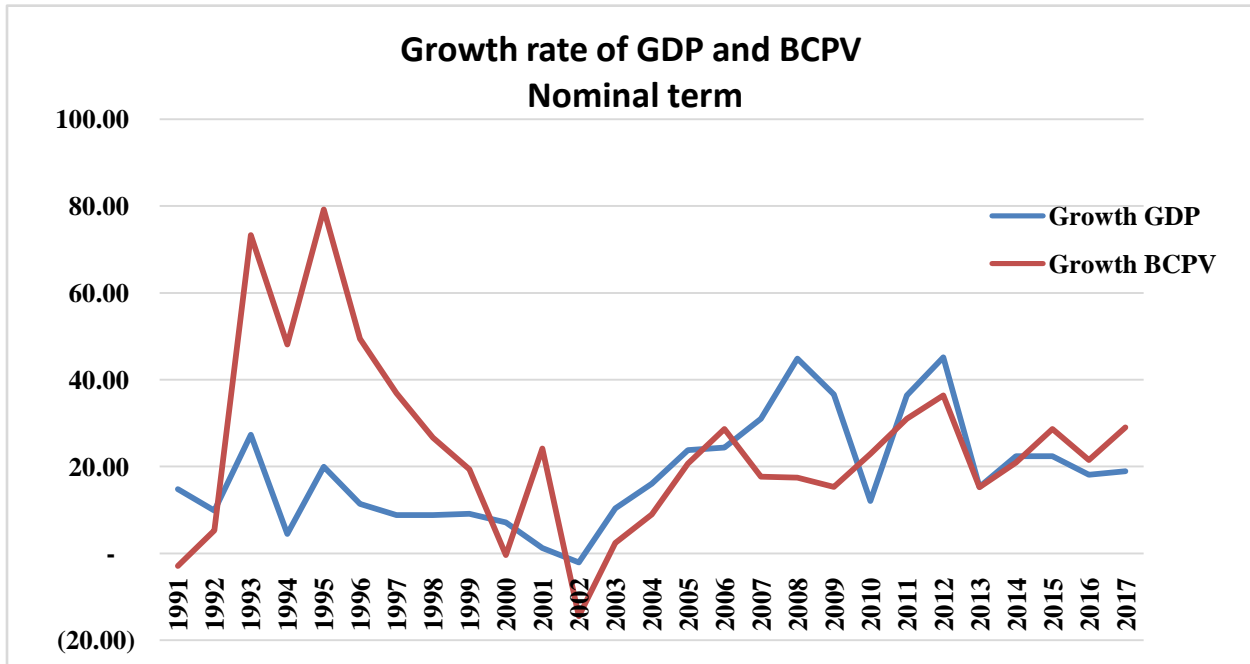
As shown in figure 4.2 above there is positive relationship between nominal private sector credit and nominal GDP. As private sector credit increased, GDP also increased, but at a lower rate. And when private sector credit decreased, GDP also decreased. Except some years their growth rate also seems to move in the same direction.

Figure 4.3 Private sector credit and GDP growth (real term) from 1990/91-2016/17

Growth rate of GDP & BCPV
Real term
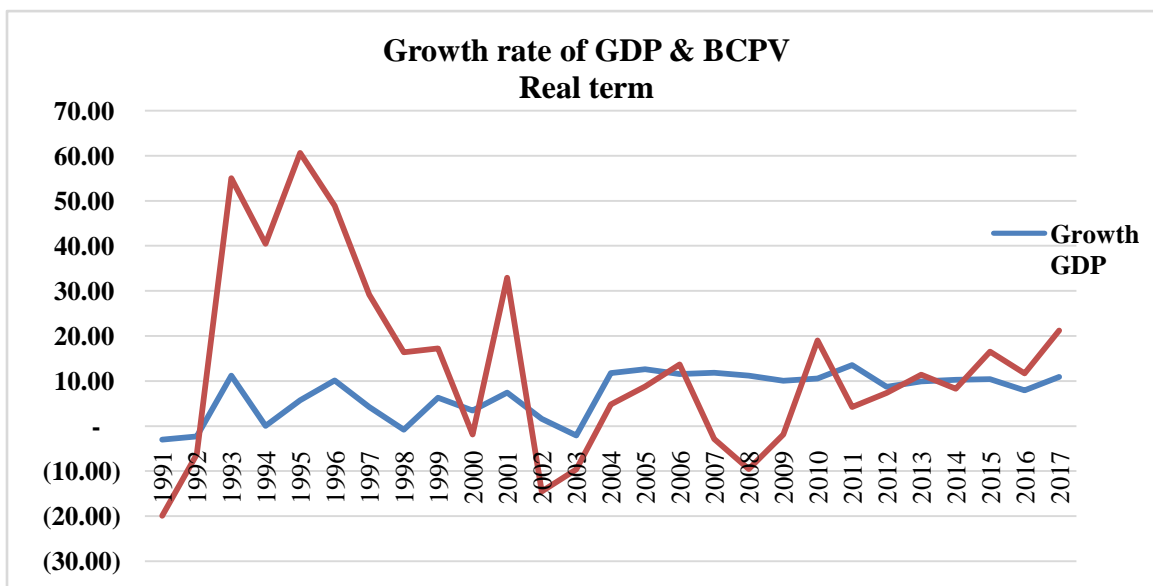
Figure 4.3 also shows that real private sector credit has positive relationship with real GDP during the period 1990/91-2016/17.

4.1.2 Sector Wise Distribution of Bank Credit

Sector wise distribution of credit has great meaning to economic growth. Generally it is assumed that credit to productive sector caters economic growth whereas credit to consumption sector cannot contribute in this regard. In Ethiopia, of the total credit provided by banks in 2016/17, credit to industry accounted for 40.2 percent followed by international trade (16.2 percent), domestic trade (13 percent), housing and construction (11.8 percent), agriculture (6.2 percent), Transport and communication (4.4 percent) , hotels and tourism (1.8 percent) and others (6.5 percent) (Figure 4.4). Though agriculture constitutes 36.3 percent of GDP in Ethiopia, only 6.2 percent of total bank credit has been provided in this sector in 2016/17. Though national bank of Ethiopia has made policy provision that banks should provide credit to priority sectors such as Agriculture, the credit contribution was merely 6.2 percent only. This is due to the fact that Ethiopia's agriculture sector is dominated by small-scale farmers who account for more than 90 percent of the total agricultural land under cultivation and much of the country's food crops as well as coffee, the country's leading export crop. Small –scale peasant farming is the most predominant mode of cultivation.

Hence, lending institutions refuse loans to poor farmers because they do not have the necessary collateral and are considered "high risk." They prefer dealing with industrial and commercial enterprises in urban areas and center of population. Most financial institutions are afraid that there may be failures of farmers to repay their debts on time, or repay at all .Furthermore, the transaction costs of dispensing and supervising small loans are very high thus limiting the access of small cultivators to institutional source of credit. The low levels of agriculture credit and financial inclusion in general is largely due to the dominance of the rural economy, with very low distribution of financial services.

From the total bank credit industry takes large portion in all years (2007/08-2016/17) followed by international trade.

Figure 4.4 Sectoral Break down of Bank Credit from 2007/08-2016/17
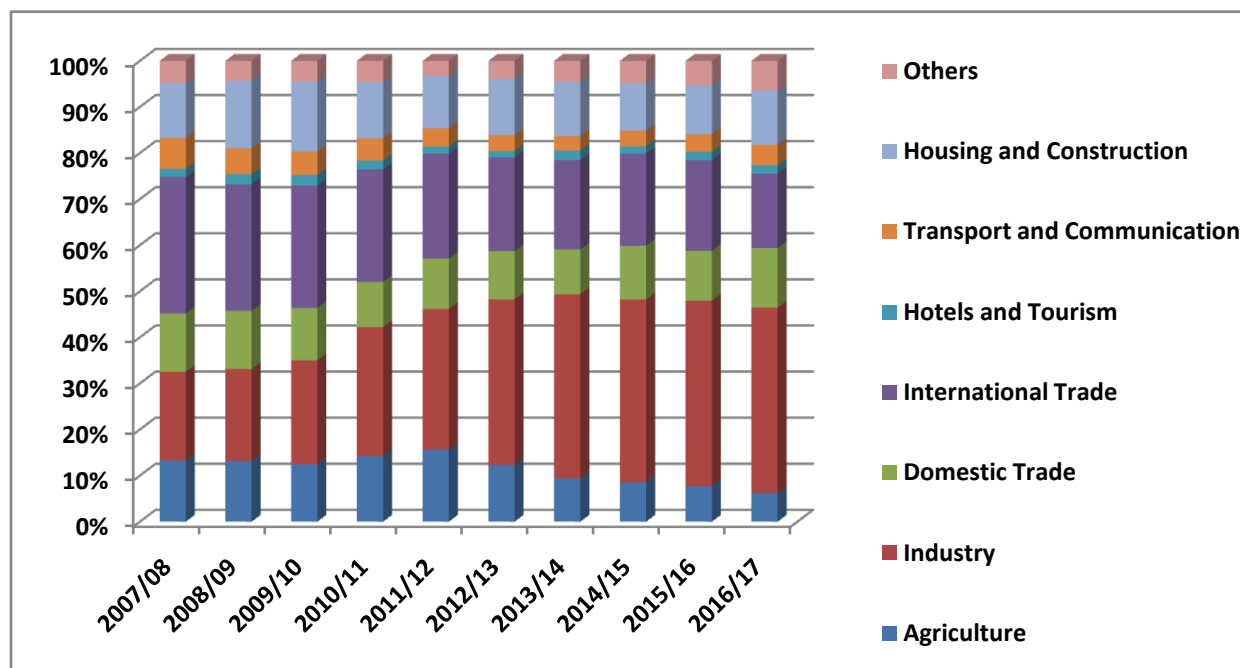
Figure 4.5 below shows the share of total bank credit (excluding central government) to public and private sector for the last five years. The share of private sector in outstanding credit was Birr 231.2 billion (or 71.6 percent) in 2016/17. For the last five years bank credit to private sector was increasing slightly and it was more than credit to the public sector.

Figure 4.5 Total Bank Credit (excluding central government) to public and private Sector from 2007/08-2016/17
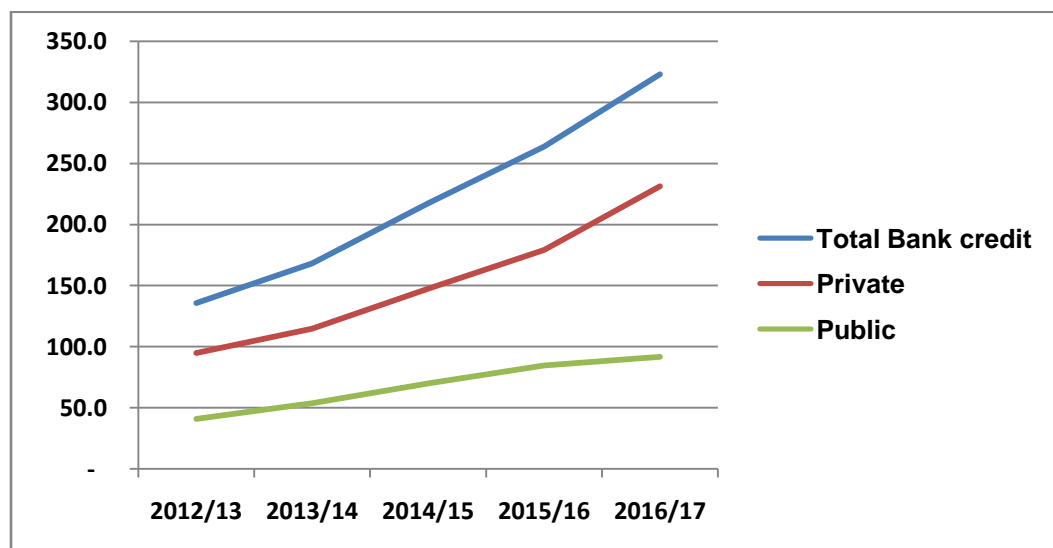
4.1.3 Banks Credit to Hotel and Tourism Sector

Ethiopia's hotel infrastructure is dispersed over the entire country although the concentration varies widely. Many of Ethiopia's main tourist hotels are found in the major cities and resort areas including Addis Ababa, Debrezeit, Hawasa, Baherdar and Nazareth. A relative increase of investment is recently observed in the hotel & tourism sector. The hotel industry consists of many different services, including accommodation, restaurants, and cafes and catering. The market for the hotel industry, especially classified hotels in a developing country like Ethiopia, is closely linked to the tourism industry, because a majority of consumers for the sector services come from international tourists.

Figure 4.6 Loans for hotel and tourism given by private and public banks from 1999/00-2016/17
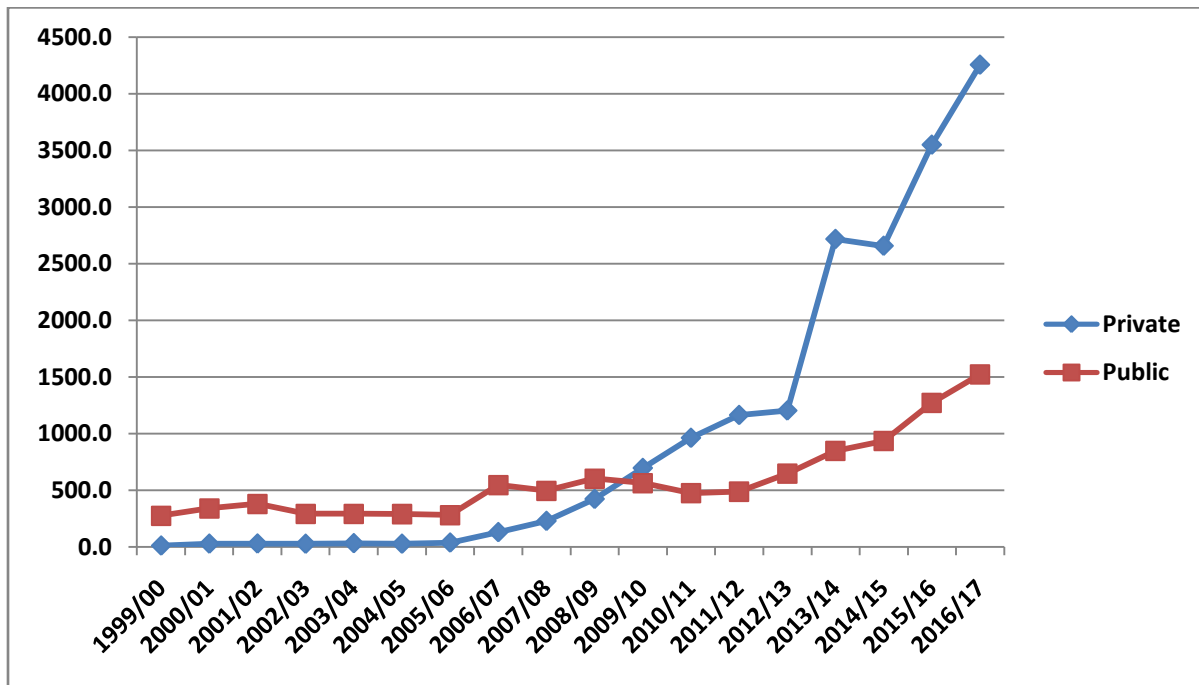
Figure 4.6 above shows the share of private and public bank credit to hotel and tourism industry. From 1999/00-2008/09 public banks credit to hotel and tourism was higher than private banks credit, however starting from 2009/10 private banks credit to the hotel and tourism sector has been showing an increasing trend and it is higher than the credit from public banks. This shows that the private banks are giving loans to private investors than public banks. Mostly, public banks give loans to the public sectors.

Figure 4.7 Hotel and Tourism sector credit and GDP growth (nominal term) from 2000/01-2016/17
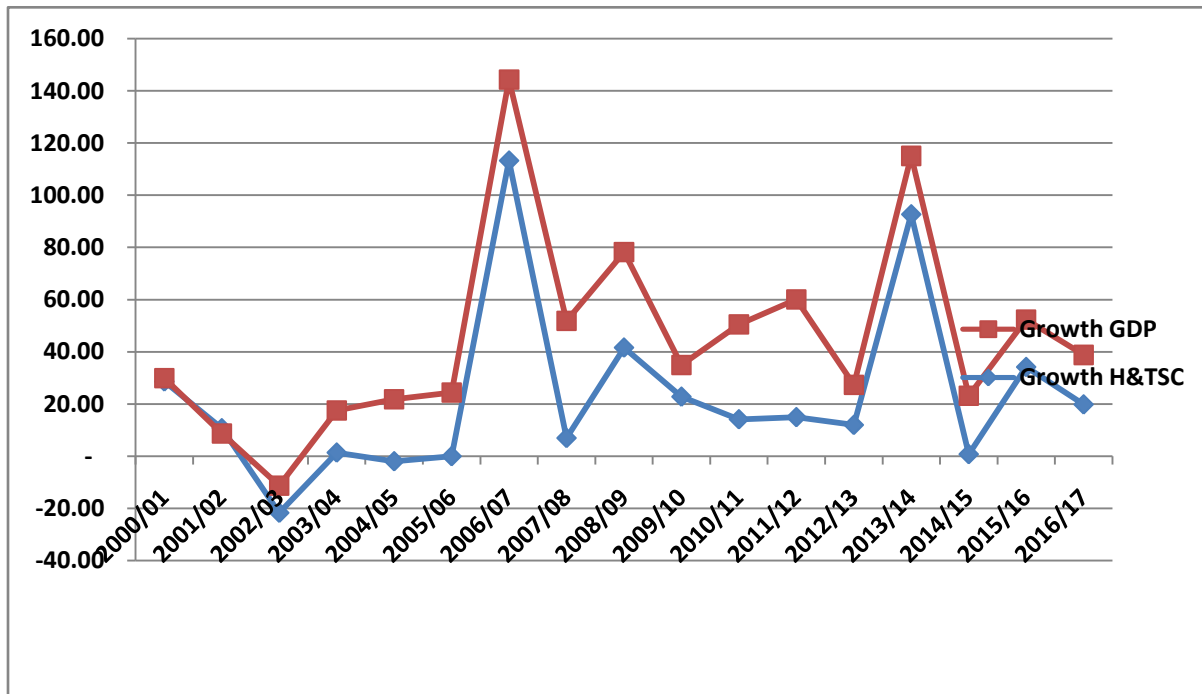
As shown in figure 4.7 above there is positive relationship between nominal hotel and tourism sector credit and nominal GDP. As hotel and tourism sector credit increased, GDP also increased, but at a lower rate. And when hotel and tourism sector decreased, GDP also decreased. Except some years their growth rate also seems to move in the same direction. As the hotel and tourism sector is also an important sector for the growth of the economy in many ways such as: it generates foreign currency, create job opportunity, it is necessary to solve the problem of credit access and grow the sector.

Tourism is one of the productive business activities directed for the production of the goods and services. It provides the goods and services for the customers (generally foreigners) while providing employment and income for the locals. It increases the foreign exchange earnings, generates the employment opportunity and increases the income. Again, the resultant income flows and circulates in the economy and boosts other economic activities ultimately inducing many rounds of income. Therefore, the role of tourism becomes distinct and significant in the economic growth and development of the country (UNWTO, 2015).

4. 2 Unit Root Test Result

The Augmented Dickey-Fuller (ADF) unit root test is applied to the study variables in order to avoid the spurious regression problem. The ADF test conducted on each of the variables is based on the null hypothesis of the series has a unit root and failure to reject the null implies the need for appropriate differencing to induce stationarity. Table 4.1 below shows the results of ADF test for unit root at level and first difference where all variables are presented in logarithmic forms.

Table 4.1 reports the results of the Augmented Dickey-Fuller (ADF) Test statistics at levels and first difference. From the results we observe that all the variables attained stationarity after first differencing and are, therefore, integrated of order one, that is I(1), implying the data will be analyzed using their first difference. This necessitated a cointegration test to establish a long-run relationship among the variables.

Table 4.1 Results of Augmented Dickey -Fuller (ADF) Unit root Test

Series	level			1st Difference		
	None	Constant	Constant and Linear Trend	None	Constant	Constant and Linear Trend
LnRGDP	3.2738	1.9637	-1.3955	-0.9721	-2.9647**	-3.7532**
LnBCPV	3.5584	-1.4615	-1.1749	-2.5765**	-8.5755*	-8.5844*
LnGEXP	3.4635	-0.1645	-3.8519	-4.2528*	-5.5747*	-5.5958*
LnFTR	-1.2120	-1.8602	-1.1093	-10.9489*	-10.9486*	-11.1095*
LnCPI	4.8662	0.7993	-0.8158	-8.0303*	-9.4038*	-9.4603*
LnREER	-0.2378	-1.9435	-1.7076**	-9.6772*	-9.6342*	-9.6899*

Source: Author's computation using Eviews 9

(*) and (**) indicate statistical significance at 1%, 5% respectively.

4.3 Johansen Co-Integration Results

Individual time series data might be non-stationary but their linear combination might be stationary. A linear combination of variables of a model is said to be co-integrating of

order I (0) if the regression residuals are stationary. Lack of co-integration between variables suggests the existence of no long-run relationship between them. This study employs the Johansen approach to cointegration test. However, checking the appropriate lag length is necessary before applying the cointegration test to prove the stability of the VAR. The optimum lag length of four is selected using lag length criteria's and the result is attached in (Annex-2).

As can be seen from the table 4.3 the results of trace test indicate four co-integrating equations at the 5 percent while the result from Max-Eigenvalue shows one cointegrating equations at the 5 percent significance , even though rarely, the trace and the Max-Eigenvalue test statistics yield conflicting results. In such a case the trace statistics is more robust than Max-Eigenvalue statistics in testing for co-integration (Luintel & Khan, 1999). Hence, based on trace and maximum Eigenvalue statistics results we can conclude that there exists meaningful long run relationship between the study variables. And the null hypothesis of "no cointegration" is rejected and the alternative hypothesis of "cointegration" is accepted at the 5 percent significance level.

Table 4.2 Results of Johansen Co-integration Test

No. of Co-integrating equations	Trace Test		No. of Co-integrating equations	Max-Eigenvalue Test	
	Trace Statistics	5% Critical Value		Max-Eigen Statistic	5% Critical Value
None *	141.1695	95.7537	None *	49.5581	40.0776
At most 1 *	91.61144	69.8189	At most 1	32.9183	33.8769
At most 2 *	58.69318	47.8561	At most 2	26.6074	27.5843
At most 3 *	32.08582	29.7971	At most 3	20.9029	21.1316
At most 4	11.18296	15.4947	At most 4	11.1754	14.2646
At most 5	0.007559	3.8415	At most 5	0.00756	3.8415

Source: Author's computation using Eviews 9
Note: (*) indicates co-integrating equations at the 5% critical level

4.4 Vector Error Correction Model (VECM) Estimation Results

Table 4.3 Results of the Vector Error Correction Model

	Coefficient	Std. Error	t-Statistic	Prob.
ECT(c1)	-0.104264	0.029445	-3.541020	0.0007

From Table 4.4, it can be observed that the ECT term is negative and significant at 1% significance level. ECT (c1) or coefficient of cointegrating equation is the speed of adjustment and it measures the speed at which Y returns to equilibrium after a change in X or it is a speed of adjustment towards long-run equilibrium. The negative and significant result of ECT tells us that about 10.43 percent of departure from long-run equilibrium is corrected each period (quarter). On the other hand statistically significant speed of adjustment tells us that all the explanatory variables granger causes the dependent variable (RGDP) or the independent variables have influence on the dependent variable (RGDP). Furthermore, the negative sign shows that the dependent variable (RGDP) will come back to the equilibrium point with the speed of 10.43 percent and there exists long-run relationship between independent variables and dependent variable used in this study.

Furthermore, the negative coefficient (-0.275079) of bank credit to private sector with the t-statistics of (-6.2) which is higher than two on the VECM long-run equation result on (Annex 4) indicates a significant and positive long-run relationship between economic growth and bank credit to private sector. The findings are consistent with Akpansung and Babolola (2011) and Demmisie et al (2012) who find a significant and positive long-run relationship between private sector credit and economic growth. All other macroeconomic independent variables such as: government expenditure, foreign trade ratio, CPI and exchange rate have significant long-run relationship with economic growth as the t-statistics is higher than two for all variables.

To test for short-run causality the coefficient diagnostic test (Wald statistics) was conducted and the results are shown in (Annex 5) below. For all variables except REERI we failed to reject the null-hypothesis of no short-run causality running from the independent variables to dependent variable. This means the entire explanatory

variables except Real exchange rate doesn't play a significant role in short run dynamics of economic growth in Ethiopia. The most important short run determinant of economic growth in Ethiopia is found to be real exchange rate (REER).

4.5 Findings from Pairwise Granger Causality Test

The pairwise granger causality test is to check the direction of causality among the variables. Here, we present the main results obtained from the Pairwise Granger-causality analysis done in the study. Fifteen pairs of variables were modeled as seen in table 4.5 below: The results from the granger causality test (in both two and four lags) indicates only a uni-directional causality from GDP to private sector credit at 5% significance level but there is no evidence of reverse causality. This means that unidirectional causality from economic growth to financial development. The result supports the growth-led finance hypothesis which is discussed in our literature part, financial development is demand following, and it is consistent with the findings of Akpansung and Babolola (2011) and Tesmina (2014), who conclude that financial development follows economic growth.

Table 4.4 Results of Pairwise Granger Causality Test (Lags 2)

Lags 2		Lags 4	
Direction of Causality	Probability	Direction of Causality	Probability
LnBCPV → LnRGDP	0.7781	LnBCPV → LnRGDP	0.8749
LnRGDP → LnBCPV	0.0106**	LnRGDP → LnBCPV	0.0341**
LnGEXP → LnRGDP	0.1022	LnGEXP → LnRGDP	0.3639
LnRGDP → LnGEXP	0.000005***	LnRGDP → LnGEXP	0.0802*
LnFTR → LnRGDP	0.262	LnFTR → LnRGDP	0.4742
LnRGDP→ LnFTR	0.2182	LnRGDP→ LnFTR	0.2892
LnCPI→ LnRGDP	0.8754	LnCPI→ LnRGDP	0.5305
LnRGDP→ LnCPI	0.0219**	LnRGDP→ LnCPI	0.0041***
LnREERI → LnRGDP	0.2003	LnREERI → LnRGDP	0.1789
LnRGDP → LnREERI	0.0000000009***	LnRGDP → LnREERI	0.00000001***
LnGEXP→LnBCPV	0.0296**	LnGEXP→LnBCPV	0.0033***
LnBCPV → LnGEXP	0.00001***	LnBCPV → LnGEXP	0.0021***
LnFTR → LnBCPV	0.8727	LnFTR → LnBCPV	0.7504
LnBCPV→ LnFTR	0.0123**	LnBCPV→ LnFTR	0.025**
LnCPI →LnBCPV	0.0382**	LnCPI →LnBCPV	0.0559*
LnBCPV→ LnCPI	0.4125	LnBCPV→ LnCPI	0.0024***
LnREERI → LnBCPV	0.0451**	LnREERI → LnBCPV	0.0669*

LnBCPV → LnREERI	0.5067	LnBCPV → LnREERI	0.3154
LnFTR → LnGEXP	0.1459	LnFTR → LnGEXP	0.1244
LnGEXP → LnFTR	0.811	LnGEXP → LnFTR	0.5681
LnCPI → LnGEXP	0.0001***	LnCPI → LnGEXP	0.001***
LnGEXP→LnCPI	0.0006***	LnGEXP→LnCPI	0.00002***
LnREERI →LnGEXP	0.4756	LnREERI →LnGEXP	0.0592*
LnGEXP → LnREERI	0.0132**	LnGEXP → LnREERI	0.0014***
LnCPI → LnFTR	0.0911*	LnCPI → LnFTR	0.0489**
LnFTR→LnCPI	0.8099	LnFTR→LnCPI	0.7134
LnREERI →LnFTR	0.0514*	LnREERI →LnFTR	0.0936*
LnFTR →LnREERI	0.2049	LnFTR →LnREERI	0.0284**
LnREERI →LnCPI	0.0008***	LnREERI →LnCPI	0.0002***
LnCPI→LnREERI	0.8536	LnCPI→LnREERI	0.4001

Source: Author's computation using Eviews 9
Note: (***), (**) and (*) indicate significance at 1%, 5% and 10% respectively

The result of the causality test also shows Uni-directional causality exists between Government Expenditure and GDP, No causality exists between GDP and Foreign trade ratio, Uni-directional causality exists between GDP and CPI, Uni-directional causality exists between GDP and exchange rate. Bidirectional causality exists between bank credit to private sector and Government Expenditure, Uni-directional causality exists between bank credit and foreign trade, Bidirectional causality exists between bank credit and CPI, Uni-directional causality exists between bank credit and exchange rate. No causality exists between foreign trade and Government Expenditure, Bi-directional causality exists between CPI and Government Expenditure, Uni-directional causality exists between exchange rate and Government Expenditure, Uni-directional causality exists between foreign trade and CPI, Uni-directional causality exists between foreign trade and exchange rate, Uni-directional causality exists between CPI and exchange rate.

More specifically, we can see that the following uni-directional and bi-directional causality exists between some selected economic indicators: GDP Granger causes Government expenditure, GDP Granger causes CPI, GDP Granger causes Exchange Rate, bank credit Granger causes foreign trade, exchange rate Granger causes bank credit, exchange rate granger causes CPI, foreign trade Granger causes exchange rate,

government expenditure granger causes exchange rate and CPI granger causes foreign trade. The bi-directional causality results are: Bank credit to private sector Granger causes Government Expenditure, Government Expenditure Granger Causes Bank credit to private sector. CPI Granger causes Government Expenditure, Government Expenditure Granger causes CPI. Bank credit Granger cause CPI, CPI Granger cause Bank credit. The results here confirms the earlier co-integration tests that depicts we have at least four cointegrated equations in the study.

4.6 Post-Estimation Diagnostics

In order to validate the model, diagnostic testing on residuals (Normality test, Heteroscedasticity and Breusch-Godfrey Serial Correlation LM Test) and stability of estimated coefficients (CUSUM and CUSUM of Squares tests) were examined. Breusch-Godfrey Serial correlation LM test indicate the absence of serial correlation in the sample. The normality test also shows that the residuals are normally distributed and the result of Heteroscedasticity test proves that there is no multicollinearity between the study variables. The stability of parameter coefficients are examined through the CUSUM and CUSUMSQ. The null hypothesis of parameter stability is not rejected as the CUSUM and CUSUMSQ sum of squares plots fall within the critical bounds at 5 per cent level of significance (Annex 10).

The tests proved that the model is stable and has no serial correlation or normality setbacks. This indicates that the estimated parameters are stable and the model is good and appropriate for this particular study.

4.7 Analysis of Primary data

Ato Milion Feleke who is a Director Research and Advocacy at Ethiopian Chamber of Commerce and Sectorail Associations gave the following response about private sector credit in Ethiopia during my interview to him.

✓ How do you see the supply or access of private sector credit in Ethiopia? Access to credit is very low in Ethiopia even when it is compared to sub-Saharan Africa and it is one of the critical obstacles for private businesses in Ethiopia. There are substantial gaps in existing supply and demand for credit among private

businesses. Private investments and their contribution to GDP are constrained substantially by limited access to credit, particularly small firms. Banks mostly give loans to big and existing firms and the problem of access to credit is worse on SMEs, new and young firms.

✓ Does the financial institutions fair on their loan distribution? The financial institutions are not fair on distributing loans to private investors. There is discrimination, and lack of transparency as to why one's loan request is accepted while another's is rejected. Private Banks rely on relationship lending in screening loan applications instead of using a credit rating system.

✓ What are the main challenges or problems of access to finance?

1. High Collateral requirements: the collateral requirement is one of the major reasons that constrain access to credit with adverse impact on growth and employment creation. Banks require collateral nearly for all loans and the value of collateral is higher relative to the amount of credits requested. Banks require 2.4 times of the loan as collateral.

2. Lending Capacity of banks: The other major concern is the structure and development of the financial sector as an instrument for building productive capacity. The limited number of private banks, the stringent rules and regulations under which they operate, and the high collateral requirements they require, are undermining the allocation of credit to domestic private investors while the market dominating state-owned banks credit primarily to the state and state-owned enterprises. The 40% credit ceiling for short term loans and 10% for Pre-shipment Export credit ceilings are also affecting banks lending capacity.

3. Obligatory 27% bond (NBE bills) purchase of private banks: starting 2011 the private banks are forced to purchase National Bank of Ethiopia bonds with 27 percent of the loans they extended for five years at a very low interest rate in an effort to finance the massive public investments. This government policy is doing harm to the capacity of private banks. It harms their profitability and the

confidence of stakeholders and it also crowd out the private sector with regard to access to credit.

4. Foreign currency problem: the directive that forces importers to make available 100% of their contract worth when they open LC; the directive that puts a maximum ceiling of 5000 USD for import of goods; lack of coordination among ERCA, NBE, and banks; absence of a just system for determining collateral and its evaluation are also other problems of access to finance. The foreign currency allocation system to the private sector is not transparent and firms are forced to wait for several months to get response for their application.

5. Commercial banks preference to provide credit to large and well-established enterprises is also another major problem. Banks are providing financial access to well established and large companies with large volume of transactions since it is easy to administer and has, therefore, lower transaction costs rather than supporting new businesses and SMEs. The problem of access to credit is worse on SMEs, new and young firms. Micro-enterprises and large firms in Ethiopia have relatively better access to finance than small and medium enterprises (SMEs). SMEs are considered as a missing middle in the country.

6. The working and capacity of microfinance institution: Directive that prevents microfinance institutions from providing foreign exchange services, and limiting the loan they give out not to go beyond 1% of their capital; and the absence of credit policy and strategy regarding small and medium enterprises also another problem.

✓ What solutions you suggest to solve the addressed problems?
   • Transparent procedures with regard to allocation of credits are needed to create a level playing field for all companies and build trust among the public and the private sector. Withdrawing the 27% requirement or reducing it, and freeing priority sectors from it. Making Adjustment on the short- term maturity definition from one year to 3 years and maximizing the

40% and 10% credit ceilings for short-term loans and pre-shipment respectively.

- Revisiting the policy framework for the financial sector is also important to improve broad-based, inclusive access to finance. Increasing savings mobilization and the range of products.

- Providing clear and transparent procedure about accepted credit collateral types and Initiating banks to accept collaterals other than buildings and vehicles.

- Financial sector reforms, as well as efforts that reduce the government's competition with the private sector for loanable funds, including more foreign aid as well as borrowing from international financial markets, may relax credit constraints of the private sector.

- Building the capacity of the national bank of Ethiopia which is the supervisory authority and liberalizing the financial sector is also another long -term solution for the addressed problem.

Responses from Director of Monetary and Financial Analysis Directorate at National Bank of Ethiopia.

- ✓ As per the government credit policy which sectors are priority sectors? And Why? The Manufacturing, agricultural and public investments on infrastructure are the main priority sectors on the government credit policy. The policy targeted laying foundation for structural transformation by consolidating on the expansion of economic and social infrastructure and at the same time paving the way for industrialization by directly investing in strategically important manufacturing industries. One reason of making the manufacturing sector as the priority sector was because the sector has strong backward and forward linkages with the agricultural sector as it uses inputs from the agricultural sector. And also the manufacturing sector is labor intensive investing in labor intensive light manufacturing industries with global standard of quality and efficiency, thus absorbing labour from the agricultural sector, and has major export potential.

✓ The government's decision to directly invest in strategic manufacturing industries such as sugar, fertilizer and textile had multiple objectives. Successful completion of the projects would help break the inertia of local private investors to invest in manufacturing sector, generate employment to graduates of technical schools and colleges, diversify export towards light and heavy manufacturing and secure foreign exchange earnings in the aim of financing further development endeavors, and ultimately deepen structural change by shifting resources away from less productive sectors to more productive manufacturing sector.

✓ The public infrastructure investment was also given priority because the major infrastructural bottlenecks will affect the implementation of the targets on investment in the manufacturing industry, so the plan had also targeted major investments on economic infrastructure such as energy, road, railway, and telecommunication. Generally, the public investments are crowding out the private investment.

✓ The policy measures taken by NBE such as NBE Bills, credit ceiling and others are claimed harming the private sector credit? What is your opinion on this? These policy majors were taken to finance the priority sector projects through development bank of Ethiopia by the Money raised from the central-bank bills. However, the policy is affecting the lending capacity of commercial banks to the private sector and they are unable to satisfy the credit demand of their customers mainly due to shortfall of liquidity.

✓ What policies do the government has to support private sector? Fiscal incentives such as: Customs duties exemption, Income tax Exemption and non-fiscal incentives and Loss carry forward are granted to encourage private investment and promote the inflow of foreign capital and technology in to Ethiopia. Export Incentives: With the exception of few products (e.g. semi-processed hides & skins, no export tax is levied on export products of Ethiopia. Franco valuta import of raw materials is allowed for enterprises engaged in export processing.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary of the Study

This study examined the impact of banks credit provided to private sector (BCPV) on Ethiopian economic growth (GDP) using quarterly time series data for the period 1989/90-2016/17. The analysis is based on Johansen co-integration approach and Vector Error Correction (VEC) econometric model for time series data in which RGDP is used as dependent variable and bank credit to private sector is used as financial indicator. The estimated models were broadened to include four macroeconomic control variables such as: government expenditure (GEXP), Foreign trade Ratio (FTR), inflation rate (CPI) and Exchange Rate (REERI).

The empirical analysis of ADF unit root test result indicated that variables present a unit root. The ADF test fails to reject the null hypothesis of the presence of a unit root for all the data series in levels and there is evidence that the variables in our model that is Ln(GDP), Ln(BCPS),Ln(GEXP) Ln(FTR) ,Ln(CPI) and Ln(REER) are stationary after first difference indicating that these variables are in fact stationary of order one, I(1). This paved way for tests of the long-run relationship between the study variables using the Johansen- cointegration test. The results of trace test indicate four co-integrating equations at the 5 percent significance level. This implies that there exists meaningful long run relationship among GDP, BCPV, GEXP, FTR, CPI and REER over the period of 1989/90 – 2016/17 in Ethiopia.

The Error Correction Term (ECT) result is negative and significant at 1% significance level. That means there is long-run causality running from independent variables to dependent variable (GDP). The negative sign of (ECT) also indicating a move back towards equilibrium , on other hand , if it has positive sign of an error correction term(ECT) it indicates that the system in the model are moving away from equilibrium (Granger, 1987). Furthermore it is observed that the estimated coefficients of the long-run relationship show the significant impact of all independent variables on the growth of GDP, during the period of the study.

Moreover, the variable namely BCPV bear the significant positive impact on the growth of GDP. The results about the significant impact of BCPV on GDP growth can be justified on the essential role of banks in support of the development process and contribute to the economic growth.

For the short-run dynamics of the variables , the coefficient diagnostic test (Wald statistics) was conducted and the results shows that the entire explanatory variables except Real exchange rate doesn't play a significant role in short run dynamics of economic growth in Ethiopia. The most important short run determinant of economic growth in Ethiopia is found to be real exchange rate (REER).

The result from pairwise granger causality test indicates a unidirectional causal relationship running from gross domestic product to bank credit to the private sector. The result supports the growth-led finance hypothesis that financial development follows economic growth. Also observed are unidirectional causality from GDP to Government expenditure, GDP to CPI, GDP to Exchange Rate, Bank credit to foreign trade, exchange rate to bank credit, exchange rate to CPI, foreign trade to exchange rate, government expenditure to exchange rate and CPI to causes foreign trade. The bi-directional causality observed among the following variables: Bank credit and Government Expenditure, CPI and Government Expenditure and Bank credit and CPI. The results here confirms the earlier co-integration tests that depicts we have at least four cointegrated equations in the study.

Response from the interview (primary data analysis) shows that access to credit is very low in Ethiopia and private investments and their contribution to GDP are constrained substantially by limited access to credit, particularly small firms. The main challenges or problems in accessing credit are High Collateral requirements, Lending Capacity of banks, Obligatory 27% bond (NBE bills) purchase of private banks, foreign currency problem and Commercial banks preference to provide credit to large and well-established enterprises are the major problems. The interviewee suggested the following solutions to solve the addressed problems: Withdrawing the 27% requirement or reducing it, and freeing priority sectors from it , Transparent procedures with regard

to allocation of credits , Financial sector reforms , Building the capacity of the supervisory and regulatory body and liberalizing the financial sector are solutions for the addressed problem.

5.2 Conclusion

This study has essentially evaluated the nature of long-run relationship between bank credits to Ethiopia's private sector and real gross domestic product as well as the direction of causality between them. From the findings, we observe that there is a significant long run relationship between bank credits to the private sector and economic growth in Ethiopia. The causality tests also confirm the existence of a long run unidirectional causal relationship that runs from economic growth to private sector credit.

In general, it can be concluded that, given the type of economy and the financial structure of the Ethiopian economy, there is a "demand following", rather than "supply leading", relationship between private sector credit and economic growth, whereby as the real sector grows, it provides the impetus for increased credit expansion.

From the interviewee responses we can conclude that Access to finance is the main obstacle for private business in Ethiopia .The Ethiopian banking industry is characterized by Collateral-based lending system. The loan given is very small, the collateral required is huge, direct and indirect service payments are high, risk evaluation capacity is inadequate, access to foreign exchange is problematic and there is problem of access to finance particularly, for small and medium enterprises.

5.3 Recommendations

Based on the results of our study there is strong evidence that a significant and positive long-run relationship exist between bank credit to the private sector and gross domestic product (GDP), the following points are the possible recommendations:

  ➢ The findings imply that for the Ethiopian economy of which the banking sector is the main source of credit and remains a key channel of financial intermediation through which financial resources can be mobilized for productive investment the

relationship between growth and credit is "demand following". As a result, the Government needs to continue to promote the real sector and that would serve to propel economic expansion, and thereby translate into employment and engineer credit growth.

➢ As mentioned on the descriptive analysis in chapter four though Agriculture in Ethiopia is the most important sector, as measured by its contribution to total output, employment, and export earnings; bank credit to agricultural sector is very low. Provision of private sector credit to key economic sectors of the economy holds great potential to promote economic growth .Hence, expanding farmers' access to financial information, increasing the number of branch offices of banks in the country and particularly in rural areas, and easing financial transaction costs might increase farmers' access to credit which in fact contributes to the growth of economy and credit thereon.

➢ The government has to Implement policy measures to improve access to finance for firms especially "the missing middle," or small and medium sized enterprises. The majority of these companies are fully credit constrained divisions. Also I recommend banks to consider setting up an SME division or department to provide specialized services to SMEs.

➢ Consequently, policies towards deepening of the financial sector and reducing the cost of credit which is currently considered to be high are important. Such policies should, however, be accompanied with other complementary strategies that enhance productivity and consequently growth of key sectors of economy. This paper suggests that Ethiopia should promote economic growth in order to encourage and thus benefit from financial development. We conclude that the government should expand and improve the credit systems through appropriate regulatory and policy reforms in order to support higher economic growth.

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ANNEXES

Annex 1: Unit Root Test Results

Null Hypothesis: D(LRGDP) has a unit root
Exogenous: None
Lag Length: 6 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.972129	0.2942
Test critical values:	1% level	-2.587387	
	5% level	-1.943943	
	10% level	-1.614694	

Null Hypothesis: D(LRGDP) has a unit root
Exogenous: Constant
Lag Length: 6 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.964729	0.0416
Test critical values:	1% level	-3.494378	
	5% level	-2.889474	
	10% level	-2.581741	

Null Hypothesis: D(LRGDP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 6 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.753151	0.0231
Test critical values:	1% level	-4.048682	
	5% level	-3.453601	
	10% level	-3.152400	

Null Hypothesis: D(LNRPSC) has a unit root
Exogenous: None
Lag Length: 3 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.576486	0.0103
Test critical values:	1% level	-2.586753	
	5% level	-1.943853	
	10% level	-1.614749	

Null Hypothesis: D(LNRPSC) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.575515	0.0000
Test critical values:	1% level	-3.490772	
	5% level	-2.887909	
	10% level	-2.580908	

Null Hypothesis: D(LNRPSC) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.584361	0.0000
Test critical values:	1% level	-4.043609	
	5% level	-3.451184	
	10% level	-3.150986	

Null Hypothesis: D(LNRTGE) has a unit root
Exogenous: None
Lag Length: 7 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.252772	0.0000
Test critical values:	1% level	-2.587607	
	5% level	-1.943974	
	10% level	-1.614676	

Null Hypothesis: D(LNRTGE) has a unit root
Exogenous: Constant
Lag Length: 10 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.574710	0.0000
Test critical values:	1% level	-3.497029	
	5% level	-2.890623	
	10% level	-2.582353	

Null Hypothesis: D(LNRTGE) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 10 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.595802	0.0000
Test critical values:	1% level	-4.052411	
	5% level	-3.455376	
	10% level	-3.153438	

Null Hypothesis: D(LNCPI) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.030330	0.0000
Test critical values:	1% level	-2.586154	
	5% level	-1.943768	
	10% level	-1.614801	

Null Hypothesis: D(LNCPI) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.403754	0.0000
Test critical values:	1% level	-3.490772	
	5% level	-2.887909	
	10% level	-2.580908	

Null Hypothesis: D(LNCPI) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.460270	0.0000
Test critical values:	1% level	-4.043609	
	5% level	-3.451184	
	10% level	-3.150986	

Null Hypothesis: D(LNFTR) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-10.94856	0.0000
Test critical values:	1% level	-3.491345	
	5% level	-2.888157	
	10% level	-2.581041	

Null Hypothesis: D(LNFTR) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-11.10945	0.0000
Test critical values:	1% level	-4.044415	
	5% level	-3.451568	
	10% level	-3.151211	

Null Hypothesis: D(LNFTR) has a unit root
Exogenous: None
Lag Length: 1 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-10.94886	0.0000
Test critical values:	1% level	-2.586350	
	5% level	-1.943796	
	10% level	-1.614784	

Null Hypothesis: D(LNREERI) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.677201	0.0000
Test critical values:	1% level	-2.586154	
	5% level	-1.943768	
	10% level	-1.614801	

Null Hypothesis: D(LNREERI) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.634248	0.0000
Test critical values:	1% level	-3.490772	
	5% level	-2.887909	
	10% level	-2.580908	

Null Hypothesis: D(LNREERI) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.689858	0.0000
Test critical values:	1% level	-4.043609	
	5% level	-3.451184	
	10% level	-3.150986	

Annex 2: VAR Lag order selection Criteria

VAR Lag Order Selection Criteria
Endogenous variables: LNRGDP LNBCPV LNGEXP LNFTR LNCPI LNREERI
Exogenous variables: C
Date: 05/15/18   Time: 21:35
Sample: 1990Q1 2017Q4
Included observations: 108

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-5.313782	NA	4.97e-08	0.209514	0.358522	0.269932
1	806.8635	1519.072	2.85e-14	-14.16414	-13.12109*	-13.74122
2	873.2982	116.8758	1.63e-14	-14.72774	-12.79065	-13.94232*
3	902.5100	48.14547	1.88e-14	-14.60204	-11.77090	-13.45411
4	972.5331	107.6281*	1.03e-14*	-15.23209*	-11.50691	-13.72167

* 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

Annex 3: Johansen Cointegration test Results

Date: 05/15/18   Time: 21:40
Sample (adjusted): 1991Q2 2017Q4
Included observations: 107 after adjustments
Trend assumption: Linear deterministic trend
Series: LNCPI LNBCPV LNFTR LNGEXP LNREERI LNRGDP
Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.370708	141.1695	95.75366	0.0000
At most 1 *	0.264825	91.61144	69.81889	0.0004
At most 2 *	0.220160	58.69318	47.85613	0.0035
At most 3 *	0.177456	32.08582	29.79707	0.0268
At most 4	0.099174	11.18296	15.49471	0.2005
At most 5	7.06E-05	0.007559	3.841466	0.9303

Trace 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

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**

None *	0.370708	49.55805	40.07757	0.0032
At most 1	0.264825	32.91826	33.87687	0.0647
At most 2	0.220160	26.60737	27.58434	0.0663
At most 3	0.177456	20.90286	21.13162	0.0538
At most 4	0.099174	11.17540	14.26460	0.1456
At most 5	7.06E-05	0.007559	3.841466	0.9303

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Annex 4: Vector Error Correction Model estimates

Vector Error Correction Estimates
Date: 05/15/18   Time: 22:07
Sample (adjusted): 1991Q2 2017Q4
Included observations: 107 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LNRGDP(-1)	1.000000
LNBCPV(-1)	-0.275079 (0.04436) [-6.20106]
LNGEXP(-1)	-0.224273 (0.04969) [-4.51371]
LNFTR(-1)	-0.377474 (0.11416) [-3.30646]
LNCPI(-1)	-0.309277 (0.05354) [-5.77642]
LNREERI(-1)	-0.886164 (0.13718) [-6.46008]
C	-1.167755

Error Correction:	D(LNRGDP)	D(LNBCPV)	D(LNGEXP)	D(LNFTR)	D(LNCPI)	D(LNREERI)
CointEq1	-0.104264 (0.02944) [-3.54102]	-0.119363 (0.12907) [-0.92476]	0.120755 (0.34210) [0.35298]	0.519948 (0.25041) [2.07641]	0.232642 (0.07793) [2.98519]	0.295799 (0.15235) [1.94152]
D(LNRGDP(-1))	0.314598 (0.10769) [2.92125]	1.099110 (0.47209) [2.32819]	-0.229198 (1.25121) [-0.18318]	2.268056 (0.91586) [2.47643]	0.147661 (0.28503) [0.51805]	-2.855424 (0.55723) [-5.12432]

D(LNRGDP(-2))	-0.245187	-0.355406	1.428375	-2.542635	-0.082990	1.085623
	(0.11310)	(0.49579)	(1.31403)	(0.96184)	(0.29935)	(0.58521)
	[-2.16788]	[-0.71684]	[1.08701]	[-2.64350]	[-0.27724]	[1.85510]
D(LNRGDP(-3))	0.582130	-0.471948	-1.120612	0.848589	-0.040984	0.404602
	(0.11667)	(0.51145)	(1.35552)	(0.99221)	(0.30880)	(0.60369)
	[4.98949]	[-0.92277]	[-0.82670]	[0.85525]	[-0.13272]	[0.67022]
D(LNRGDP(-4))	-0.142514	-0.861074	1.075845	-0.481700	0.226437	0.916743
	(0.12101)	(0.53047)	(1.40594)	(1.02911)	(0.32028)	(0.62614)
	[-1.17770]	[-1.62324]	[0.76522]	[-0.46807]	[0.70699]	[1.46412]
D(LNBCPV(-1))	-0.015917	-0.086863	0.261694	0.181718	0.018557	0.219431
	(0.02587)	(0.11341)	(0.30058)	(0.22002)	(0.06848)	(0.13387)
	[-0.61524]	[-0.76591]	[0.87062]	[0.82591]	[0.27100]	[1.63918]
D(LNBCPV(-2))	-0.002406	-0.003173	0.014414	0.511157	0.000389	-0.026203
	(0.02534)	(0.11107)	(0.29438)	(0.21548)	(0.06706)	(0.13110)
	[-0.09495]	[-0.02857]	[0.04896]	[2.37220]	[0.00580]	[-0.19986]
D(LNBCPV(-3))	-0.048867	0.158615	-0.661742	-0.259926	-0.084503	0.033890
	(0.02517)	(0.11032)	(0.29239)	(0.21402)	(0.06661)	(0.13022)
	[-1.94175]	[1.43776]	[-2.26320]	[-1.21447]	[-1.26865]	[0.26026]
D(LNBCPV(-4))	-0.010456	0.314052	0.693926	-0.021691	-0.168506	-0.172660
	(0.02642)	(0.11580)	(0.30691)	(0.22465)	(0.06992)	(0.13668)
	[-0.39582]	[2.71210]	[2.26104]	[-0.09655]	[-2.41016]	[-1.26324]
D(LNGEXP(-1))	-0.018758	-0.046884	-0.423960	0.094056	0.113946	0.098258
	(0.01082)	(0.04742)	(0.12569)	(0.09200)	(0.02863)	(0.05598)
	[-1.73393]	[-0.98862]	[-3.37305]	[1.02233]	[3.97952]	[1.75534]
D(LNGEXP(-2))	-0.011633	-0.008640	-0.259360	0.082994	0.057389	-0.003528
	(0.01100)	(0.04820)	(0.12775)	(0.09351)	(0.02910)	(0.05690)
	[-1.05795]	[-0.17925]	[-2.03016]	[0.88752]	[1.97193]	[-0.06201]
D(LNGEXP(-3))	-0.007730	0.040838	-0.303207	0.050786	0.050056	0.030886
	(0.00975)	(0.04276)	(0.11333)	(0.08295)	(0.02582)	(0.05047)
	[-0.79247]	[0.95509]	[-2.67552]	[0.61223]	[1.93894]	[0.61196]
D(LNGEXP(-4))	-0.001424	0.025355	0.486386	0.095724	0.048734	0.001324
	(0.00845)	(0.03704)	(0.09816)	(0.07185)	(0.02236)	(0.04372)
	[-0.16853]	[0.68460]	[4.95495]	[1.33224]	[2.17931]	[0.03029]
D(LNFTR(-1))	-0.022697	-0.027341	0.292963	-0.291241	0.031466	-0.069755
	(0.01532)	(0.06717)	(0.17803)	(0.13032)	(0.04056)	(0.07929)
	[-1.48119]	[-0.40702]	[1.64555]	[-2.23488]	[0.77585]	[-0.87977]
D(LNFTR(-2))	-0.004952	-0.098204	0.511193	-0.234714	0.026946	-0.074678
	(0.01583)	(0.06938)	(0.18389)	(0.13460)	(0.04189)	(0.08189)
	[-0.31289]	[-1.41543]	[2.77994]	[-1.74379]	[0.64325]	[-0.91188]
D(LNFTR(-3))	-0.015480	-0.092552	0.283000	-0.024729	-0.019688	-0.118413
	(0.01458)	(0.06393)	(0.16943)	(0.12402)	(0.03860)	(0.07546)
	[-1.06153]	[-1.44779]	[1.67031]	[-0.19939]	[-0.51010]	[-1.56931]

D(LNFTR(-4))	-0.015435	-0.067908	0.340326	-0.089235	-0.013140	-0.088245
	(0.01254)	(0.05499)	(0.14575)	(0.10668)	(0.03320)	(0.06491)
	[-1.23043]	[-1.23490]	[2.33505]	[-0.83645]	[-0.39576]	[-1.35952]
D(LNCPI(-1))	-0.048149	-0.063447	-0.439653	-0.145819	0.160262	0.446684
	(0.04274)	(0.18735)	(0.49655)	(0.36347)	(0.11312)	(0.22114)
	[-1.12658]	[-0.33865]	[-0.88541]	[-0.40119]	[1.41676]	[2.01990]
D(LNCPI(-2))	-0.027388	0.102231	-0.862009	-0.294702	0.119645	-0.144811
	(0.04350)	(0.19070)	(0.50544)	(0.36997)	(0.11514)	(0.22510)
	[-0.62957]	[0.53607]	[-1.70547]	[-0.79656]	[1.03910]	[-0.64332]
D(LNCPI(-3))	0.000889	0.392869	-0.482748	-0.430594	-0.045164	0.222752
	(0.03951)	(0.17318)	(0.45900)	(0.33598)	(0.10456)	(0.20442)
	[0.02250]	[2.26851]	[-1.05173]	[-1.28161]	[-0.43193]	[1.08969]
D(LNCPI(-4))	0.019509	0.081829	1.471237	0.145428	0.020743	-0.179842
	(0.03901)	(0.17103)	(0.45329)	(0.33180)	(0.10326)	(0.20187)
	[0.50005]	[0.47845]	[3.24570]	[0.43830]	[0.20088]	[-0.89087]
D(LNREERI(-1))	-0.052917	-0.272749	0.303967	-0.166375	0.319234	0.328643
	(0.02883)	(0.12637)	(0.33493)	(0.24516)	(0.07630)	(0.14916)
	[-1.83566]	[-2.15835]	[0.90756]	[-0.67864]	[4.18402]	[2.20329]
D(LNREERI(-2))	0.012140	-0.349377	0.315440	0.424160	-0.029334	0.065010
	(0.02913)	(0.12771)	(0.33847)	(0.24775)	(0.07711)	(0.15074)
	[0.41672]	[-2.73581]	[0.93197]	[1.71205]	[-0.38044]	[0.43128]
D(LNREERI(-3))	-0.058422	-0.248836	0.162691	0.088373	0.143738	0.152324
	(0.02806)	(0.12300)	(0.32599)	(0.23861)	(0.07426)	(0.14518)
	[-2.08218]	[-2.02313]	[0.49907]	[0.37036]	[1.93556]	[1.04922]
D(LNREERI(-4))	-0.065316	-0.084752	0.183434	0.068131	0.055516	-0.023446
	(0.02293)	(0.10051)	(0.26638)	(0.19499)	(0.06068)	(0.11863)
	[-2.84877]	[-0.84325]	[0.68861]	[0.34941]	[0.91485]	[-0.19763]
C	0.013018	0.016701	-0.003992	0.009562	0.016377	-0.000958
	(0.00343)	(0.01502)	(0.03980)	(0.02913)	(0.00907)	(0.01773)
	[3.80009]	[1.11213]	[-0.10031]	[0.32821]	[1.80620]	[-0.05406]

R-squared	0.484905	0.431850	0.860166	0.414390	0.527026	0.531548
Adj. R-squared	0.325925	0.256495	0.817007	0.233647	0.381047	0.386965
Sum sq. resids	0.018659	0.358562	2.518720	1.349504	0.130711	0.499560
S.E. equation	0.015178	0.066533	0.176339	0.129076	0.040171	0.078533
F-statistic	3.050098	2.462720	19.93029	2.292695	3.610276	3.676403
Log likelihood	311.1757	153.0424	48.74925	82.13397	207.0298	135.3003
Akaike AIC	-5.330387	-2.374624	-0.425220	-1.049233	-3.383735	-2.042997
Schwarz SC	-4.680914	-1.725152	0.224253	-0.399761	-2.734263	-1.393525
Mean dependent	0.017867	0.029416	0.021537	0.007310	0.023256	-0.001725
S.D. dependent	0.018486	0.077161	0.412221	0.147445	0.051061	0.100302

Determinant resid covariance (dof adj.)	2.58E-15
Determinant resid covariance	4.85E-16
Log likelihood	975.5757
Akaike information criterion	-15.20702
Schwarz criterion	-11.16031

Dependent Variable: D(LNRGDP)
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 05/15/18   Time: 22:21
Sample (adjusted): 1991Q2 2017Q4
Included observations: 107 after adjustments
D(LNRGDP) = C(1)*(LNRGDP(-1) - 0.275079299841*LNBCPV(-1) -
    0.224473242103*LNGEXP(-1) - 0.37747380719*LNFTR(-1) -
    0.309277436351*LNCPI(-1) - 0.886163676614*LNREERI(-1) -
    1.16775464577) + C(2)*D(LNRGDP(-1)) + C(3)*D(LNRGDP(-2)) +
    C(4)*D(LNRGDP(-3)) + C(5)*D(LNRGDP(-4)) + C(6)*D(LNBCPV(-1)) +
    C(7)*D(LNBCPV(-2)) + C(8)*D(LNBCPV(-3)) + C(9)*D(LNBCPV(-4)) +
    C(10)*D(LNGEXP(-1)) + C(11)*D(LNGEXP(-2)) + C(12)*D(LNGEXP(-3))
    + C(13)*D(LNGEXP(-4)) + C(14)*D(LNFTR(-1)) + C(15)*D(LNFTR(-2)) +
    C(16)*D(LNFTR(-3)) + C(17)*D(LNFTR(-4)) + C(18)*D(LNCPI(-1)) +
    C(19)*D(LNCPI(-2)) + C(20)*D(LNCPI(-3)) + C(21)*D(LNCPI(-4)) +
    C(22)*D(LNREERI(-1)) + C(23)*D(LNREERI(-2)) + C(24)*D(LNREERI(
    -3)) + C(25)*D(LNREERI(-4)) + C(26)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.104264	0.029445	-3.541020	0.0007
C(2)	0.314598	0.107693	2.921250	0.0045
C(3)	-0.245187	0.113100	-2.167877	0.0331
C(4)	0.582130	0.116671	4.989489	0.0000
C(5)	-0.142514	0.121010	-1.177704	0.2424
C(6)	-0.015917	0.025872	-0.615237	0.5401
C(7)	-0.002406	0.025337	-0.094947	0.9246
C(8)	-0.048867	0.025166	-1.941754	0.0556
C(9)	-0.010456	0.026416	-0.395822	0.6933
C(10)	-0.018758	0.010818	-1.733930	0.0867
C(11)	-0.011633	0.010996	-1.057950	0.2932
C(12)	-0.007730	0.009754	-0.792474	0.4304
C(13)	-0.001424	0.008449	-0.168530	0.8666
C(14)	-0.022697	0.015323	-1.481194	0.1424
C(15)	-0.004952	0.015827	-0.312895	0.7552
C(16)	-0.015480	0.014583	-1.061535	0.2916
C(17)	-0.015435	0.012545	-1.230426	0.2221
C(18)	-0.048149	0.042739	-1.126584	0.2632
C(19)	-0.027388	0.043504	-0.629565	0.5308
C(20)	0.000889	0.039507	0.022499	0.9821
C(21)	0.019509	0.039015	0.500047	0.6184
C(22)	-0.052917	0.028827	-1.835664	0.0701
C(23)	0.012140	0.029132	0.416722	0.6780
C(24)	-0.058422	0.028058	-2.082184	0.0405
C(25)	-0.065316	0.022928	-2.848770	0.0056
C(26)	0.013018	0.003426	3.800088	0.0003

R-squared	0.48490 5	Mean dependent var	0.017867
Adjusted R-squared	0.325925	S.D. dependent var	0.018486
S.E. of regression	0.015178	Akaike info criterion	-5.330387
Sum squared resid	0.018659	Schwarz criterion	-4.680914
Log likelihood	311.1757	Hannan-Quinn criter.	-5.067099
F-statistic	3.050098	Durbin-Watson stat	1.853917
Prob(F-statistic)	0.000082		

Annex 5: Wald tests for Short-run Causality

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	1.188710	(4, 81)	0.3221
Chi-square	4.754839	4	0.3134

Null Hypothesis: C(6)=C(7)=C(8)=C(9)=0
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(6)	-0.015917	0.025872
C(7)	-0.002406	0.025337
C(8)	-0.048867	0.025166
C(9)	-0.010456	0.026416

Restrictions are linear in coefficients.

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	1.430652	(4, 81)	0.2313
Chi-square	5.722609	4	0.2208

Null Hypothesis: C(10)=C(11)=C(12)=C(13)=0
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(10)	-0.018758	0.010818
C(11)	-0.011633	0.010996
C(12)	-0.007730	0.009754
C(13)	-0.001424	0.008449

Restrictions are linear in coefficients.

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	1.241323	(4, 81)	0.3001
Chi-square	4.965291	4	0.2909

Null Hypothesis: C(14)=C(15)=C(16)=C(17)=0
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(14)	-0.022697	0.015323
C(15)	-0.004952	0.015827
C(16)	-0.015480	0.014583
C(17)	-0.015435	0.012545

Restrictions are linear in coefficients.

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	0.490254	(4, 81)	0.7429
Chi-square	1.961018	4	0.7429

Null Hypothesis: C(18)=C(19)=C(20)=C(21)=0
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(18)	-0.048149	0.042739
C(19)	-0.027388	0.043504
C(20)	0.000889	0.039507
C(21)	0.019509	0.039015

Restrictions are linear in coefficients.

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	3.664496	(4, 81)	0.0086
Chi-square	14.65799	4	0.0055

Null Hypothesis: C(22)=C(23)=C(24)=C(25)=0
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(22)	-0.052917	0.028827
C(23)	0.012140	0.029132
C(24)	-0.058422	0.028058
C(25)	-0.065316	0.022928

Restrictions are linear in coefficients.

Annex 6: Pairwise Granger Causality Test

Pairwise Granger Causality Tests
Date: 05/18/18   Time: 01:15
Sample: 1990Q1 2017Q4
Lags: 2

| Null Hypothesis:	Obs	F-Statistic	Prob.
LNBCPV does not Granger Cause LNRGDP	110	0.25145	0.7781
LNRGDP does not Granger Cause LNBCPV		4.87939	0.0106
LNGEXP does not Granger Cause LNRGDP	110	2.33106	0.1022
LNRGDP does not Granger Cause LNGEXP		13.8521	5.E-06
LNFTR does not Granger Cause LNRGDP	110	1.35666	0.2620
LNRGDP does not Granger Cause LNFTR		1.54442	0.2182
LNCPI does not Granger Cause LNRGDP	110	0.13322	0.8754
LNRGDP does not Granger Cause LNCPI		3.96209	0.0219
LNREERI does not Granger Cause LNRGDP	110	1.63260	0.2003
LNRGDP does not Granger Cause LNREERI		25.6357	9.E-10
LNGEXP does not Granger Cause LNBCPV	110	3.64049	0.0296
LNBCPV does not Granger Cause LNGEXP		12.7030	1.E-05
LNFTR does not Granger Cause LNBCPV	110	0.13638	0.8727
LNBCPV does not Granger Cause LNFTR		4.58530	0.0123
LNCPI does not Granger Cause LNBCPV	110	3.36777	0.0382
LNBCPV does not Granger Cause LNCPI		0.89295	0.4125
LNREERI does not Granger Cause LNBCPV	110	3.19275	0.0451
LNBCPV does not Granger Cause LNREERI		0.68432	0.5067
LNFTR does not Granger Cause LNGEXP	110	1.96056	0.1459
LNGEXP does not Granger Cause LNFTR		0.20993	0.8110
LNCPI does not Granger Cause LNGEXP	110	9.66626	0.0001
LNGEXP does not Granger Cause LNCPI		7.89589	0.0006
LNREERI does not Granger Cause LNGEXP	110	0.74854	0.4756
LNGEXP does not Granger Cause LNREERI		4.50911	0.0132
LNCPI does not Granger Cause LNFTR	110	2.45142	0.0911
LNFTR does not Granger Cause LNCPI		0.21128	0.8099
LNREERI does not Granger Cause LNFTR	110	3.05406	0.0514
LNFTR does not Granger Cause LNREERI		1.60926	0.2049
LNREERI does not Granger Cause LNCPI	110	7.64127	0.0008
LNCPI does not Granger Cause LNREERI		0.15848	0.8536

Pairwise Granger Causality Tests
Date: 05/18/18   Time: 01:22
Sample: 1990Q1 2017Q4
Lags: 4

Null Hypothesis:	Obs	F-Statistic	Prob.
LNBCPV does not Granger Cause LNRGDP	108	0.30360	0.8749
LNRGDP does not Granger Cause LNBCPV		2.71302	0.0341
LNGEXP does not Granger Cause LNRGDP	108	1.09382	0.3639
LNRGDP does not Granger Cause LNGEXP		2.15047	0.0802
LNFTR does not Granger Cause LNRGDP	108	0.88780	0.4742
LNRGDP does not Granger Cause LNFTR		1.26422	0.2892
LNCPI does not Granger Cause LNRGDP	108	0.79603	0.5305
LNRGDP does not Granger Cause LNCPI		4.09409	0.0041
LNREERI does not Granger Cause LNRGDP	108	1.60553	0.1789
LNRGDP does not Granger Cause LNREERI		13.0375	1.E-08
LNGEXP does not Granger Cause LNBCPV	108	4.23660	0.0033
LNBCPV does not Granger Cause LNGEXP		4.53509	0.0021
LNFTR does not Granger Cause LNBCPV	108	0.47998	0.7504
LNBCPV does not Granger Cause LNFTR		2.91760	0.0250
LNCPI does not Granger Cause LNBCPV	108	2.39036	0.0559
LNBCPV does not Granger Cause LNCPI		4.43965	0.0024
LNREERI does not Granger Cause LNBCPV	108	2.27099	0.0669
LNBCPV does not Granger Cause LNREERI		1.20056	0.3154
LNFTR does not Granger Cause LNGEXP	108	1.85514	0.1244
LNGEXP does not Granger Cause LNFTR		0.73827	0.5681
LNCPI does not Granger Cause LNGEXP	108	5.01805	0.0010
LNGEXP does not Granger Cause LNCPI		7.62137	2.E-05
LNREERI does not Granger Cause LNGEXP	108	2.35238	0.0592
LNGEXP does not Granger Cause LNREERI		4.78603	0.0014
LNCPI does not Granger Cause LNFTR	108	2.47783	0.0489
LNFTR does not Granger Cause LNCPI		0.53073	0.7134
LNREERI does not Granger Cause LNFTR	108	2.04713	0.0936
LNFTR does not Granger Cause LNREERI		2.83573	0.0284
LNREERI does not Granger Cause LNCPI	108	6.22794	0.0002
LNCPI does not Granger Cause LNREERI		1.02146	0.4001

Annex 7: Jarque-Bera Normality Test
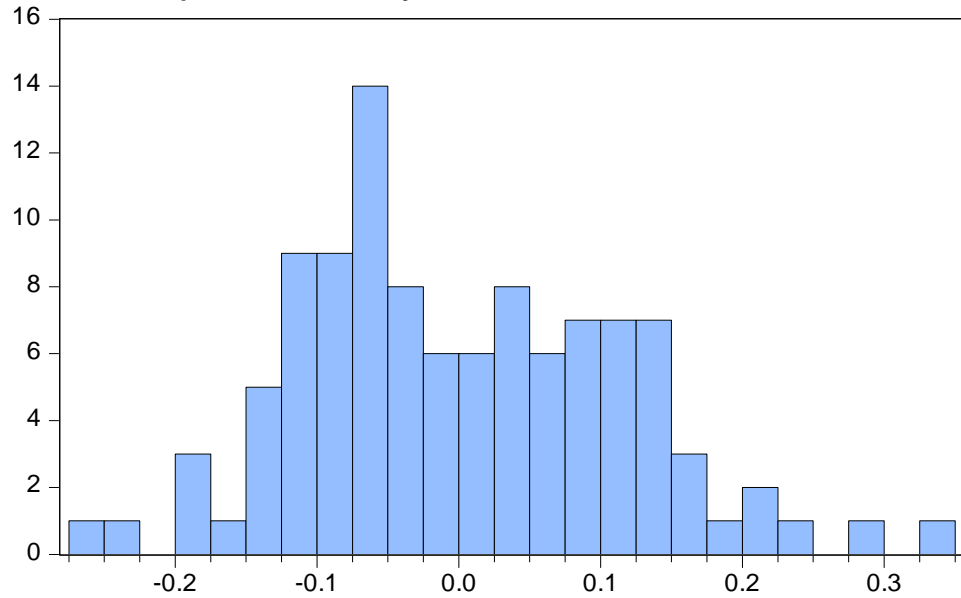
Series: Residuals	
Sample 1991Q2 2017Q4	
Observations 107	
Mean	5.74e-15
Median	-0.017764
Maximum	0.341467
Minimum	-0.256611
Std. Dev.	0.112832
Skewness	0.326586
Kurtosis	2.944472
Jarque-Bera	1.915827
Probability	0.383693

Annex 8: Serial Correlation Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.558788	Prob. F(4,77)	0.6932
Obs*R-squared	3.018375	Prob. Chi-Square(4)	0.5548

Annex 9: Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.113651	Prob. F(30,76)	0.3453
Obs*R-squared	32.67376	Prob. Chi-Square(30)	0.3369
Scaled explained SS	18.20427	Prob. Chi-Square(30)	0.9551

Annex 10: CUSUM and CUSUM of Squares