The Link between Financial Development and Sectoral Output Growth in Ethiopia: *The Case of Agriculture, Industry and Service Sectors*

A Thesis Submitted to the School Graduate Studies of Jimma University in the Partial Fulfillment of The Requirements for the Award of The Degree of Masters of Science in Economics (Economic Policy Analysis)

By:

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DECLARATION

I hereby declare that this thesis entitled "*The Link between Financial Development and Sectoral Output Growth in Ethiopia: The Case of Agriculture, Industry and Service Sectors*", has been Carried out by me under the guidance and supervision of Dr. Wondaferahu Mulugeta and Mr. Jibril Haji.

The thesis is original and has not been submitted for the award of degree of diploma any university or instructions.

Researcher's Name	Date	Signature
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CERTIFICATE

This is to certify that the thesis entities "The Link between Financial Development and Sectoral Output Growth in Ethiopia: The Case of Agriculture, Industry and Service Sectors", Submitted to Jimma University for the award of the Degree of Master of science in Economics (Economic Policy Analysis) and is a record of Valuable research work carried out by Mr. Tekilu Tadesse , under our guidance and supervision

Therefore we hereby declare that no part of this thesis has been submitted to any other university or institutions for the award of any degree of diploma.

Main Adviser's Name *Date* *signature*

Dr. Wondaferahu Mulugeta

Co-Advisor's Name *Date* *Signature*

Mr. Jibril Haji

Abstract

This paperaimed toinvestigate the linkage between financial development and sectoral output growth with special emphasis on Agriculture, industry and service sectors in Ethiopia during the period from 1975 to 2016. The study has used Autoregressive Distributive lag(ARDL) bound testing approach viaanaugmented growth model to examine the linkage between the financial development, proxied by bank credit to sectors,and sectoral output growth.Furthermore, Vector Error Correction Model (VECM) was employed to investigates the direction of causality between financial development and sectoral output growth. The results of bound test confirmed that the long run relationship between explanatory variables and sector output growth with less cointegration of agricultural output growth and respective independent variables. The empirical results of this study showed, that in the long run financial development had aless significant positive impact on agricultural and service sector output growth but, short run relationship was found to be insignificant. However, financial development has apositive and significant impact on industrial and aggregate output growth both in the short run and long run..Furthermore, VECM granger causality tests show that there is no causality between financial development and agricultural output growth both in long run and short run. However, uni-directional causality running from (1) financial development to industrial output growth both in the long run and short run which confirmed supply leading growth hypothesis (2) financial development to service sector output growth in thelong run(supply leading) and in the short run running from service sector to financial development which supports demand leading hypothesis only in short run. At theaggregatelevel, the direction of causality is running from financial development to economic growth both in short run and long run.

Keywords: Financial Development, Sectoral Output Growth, ARDL bound tests, VECM, Granger Causality Tests

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Acronym

AIC- Akaike Information criterion

AGDP – Agricultural sector gross domestic product

ADF -Augmented Dickey-Fuller

ADRL-Autoregressive Distributed Lag

DW- Durbin-Watson Statistic

ECT- Error correction term

GMM- Generalized method of moments

MGDP – Manufacturing sector gross domestic product

MOFEC- Ministry of Finance and Economic Cooperation

MEDaC -Ministry of Economic Development and External Cooperation

NBE-National bank of Ethiopia

NFLs- non-performing loans

OECD- Organization for Economic Co-operation Development

SGDP – Service sector gross domestic product

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

Financial development is considered as one of the important inputs needed for economic growth and development. This is because the financial sector development determines the level of domestic saving distributed towards productive investments in which efficient resources mobilization and credit expansion raise the level of investment thereby capital accumulation in a given economy. The capacity of financial sector of the economy to provide capital for investment is anessential determinant of economic growth and transformation (Dejene, 2016).

As result, financial development is linked to economic growth due to having various functions, includes financial intermediation, reduction of transaction costs, and thepossibility for diversification. The overall functions of financial institution come up with animproved accumulation of capital, efficient allocation of economic resources and improvement in technological capability which are crucial ingredients for economic growth (Levine, 2004). Furthermore, financial institutions make thelinkage between the surplus and deficit sectors of the economy through intermediation.

Accordingly, countries having a well-functioned financial institutionis no more dependence on external source financing, rather can create domestic credit expansion to run economic activities in a given economy. Most of underdeveloped financial institution rely on external sources of financing in which its constraints provoke credit expansion thereby affecting the expansion of firms and industries as whole(Mishkin, 2007).

For long period of time, both theoretical and empirical analysis agrued that financial sector development comprises an important mechanism for long run economic growth through effective mobilization of domestic savings for productive investment, thereby alleviation of poverty especially for developing nations (Ellahi, 2011).In line with that there are varous studies have identified the relation between financial development and ecomic growth.

However, there is no cross-cutting consensus arrived on such linkage. For instance, some theoretical and empirical investigation witness that financial development leads to foster

economic growth. Emiperical analysis supporting the positive relationship between finance and growth nexus argued by those researchers such asRuiz-Arranz(2009)and Nkoro and Uko(2013) stating that financial sectordevelopment creates strong environment for investment through efficient allocation of funds and also strengthen trade and business linkages and technological diffusion and innovation. This outcome is captured mainly through mobilizing savings for productive investment and thereby accelerate economic growth. Unlike to positive linkage argument, the finding of Adusei(2012) that financial development play insiginificant role in promoting economic growth. The extremecontrast to positive contribution financial development, some scholars such asLoayza and Ranciere(2006), Adusei and Nkrumah(2013) and Beck et al (2013) still come up with thenegative impact of financial development on economic growth in their empirical analysis.

In Ethiopian context, development of the financial sector has a long history and categorized as banking and non-banking institutions which consists of commercial banks, development banks, specialized financial institutions, cooperatives, insurance companies, etc. However, the organizational structure, management, and ownership of these financial institutions as well as their performance have been varying across the three regimes(Roman, 2012). The detailed financial sector structure and its performance under three regime was discussed in other chapter of the study.

Although some success registered in financial sector development through shifting the direction of the flow financial resources (mainly credit) from public enterprises to the private sector during post reform regime, the economic reforms have failed to make linkage financial sector with dominant sector mainly the agricultural sector to be more attractive and suitable for long term investments through the use of financial sector. As compared to industry and service sector, the share of agricultural sector in the total credit disbursed by the banks has been marginal which will have little impact on long-term investment and transformation of agriculture for commercalization. However, agricultural sector's actual and expected contribution to the economy has significantly large next to service sector(Alemayehu, 2006).

When looking the structural transformation of the sector, Ethiopia has enjoyed strong economic performance since the mid-2000s which has helped turn Ethiopia into one of the fastest growing non-oil producing economies on the continent, with average annual growth rates above 11

percent between 2004 and 2008 - driven mainly by the agriculture and services sectors. Currently, Ethiopia has recorded a rapid economic performance of 10.2 percent in 2015; continuing the double-digit growth trend with thebroad contribution of all sectors in which industry grew by 21.6 percent, services sector by 10.2 percent and agriculture by 6.4 percent. Regarding the share in GDP, agriculture, industry, and service sector share of GDP were 38.8 percent, 15.2 percent and 46.7 percent, as well as their contribution to annual growth, were 3.0 percent, 4.7 percent and 2.5 percent respectively revealing that there is gradual structural transformation (NBE, 2016).

In line with surprising economic growth, thefinancial system in Ethiopia has also improved following rapid growth in the number of participating institutions including the scope and services rendered in which the system comprises the regulatory authorities, banks, non-bank financial institutions with non-existent capita markets(Dejene, 2016).

Therefore, analyzing the impact the financial sector development towards supporting the output growth in agriculture, industry, and service sectors were the main concern of the study.

1.2. Statement of the Problem

Examining the relationship between financial development and sectoral output growth in a given country is crucial because it provides useful information on economic phenomena that the government and concerned bodies need to control relevant variables in order to attain the desired level of the macroeconomic objectives such as economic growth (Miftah, 2013).

In Ethiopia economic system including financial institution has become market-oriented in 1992 after thecollapse of socialism economic system and has undergone financial reforms called liberalization through gradualism (Alemayehu, 2006; Murty et al., 2012). After the policies reform, Ethiopia has been experiencing strong economic growth compared to early years; the major financial institutions operating in Ethiopia are banks, insurance companies, and microfinance institutions and the financial sector of the country shows a slightly on the way of growth but the performance of the financial sector of Ethiopia as compared to other middle-income African countries shows the need for more improvement(Fozia, 2014). This clearly show that there is still weak financial system which manifested in high government regulation and dominance of the government-owned commercial bank in terms of holding assets, savings

mobilization, and loans disbursement. In sub-Saharan countries in which Ethiopia is inclusive, the national saving is very low and insufficient to finance the development which necessitating financial sector development and attraction of foreign direct investment (Roman, 2012).

Moreover, Ethiopia's financial sector is infant stage and is highly dominated by the banking system. Ethiopia has also expreienced the non-existance of capital market and undergound informal investment in shares of private companies. Inaddition to missing market of capital including stock and equity market, money markets are at infant stage and there is only a thin primary market for treasury bills and weak inter-bank money market. There are only government issued bonds available in Ethiopia. Despite of supply of the banking service which is growing from year to year, it has not yet increased theoutreach of the banking system at large in which large populations are notserved well. This is an implication that Ethiopia still characterized by under-banked country in the world (Kiyota et al, 2007and Roman, 2012).

Regardless of whether the country are developed or developing, there is no clear cut conclusion drawn on the impact of financial development on economic growth in the emiperical investigation even though a significant amount of work has been done. Most of researchers have found a positive impact of financial development on economic growth using different indicators in accordance with development stage of financial system(Levine, 2000; Christopoulos& Tsionas, 2004;Shahbaz, 2009 and Sunde,2013)whereas some other studies have found a negative relationship between financial development and economic growth (Friedman & Schwartz, 1963; Lucas,1988; Cecchetti and Kharroubi, 2012Adusei, 2012 andBeck et al., 2013).

With regards to direction of causality, the empirical results across different countries implies that there is no clear cut conclusion on the direction of causality between financial development and economic growth rather, causality result widely differs across countries based on the individual characteristics of financial development, the pattern of economic growth, and government macroeconomic policy designed towards enhancing financial sector development (Kyophilavong et al., 2014). Moreover, some of the emipirical work reveals that the direction of causality between finance and growth largely depends on the choice of the proxy used to measure financial development in a countries specific studies(Sebina et al., 2014).

In the context of Ethiopia, there area few studies that have been conducted on the relationship between financial development and output growth at aggregate leveland have all come up with

mixed result and contradicting with each other. For instance,Haile and Kassahun (2011), Murty et.al (2012)and Melkamu (2015) have founda positive relationship between overall output growth and financial development by using different indicators with their respective study. Conversely, Fozia (2014)found that financial development has long run negative impact on aggregate output growth in Ethiopia. On another hand,the study conducted by Roman(2012) found the presence of positive and significant long-run relationship between financial development and economic growth and an insignificant effect in the short-run. In contrast to this finding, Dejene (2016) found the negative andinsignificant effect of financial development on economic growth in the long run but significant relation in the short runwhich implies controversies result toward the financial development and economic growth relationship. Except for the study of Roman (2012) who found theexistence of a uni-directional causality from economic growth to financial development, all other studies have failed to address the causality between the variables even at aggregate output level.

Moreover, the previous studies were only concentrated on the linkage between the aggregate output growth and financial development in the case of Ethiopia. The aggregate level analysis can not be relevant to draw a policies issue to sectoral specific case so as to transform the economy. In our knowledge, there is no sectoral disaggregationanalysisof output growth linkage with financial development in Ethiopia in which the financial development response differently to each economic sectors than at aggregate level.

Neglecting important sector specific analysis in the existing literature created an empirical gap for which research can be carried out and indeed might have undermined the policy relevance of inferences from the empirical evidence from such studies, especially on Ethiopia. The study fills another research gap of methodology perspectives in which Autoregressive Distributive Lag (ARDL) model which has asuperior advantage over Engle-Granger and conventional Johansson cointegration. Furthermore, exception for some long run causality studies conducted at aggregate ouput level, the direction of causality between the financial development and disaggregated sectoral output growth in the long run and short run separately were also auncovered area of research previously. Therefore, The present study has performed a disaggregated analysis of output growth mainly output growth of agriculture, industrial and services sectors and financial

development nexus by considering appropriate financial development indicators for the period 1974/5-2015/6 in Ethiopia.

1.3. Objectives of the Study:

The general objective of this study was to examine the link between financial development and sectoral output growth in in Ethiopia. More specifically, the study attempted:-

- To examine the short-run and long-run impact of financial development on the output growth of agriculture, industry and service sectors in Ethiopia.
- To examine the long run and short run direction of causality of financial development with agriculture, industry and service sectors in Ethiopia.

1.4. Hypothesis of the Study

Based on the specific objectives of the study outlined above, the following testable hypotheses were formulated:

HO_1: There is no a strong short-run and long- run relationship between financial development and output growth in the agriculture, industry and service sectors

HO_2: There are a uni-directional long run and short-run causality between financial development and agriculture, manufacturing and service sectors output growth running from sectoral output growth to financial development(demand leading hypothesis).

1.5. Significance of Study

A number of the studies were carried out on the relationship between the financial development and economic growth in Ethiopia. These includes among others, the studies conducted by Roman (2012);Murty(2012), Melkamu (2015); Fozia, (2014) and Dejene (2016) who investigated the relationship between financial development and economic growth by using different methodology and variables which proxy for measuring financial development and finally come up with different result with their respective conclusion. However, these studies fail to analyze how financial development affects sectoral output growth, through which it affects economic growth. Moreover, to the best of our understanding, studies focusing on the link between financial development and sectoral output growth as well as its direction of causality is missing.

Thus, we believe that study on thelink between financial development and sectoral output growth in Ethiopia is important due to the fact that financial sector development indicated by proxy variables may have differentiated impacts at sector levels output growth as compared to the result obtained when analyzed at an aggregate level. Therefore, this study attempts to fill the gap in theliterature in whichstudy can be taken as reference for those who willundertake a study on the area of financial developments impact on sectoral output growth. Moreover, the result of this study is expected to provide relevant information for policy makers and financial institutions inconsidering areas of intervention to develop the financial sector and promote sectoral outputgrowth, which are preconditions for sustained economic growth at thesector level.

1.6. Scope and Delimitation of the Study

The study was explored the relationship between financial development and sectoral output growth. The sectors chosen are agriculture, manufacturing and service sectors using the time series data ranging from 1975 -2016. This period is chosen based on theavailability of data. Although this study attempts to shed light on the impact of financial development on sectoral output growth in Ethiopia, yet it suffers from certain limitations. The first problem arises from alack of literature on the link between financial development with specific sectors. Secondly, the study took the output of agricultural,industrial and service as a whole but sub-sector such as manufacturing, construction, telecommunication sector and the like which are currently important for economic development were not addressed specifically.

1.7. Organization of the Paper

The study of research is organized into six chapters. The first chapter dealt with abackground of the study, statement of the problem, research objectives, hypothesis, significance of the study, scope and limitation of the study, and organization of the research paper. The second chapter presented the theoretical and empirical literature related to thefinancial development and economic growth. Chapter three presented the methodological aspects of the study, which includes: data source and method of analysis, model specification, estimation procedure, and variable definition. Chapter four overviewed the trend of thefinancial sector and economic growth in Ethiopia. Chapter five dealt the regression result and its interpretation. Finally, chapter six provided the conclusion and policy recommendation emanating from the study. All the reference materials going to be used in the study are listed under reference.

CHAPTER TWO

REVIEW OF RELATED LITERATURES

2.1. Theoretical Literature Review

2.1.1. The Finance -Growth Nexus

According to Roman (2012), financial system is defined as financial institutions and markets networking that considers a variety of financial tools which are involved in money transmission activities and facilitating the loans and credit provision among productive area of activities. Well known activities of financial institutions and markets in a given economy is that it act as intermediaries that allocating and channeling savings and other funds from depositor to borrowers and investors.

The starting points of theoretical justification of the relationship between financial development and economic growth can be traced back to the work of Schumpeter (1912) and, more recently modified in the work of McKinnon (1973) and King and Levine (1993). These authors suggested that financial development may have strong correlationwith economic growth through which a well- developed financial system performs the most important function which is manifested in term of reducing information, transaction, and monitoring costs thereby enhance the efficiency of financial intermediation.

According toDe Gregorio and Guidotti (1995), the theoretical linkage between economic growth and financial sector development has become a debatable issue among different researchers and policymakers. Accordingly, early classical economic growth theory school of thought argument implied that economic development is a implication of continous process of innovations in which financial institution and real economic sector interacted inline with innovations that provide us with a driving force for dynamic economic growth.The argument is equivalent to fact that exogenous technological progress is a dirving force to determine the long-run growth rate while financial intermediaries were not separately augumented to affect the long-run growth rate.

Unlike classical point of view, the new growth theory argues that financial intermediaries and markets are endogenously determined by the market imperfection and thereby benefit to long-run growth. So as to mitigate the problem of information and transaction cost friction, financial institutions and markets has to a solution because it is endogenously determinedthat affects decisions to invest in productivitive activities through evaluating prospective entrepreneurs and funding the most safety projects from the alternatives. This statement clearly underlines that financial intermediaries can provide these evaluation and monitoring services more efficiently than individuals would make(Kabir et al., 2010).

In contrast to thepositive contribution of financial development towards economic growth, Arcand et al.(2012) state that when finance become bigger, it is not always good for economy rather, there might be negative side effects economic growth after financial development came to climax which is non-linear relationship exists. They indicated that there may be a threshold above which financial development no longer has a positive effect on economic growth and may harm the economy and society as a whole. According to them, for example, when the financial sector grows too large, it might lead to a inefficient allocation of resources and diseconomies of scale which finally cause financial crises. In addition to the argument of Arcard et al (2012), Allen et al(2013) stated similar theoretical justification of effect of the finance on growth by saying *"too little finance is not desirable—but too much is not desirable either".*

On another hand, the theoretical aurgmet made by FitzGerald(2006) suggest that promoting financial sector development in a given economy is highly characterized by liberalization of the financial system because it makes an efficient channeling of resources through transferring investible funds from less growth enhacingactivities to more productive activities, thereby accerelate growth through increased investment.similarly, Levine (2000)argue that the financial institution at broad level play vital role in mobilizing saving and facilitating higher level of investment in country through putting the different requirements for depositor and borrowers, economy than others would do best .

There are two reason for emergencies of financial market and institutions which arecost of acquiring information and transaction cost which is theoretically supported Arrow-Debreu model. The model is claimed if there is noinformation and transaction cost, no need for afinancial system that expends resources researching projects or designing anarrangement to ease

risk management and facilitate transaction. Accordingly, Levine(1997) andDemirgüç-Kunt and Levine(2008), provided diagrammatically how market friction is reason for the emergencies of financial system thereby affects economic growth through capital accumulation and technological innovation channel.

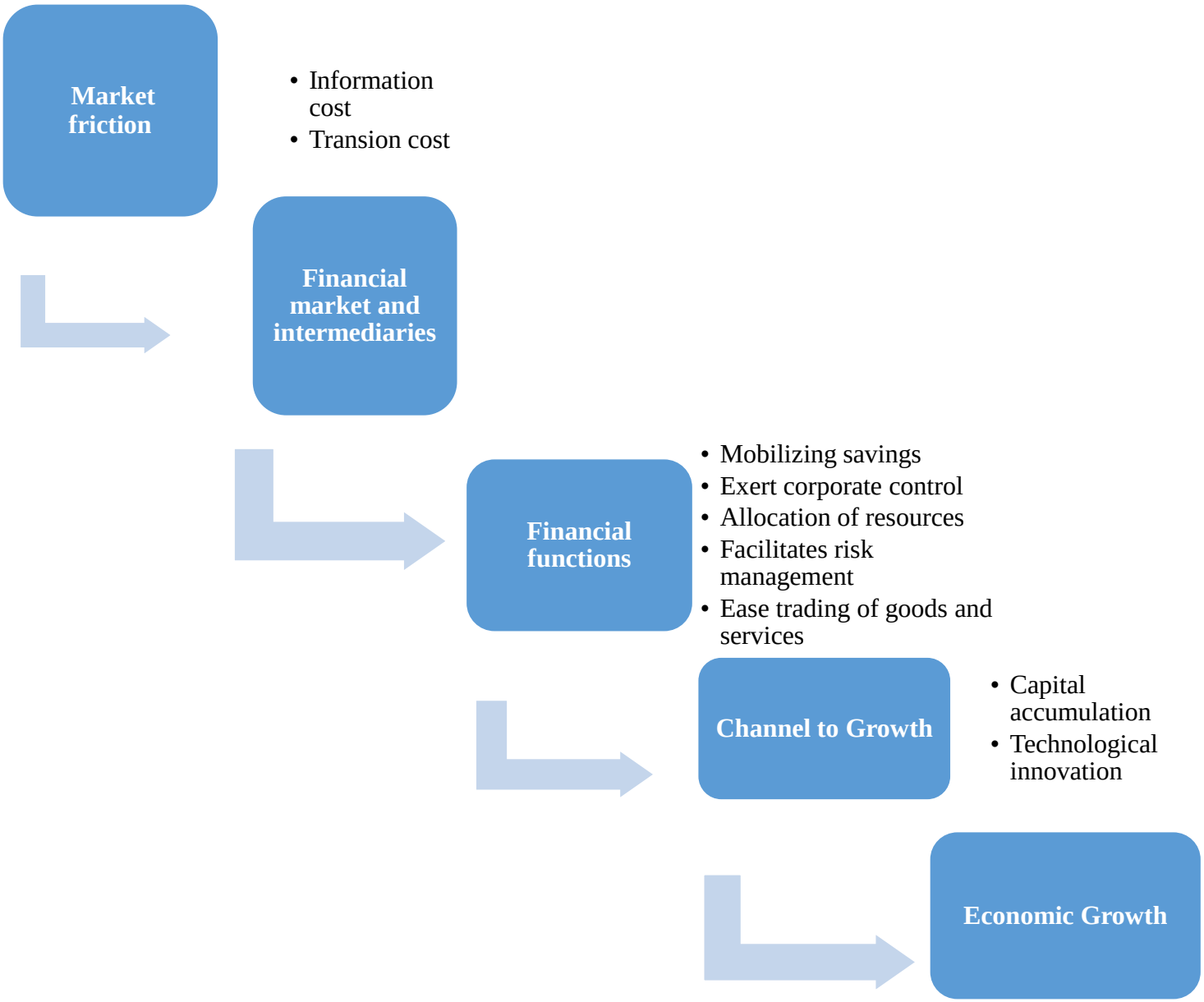


Figure2.1the theoretical approach to finance and growth

Source: (Levine, 1997 and Demirgüç-Kunt and Levine, 2008)

One of the attentions given in the literature is that financial development can influence economic growth and thereby bring structural transformation among the real sector through two distinct, yet complementary channels which are accumulation channel and allocation channel(Chimobi, 2010). The argument of accumulative channel mainly stresses the finance-induced positive effects of physical and human capital accumulation on economic growth (Pagano, 1973; DeGregorio and Kim, 2000). On other hand, scholars like King and Levine(1993) supports the allocation channels in which it emphasis on the raising efficiency of resource allocation as results of financial intermediation and then it leads to economic growth. Efficient allocation of resources to productive sector enhance economic growth through investment is the argument supporting allocative channel against accumulative channel.

the modern growth models developed by McKinnon and Shaw (1973)showed that economic development as a function of financial sector development and liberalization. They relate financial developmet with liberalization to accelerate country's economic development. They argue that when there is financial repression in the economy, there might be the existence of low levels of savings and poor andinefficient allocation of credit facilities. Financial repression means that it empede the smooth flow of resources to the financial sector and allocate funds towards unproductive economic activities. This consequently decline economic growt growth and restrains the expansion of the financial sector at large. McKinnon-Shaw model focused solely on the role of capital accumulation in economic growth. They further indicated in their model that economic growth can be increased by removing institutional interest rate discrimination and reserve requirement tax and ensuring that the financial system operates competitively under conditions of free entry under the liberalization environment.

In contrast to McKinnon and Shaw's view, the opinion of structural economists namelyTaylor (1983), Van Wijinbergen (1983) andBuffie(1984) argued that financial development has anegative effect on total real credit supply and thereby preventing economic growth.

Theoretically, link between finance and economic growth canbe analayzed through various transmission mechanism or channels. Accordingly, there are a number of theoretical frameworks to find out thethe existence of finance-growth relationship in the literature. Some theoretical justifications for the underlying relationship developed by Pagano (1993) who adopts an endogenous growth model, which presents aggregate output (Y) as alinearly combinedfunction

of aggregate capital stock (K) which is called AK model. A is the coefficient that represent the impact of K on Y. Mathematically;

$$Y_t = AK_t \quad (2.1)$$

AK model indicated in theequation operated on a competitive economy as represented by Romer, (1989) and the model assumes that technology has constant returns to scale while productivity is an increasing function of the aggregate capital stock (K). If we assume that B is a parameter by individual firms that responds to average capital stock according to $B = AK_t^{1-\partial}$ as proposed by Roseline (2010), then output of each firm will be;

$$Y = BK_t^{\partial} \quad (2.2)$$

In addition, where there is N identical number of firms, theoutput will be:

$$Y_t = Ny_t \quad (2.3)$$

If it is assumed that population is stationary(could not change) and that the economy produces a single good that can be invested and if depreciation is δ per period, Gross Investment is given by

$$GI_t = K_{t+1} - [1-\delta]K_t \quad (2.4)$$

In a closed economy with no government, capital market equilibrium requires that savings (St) be equal to gross investment (GI_t):

$$S_t = I_t \quad (2.5)$$

Another underlying assumption that a proportion of the flow of savings will be lost in the process of financial intermediation which is also proposed by Roseline (2010), therefore

$$\theta S_t = GI_t \quad (2.6)$$

Where θ is proportion of flow saving will be lost in the process of financial intermediation. From the equation (1) the growth rate at time t+1 can be derived as

$$g_t = \frac{Y_{t+1}}{Y_{t-1}} = \frac{K_{t+1}}{K_{t-1}} \quad (2.7)$$

When we ignore time trend the equation (5) will become

$$g = 1 + \frac{AGI}{Y} - \delta = 1 + A\theta s - \delta \quad (2.8)$$

Wheres = S/Y

The key theoretical justification for financial development can affect growth through an increase in θ , which is the proportion of savings channeled to investment as represented by equation (2.8). This is important to apply empirical investigation on the issue how financial sector accelerate growth through channeling saving to investment in which one of the indicator used to measure financial development is credit supply from saving moblization to the private sector for investment.As it is explained by Roseline(2010), financial development can also affect growth through an increase in A which is the social marginal productivity of capital. It may equally affect the private savings rate, s. This theoretical justification through AK model is valid even in empirical analysis. This is because of the fact that the main function of the financial intermediation is intended to increase in savings rate and increases funds hence, the deposit money banks allocates for lending purposes. He also implied that private savings increases, banks will be capable of giving out more funds to the private sector.

According to Michael(2001),a symbol*A*which denotes capital productivitywill be raised, if and only if there is an efficient financial system; basically impact of financial system on transaction costs and the saving ratio work depends on their impact on the resources available for investment. In addition to this effect on capital accumulation, the literature proved of a number of channels, through which financial activity might raise the productivity of capital *A.*Another explanation made by Michael (2001)based on above equation is that well organized and functioned financial system in term of efficiency reduces the loss of resources$(1-\delta)$ required to allocate capital. In real world phenomena, δindicatesthe transaction costs such asthe spread between banks' borrowing and lending rates,fees to market organizations or financial intermediaries,. In a competitive environmentas which assumed at beginning, the amount of $\delta$is determined by the real costs of financial intermediation. Accordingly, there are some of the factor affecting transaction cost (δ)are inefficiency provision of financial services, the redistribution of the financial intermediaries' profits to the state by taxes, and a compensation for the risk undertaken by the intermediaries.

Moreover, beyond aforementioned sholars,Demetriades and Luintel (1997) alsoused the AK growth model to show the nexus between finance and growth. Accordingly, they suggested that the country's economic growth depend positively on the average product of capital and the

proportion of resources devoted to capital accumulation whose cofficient denotes the elasticity of output with respect to capital stock in the AK model. As result, formulating policies towards promoting financial sector development can have large influence both financial intermediation process specially efficiency and the long run equilibrium growth rate through several channels. Other scholars such as Romer (1994) Greenwood & Smith (1997) used several versions of this model to analyze the relationship between the variables.

Roman (2012) reviewed model developed by Greenwood and Jovanovic (1990) in which they expressed the presence of two-way benefits of finance-growth nexus that is growth used as a means for the financial sector development and the development of the financial sector, in turn, allowed for higher growth through investment. In other word, the financial sector and economic growth are simultaneously determined in the model in response to the external shock. The same argument made by Blachburn and Hung (1998)focused on the positive, two-way mutual relationship between growth and financial development.

2.1.2. The Causality between Economic Growth and Financial Development:

2.1.2.1. Supply-Leading Vs Demand Following Hypothesis

In the literature history, finance growth causality has become econtinuous debateble issue among the economist and policy maker in which whether finance lead economic growth, or economic growth leads financial development, or whether both finance and growth are Simultaneouslyneeded at the same time to affect each other. In another expression, from the relationship between financial development and economic growth, which sector leads and which one follows in the dynamic process of economic development is the main concern in recent literature.

The debate among policy makers is catagorized as two views in the literature. The first view in the first time argued by McKinnon (1973) and Shaw (1966) was that financial development, which mainly results from financial liberalization leads to economic growth what is called asupply-leading hypothesis. The second view suggests that economic growth leads to financial development is the result of economic growth which expand the demand for financial service through higher income that devoted to increase saving and investment. In another words, a better and sustainable economic growth paves the way for financial development in a given country. Moreover, more early scholar called Robinson (1952) put his famous statement quoted regarding

causality relation was "*finance follows where enterprise leads*" so as to argue that the causal relation runs from the economic growth to the financial sector which is called demand following finance.

The argument of supporting supply-leading finance literature begins with the works of McKinnon(1973) and Shaw (1973). This is a modern branch of supply-leading hypothesis in which finance as largely supply- growth leading, i.e. real economy is positively affected the financial sector. They believe that the financial institution's activities serve as an important tool for increasing the productive capacity of the economy. That means countries having well developed financial system grow better than underdeveloped financial sector would have been happen. One of early exemplary economist Schumpeter (1911) who supported the view of finance led causal relationship between finance and economic growth in his bookof economic development theory. He argued that financial markets play a significant role in the growth of the real economy by channeling funds from savers to borrowers in an efficient way to facilitate investment in physical capital, spur innovation. He further forwarded towards promoting entrepreneurs who requires credit in order to finance the adoption of new production techniques thereby acquiring innovation and financial institution is considered as key agents in facilitating these financial intermediating activities in particularly and promoting economic development in general. Most of theEconomists supporting supply leading hypothesis by referring to the danger of financial crises, often in relation with speculative bubbles(Bhatt, 1995).

In contrast to the supply leading view, proponents of the demand following hypothesis argue that financial development basically follows economic growth and that the engines of growth must be essential for financial development. Rising incomes generated from fast growing economy provide investible funds for which the financial intermediaries exist to serve these real economic sectors (Blum et al., 2002). In other words, Economic growth creates the demand which the finance sector fulfills. The proponents of this hypothesis believe that postulate that economic growth is a causal factor for financial development. According to Gurley and Shaw(1967), as the real sector grows, the increasing demand for financial services stimulates the financial sector to grow faster.

Another scholar such as Sunde (2013), Odhiambo(2008), Waqabaca(2004) and Agbetsiafa, (2003) expressed similar way in arguing the demand lead hypothesis. they suggested that

economic growth creates demand for financial services and therefore economic growth precedes financial development. Another proponets came to argue that that economic growth plays a major role on finance while financial sector play insiginificant on growth of economy (Lucas, 1988;Adusei, 2012).

In contrasting to above two views, the theoretical justification also suggests that both arguments in favor of supply-leading and demand-following finance are equally important. However, the causal link between finance and real growth runs in both directions. This mutual interdependence at the same time is an indication that financial depth (i.e. large financial markets) drives real growth, while the growing economy's demand for finance is met by the advancing financial sector (Blum et al., 2002).

Generally, according to the idea forward by Patrick (1966), the decision toward supporting and opposing the view may be judgedbased on overall economy's development stage to decide whether its financial sector is supply-leading or demand-following. Patrick argues that underdeveloped countries can be advantagous from developing their financial sectors (supply-leading finance), whereas in highly developed economies finance becomes increasingly demand-following. This argument is highly contrasted by Gerschenkron (1962) in which his assertion is developed economies tend to become increasingly supply leading as production becomes more and more capital-intensive.

2.2. Empirical Literature Review

2.2.1. Evidence on the Causality between Economic Growth and Financial Development

Unlike the mixed views manifested in the theoretical literature, finance and growth impact empirical investigation intended to look at financial development in a more positive light cross-country analysis as well as countries specific studies conducted by different scholars though some studies are confirmed theinsignificant or negative impact of financial development on growth. However, other than impact assessment, the contemporary issue that has been emerged in empirical work is the direction of causality between financial development and economic growth which are categorized assupply leading response or school of thought, demand following aschool of thought and bidirectional school of thought (Adusei, 2014).

A different study conducted in different countriesregarding causality between financial development and economic growth in which whether the causality is supporting demand following or supply leading hypothesis or bidirectional or no causality between the variables of interest in which there are four empirical evidence on causality. There is no conclusive results found. For example, in chronological order the studies done by McKinnon (1973), King and Levine(1993),Levine et al. (2000),Majid and Mahrizal(2007), Odhiambo (2007), Quartey and Prah (2008),Bittencourt(2012)and Shahbaz(2013) are strongly confirmed the 'supply-leading'hypothesis in their empirical investigation. They found thatthe unidirectional causation running from finance to economic growth. In their finding, a country is being enjoy sustainable growth when there is developed financial sector matter.Contrary to above argument, some of scholars such as Gurley and Shaw(1967), Levine(2005), Liang & Teng (2006), Odhiambo (2007), Ang (2008); Demirgüç-Kunt and Levine (2008), Odhiambo (2010) and Rafindadi and Yusof (2013)found the 'demand following finance hypothesis' in their empirical work which argues that economic growth comes firstto accelerate financial development than otherwise.

The third category of direction of causality between the variable is bi-directional school of thought as empirically evidenced by different scholars such as Greenwood and Smith(1997); Majid(2007); Rousseau and Vuthipadadorn (2005); Jenkins and Katircioglu(2010) and Kyophilavong et al. (2016)who submits in their empirical work that there is the bidirectional relationship exists.

Contrary to aforementioned three schools of thought with regard to thedirection of causality, some other empirical work confirmed that there is no causality between financial development and growth. Such study has conducted by De Gregorio & Guidotti (1995) and Gries et al. (2009) as well. According to them, neither financial development nor economic growth are endogenously determined.

2.2.2. Evidence on the Impact of Financial Development on Output Growth

2.2.2.1. Evidence on Country- Specific Studies of Finance and Output Growth

There has also been a movement away from applying time-series methods to a variety of countries and toward examining individual countries, which allows research to design country-specific measures of financial development.

Accordingly, Nkoro and Uko(2013) examined the finance-growth nexus in Nigeria. They employed Error Correction Mechanism (ECM) with anannualseries covering the period, 1980-2009. They also used five different indicators namely; ratios of broad money stock to GDP, private sector credit to GDP, market capitalization-GDP, banks deposit liability to GDP and Prime interest rate were used to measure financial development. The empirical results show that there is a positive effect of financial sector development on economic growth in Nigeria. However, credits to theprivate sector and financial sector depth were found to be ineffective and fail to accelerate growth. However, this study did not address the problem of endogeneity which is a problem in time series studies since the relationship between financial development and economic growth cannot be determined on a priori grounds.

Karbo and Adamu (2011)analayzed the nexus between financial development and economic growth in Sierra Leone over the period 1970-2008 and employed methodology for analysis was autoregressive distributed Lag (ARDL) model. They found that financial development as represented by private credit exerts a a positive and statistically significant effect on economic growth and concluded that investment is an important allocative channel through which financial development affects economic growth. A similar conclusion has been drawn early by Sanusi & Sallah(2007) that they investigated the relationship between financial development and economic growth in Malaysia data covering period of 1960 to 2002 using autoregressive distributed lag (ARDL) and took different financial development indicator to compare their significance on growth. Finally, they come up with apositive and statistically significant impact on economic growth in the long-run when only ratio of broad money to GDP and bank credit used as indictor. Moreover, similar to other conclustion that a rise in investment will encourage economic growth in the long-run.

Murcy et al.(2015)examined the relationship between financial development and economic growth in Kenya using annual time series data. They employed autoregressive distributed lag (ARDL) so as to accommodate small sample data sriesand to address the problem of endogeneity and found that financial development has a positive and statistically significant effect on economic growth in Kenya in long run and short run hence confirmed supply leading hypothesis.

2.2.2.2. Evidence on Sectoral Specific Studies of Finance and output Growth

Some of theempirical studies have been conducted on the relationship between the impact sectoral output growth by taking a sector growth independently and financial development to spill out the relative impact of sectoral output growth in country specific case.

For instance, Yazdani (2008) employed cointegration and causal relationship between financial development, capital stock, real interest rate, international trade and agriculture growth in case of theIranian economy. He found out that variables are co-integrated for thelong-run association. Its causality analysis implied that financial development Granger-caused agriculture growth. In the same country with methodology including Error correction model, other empirical investigation done by Yazd and Khanalizadeh(2012) who examine the causal relationship between the dynamic financial development, agricultural economic growth, and instability by using annual time series covering the period 1970-2011. They suggested that there is bidirectional causality between agricultural economic growth and financial development. But, both studies failed to incorporate other influential sectors in the analysis.

Furthermore, Afangideh(2009) studied the impact of financial development on investment in agriculture and agricultural production by using three-stage least squares (3SLS) approach (historical simulation approach) in Nigeria. The cointegration results confirmed that gross national savings, bank loans for agriculture, agricultural investment and agricultural production are co-integrated for a long term relationship. In addition, the results show that the increase in bank lending improves the performance of the agriculture sector by improving real gross national saving and real production. In line with Afangideh(2009)finding, Anthony(2010) explored the role of agriculture credit, interest rate and theexchange rate for the same country. The finding come up with that agriculture credit improves the efficiency of theagriculture sector and agriculture sector promotes economic growth.

Akpaeti(2010)also evaluated the effect of financial sector reforms on agricultural investments in Nigeria from 1970-2009 using a Jhonson cointegration and vector error correction model (VECM) in a long time series analysis and revealed that financial sector reforms significantly affect agricultural investments in Nigeria both in the long and short-run. Other similar study in the same country conducted by Toby and Peterside(2014) analyzed the role of banks in financing the agriculture and manufacturing sector by employing two multiple regression models over the

time span of 1981 – 2010 years data and found the evidence that there is significantly positive correlation between merchant bank lending and agriculture and manufacturing sector contribution to GDP whereas the result differs in role of commercial bank lending to two sectors mainly they found a significantly weak correlation between commercial bank lending and agricultural sector contribution to GDP and inverse relationship with manufacturing sector contribution to GDP. They justified for the limited role of banks in facilitating the contribution of the agriculture and manufacturing sectors to economic growth is that the rise of numerous public intervention funding programs in these sectors lagged behind banking intermediation.

Similar study done by Ebi and Emmanuel(2014) analyzed the implications of commercial bank loans on economic growth in Nigeria particularly commercial bank loans to key sectors like industrial, manufacturing, agriculture and the service sectors, using the Ordinary Least Square (OLS) multiple regression techniques; and finally revealed that only the agricultural sector have been enjoying much of Bank credit and it is statistical significant positive impact on the Gross Domestic products (GDP) while others like Mining and Quarrying, Manufacturing and the Building and Constructions sectors have not been getting much attention in terms of bank credit to spur development in that sector.

Udoh and Ogbuagu(2012) used autoregressive distributed lag (ARDL) cointegration technique for Nigerian time series data covering the period 1970 to 2009 and found that a co-integration relationship between financial sector development and industrial production. Both the long run and short run dynamic coefficients of financial sector development variables have anegative and statistically significant impact on industrial production.

Hye and Wizarat(2011) examined the effect of financial liberation on agriculture growth by employing convetional Cobb-Douglas function for the case of Pakistan using ARDL bounds testing approach to co-integration. They indicated that financial liberalization has apositive impact onthe performance of agriculture sector in long-run and short run.

Furthermore, Imoughele et al.(2013) study investigated the impact of commercial bank credit accessibility and sectoral output performance in Nigerian economy for the period which spanned between 1986 and 2010. An augmented growth model was estimated through the Ordinary Least Square (OLS) techniques to examine the relationship between various commercial bank credits and sectoral output growth. Their contigration results depicted that the different commercial

bank credit supply and other control variables included in the model have a long run relationship with sectoral output performance namely, agricultural, manufacturing and services sector output. The core finding implied that the main demand for acredit facility in Nigeria was the manufacturing sector. On another hand, they found that commercial bank credit has adirect and insignificant impact on sectoral output performance but cumulative supply and demand for credit in the previous period has adirect and significant impact on the growth of agriculture, manufacturing and the services sectors output. Based on the result from regression they argued that the finding highly attributed to the vital importance of credit facility as an input in the production process and persistent inflow to the manufacturing, Agriculture, and services sectors have the capacity to induce the growth and development of the sectors.

Similar to above studies, Muhammad et al.(2011) investigated the relationship between financial development and agriculture output growthby using Cobb-Douglas function so as to include financial development as an important input for production for the period 1971-2011. In order to examine the relationship the ARDL bounds testing approach to cointegration used and VECM Granger causality test employed to know thedirection of causality among financial development and output growth in agricultural sector. Their cointegration finding confirms that the variables are cointegrated for theequilibriumlong-run relationship between agriculture growth, financial development, capital, and labor. Specifically, they found financial development positively boost agricultural growth. Regarding the Granger causality analysis, they obtained bidirectional causality between agricultural growth and financial development.

2.2.2.3.Evidence onthe Financial Development and Output Growth for the case of Ethiopia

The empirical studies have been undertaken in Ethiopia primarily on the relationship between financial development and economic growth at theaggregate level. Among empirical studies, Haile and Kassahun(2011) investigated the link between financial development and economic growth using data of Ethiopia from 1972-2010 and finally found a positive link between the two. But, they did not say anything about the causality between financial development and GDP growth.

Other study by Roman (2012) investigated the link between the financial development and economic growth by using ECM Model and found that the existence of a uni-directional

causality from economic growth to financial development and the presence of positive and significant long-run relationship between financial development and economic growth and an insignificant effect in the short-run which implies controversies result toward the financial development and economic growth relationship in line with other studies in the same area. On another hand, Murty et al.(2012) investigatedthe 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.Their focus of theinvestigation was transmission mechanism through which bank credit to the private sector affects economic growth and found that a positive and statistically significant equilibrium relationship between bank credit and economic growth in Ethiopia. Moreover, they also come up with results that deposit liabilities affect long-run economic growth positively and significantly through banks services of resource mobilization. Basically, their finding show that bank credit to the private sector affects economic growth through its role in theefficient allocation of resources.

In the same manner, Melkamu, (2015) conducted the impact of commercial banks development on economic growth by using ordinary least square(OLS) method and found that a positive and significant relationship among economic growth, deposit and loan and advances whereas negative and significant association ship between economic growth and bank size i.e. asset.

Fozia, (2014), tried to investigate the effect of thefinancial sector on the economic growth of Ethiopia over the period of 1980-2013 by employing ordinary least square method to determine both long-run and short-run effects of financial development on economic growth. An indicator of financial development used by theresearcher was commercial-central bank asset ratio whereas variables such as openness lagged real GDP, total investment, aid, and labor force were used as conditioning variables. She found a negative and significant effect of financial development indicator (i.e. commercial-central bank asset ratio) on the economic growth of Ethiopia. In addition, regarding control variables she used indicated that trade openness and labor force had an expansionary effect on the economic growth whereas aid showed a significantly negative effect on the economic growth.

Furthermore, the current study was done by Dejene(2016) who undertaken empirical investigation of the relationship between financial development and economic growth by using VAR approach and Johnson cointegration, and found that financial development has negative

coefficient and insignificant effect in the long run but significant relation in the short run which is conflicting results with the Roman(2012) finding.

The studies implied in Ethiopia context are come up with thedifferent result which is difficult to draw arelevant conclusion on the relation between financial development and economic growth in one hand and in another perspective, the sectoral output response to financial development is not addressed.

2.3. Conceptual Framework

The conceptual framework in Figure 2 indicate sectoral output growth mainly agriculture, manufacturing and service sectors are dependent variable on the financial development which is represented by bank credit to agriculture, manufacturing and service sector; market liberalization indicated by trade openness; the size of government represented by government consumption expenditure and another independent variable such as human capital, gross investment, and inflation which are expected to affect the sectoral output growth.

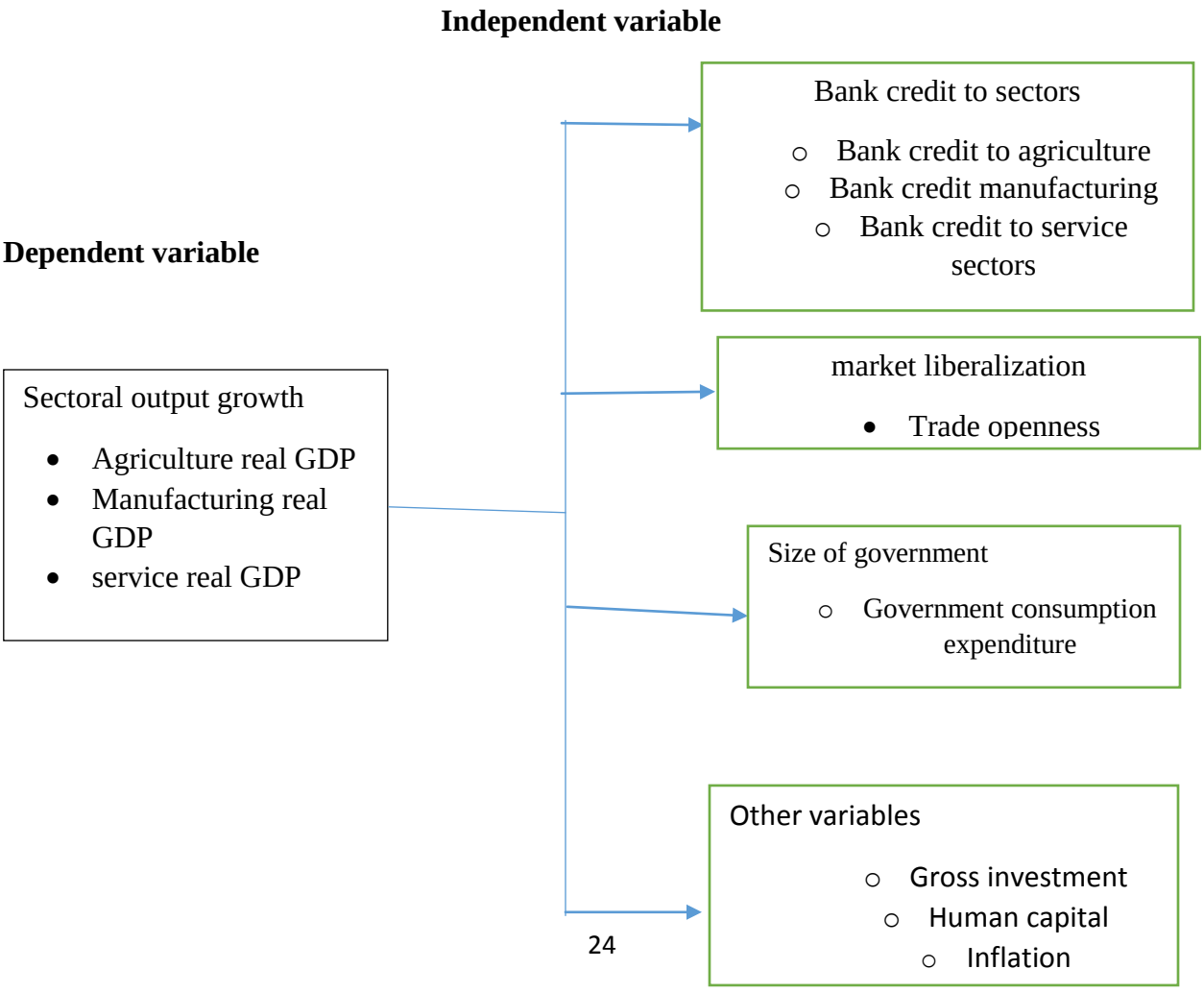


Figure 2.2: Self-constructed conceptual Framework for finance and sectoral output growth

CHAPTER THREE

DATA AND METHODOLOGY OF THE STUDY

3.1. Data Type and Source

The annual time series data set serially ranging from 1974/75 to 2015/16 has been employed in the current study. The study used sectoral dis-aggregate macro-data based on the availability of relevant data for the study. The relevant data was collected from various sources: National Bank of Ethiopia, Ethiopia Development Bank, Ministry of Finance and Economic Development (MoFED), Ethiopian Economic Association, World Bank, World Development Indicator database.

3.2. Methods of Data Analysis

In order to conduct the study, the researcher has used both descriptive and econometric methods. The descriptive statistical tools such as tables, charts, and graphs were used mainly to analyze the trend and performance of thefinancial sector and sectoral economic growth over the study year while standard econometric techniquewas applied to analyze the link between financial development and sectoral economic growth during the study period. Furthermore, Eviews 9.0 latest version was used as statistical software for entire analysis the empirical study.

3.3. Model Specification

In analyzing the relationship between financial development and sectoral output growth, the researcher employed augmented Solow growth model based onImougheleet al. (2013) who attempted to analyze commercial credit accessibility and sectorial output performance in a deregulated financial market in Nigeria. They adopted augmented Solow production functionin which output is a function of stock of capital, labor, human capital, and technology(Solow,

1956). This model is different from that of traditional solow growth model by incorporating human capital as a factor of production in which it is endogenously determined within model.

Imoughele et al (2013) and Adebola and Dahalan (2012)analyzed the effect of financial sector development on economic growth within standard growth accounting framework and assumed that capital stock is delivered by two sector – banking sector and thestock market. Similar assumption had been taken in anearly studybyCaporale et al. (2004), and Bolbol et al(2005). However, in Ethiopia context, thestock market is missing. So, it is ignored from the model specification.

In cobb-Douglas production function framework, the augmented Solow growth model can be specified as

$$Y_t = A_t K_t^{\partial} L_t^{\beta} H_t^{\gamma} \quad \text{---------- (3.1)}$$

Where Y is the output flow, L is labor force, K is capital stock and H is human capital. As described above the total capital stock is represented by banking sector (financial sector development) indicators. Therefore,

$$Y_t = A_t K_{FDt}^{\alpha} L_t^{\beta} H_t^{\gamma} \quad \text{---------- (3.2)}$$

Furthermore, the effect of technology (A_t) is divided into constant term β_0 and country specific deviation ε(Mankiw, Romer and Weil, 1992 as also cited by Imoughele et al.,2013). Taking the above equation in to natural logarithm so as make log linear form for estimation purpose, it can be:

$$lnY_t = \beta_0 + \alpha lnK_{FDt} + \beta lnL_t + \gamma lnH_t + \varepsilon_t \quad \text{---------- (3.3)}$$

As long as the study concern the relationship between the total capital stock represented by financial sector (banking sector) indicators, adopting this model to focus on the relationship between financial development and sectoral economic growth is necessary. We could not use labor in the equation because we have human capital variable which is more important to represent more human skills than labor. This is similar toBeck and Levine (2004) and Imoughele et al (2013). Thus, we are left with the following equation:

$$lnY_t = \beta_0 + \alpha lnK_{FDt} + \gamma lnHK_t + \varepsilon_t \quad \text{---------- (3.4)}$$

Rather than taking theentire unexplained variable in the technology which is exogenously determined, including additional combination variables in the model that should be aproxy for technology is important because it makes the model more predictable and appropriate to know the accurate effects these variable on economic growth (Imoughele et al., 2013). Therefore, $\varepsilon_t = X_t + U_t$, the above equation can be rewritten as below when control variables are included;

$$lnY_t = \beta_0 + \alpha lnK_{FDt} + \gamma lnHK_t + \pi X_t + U_t \quad (3.5)$$

Where K_{FDt} is total capital stock provided by banking (financial) sector and HKt is human capital proxy by secondary school enrollment whereas X_t is a vector of control variables in which we have considered the variables that are not included in the reference model. Thefore, the control variables that are not included in the previous or reference model includesgross investment as ratio of GDP, government consumption expenditure as % of GDP as proxy for the size of the government and trade openness (import plus export as percentage of GDP) as a proxy for market liberalization whereas inflation rate is included in both modified and reference model as control variable.Furthermore, other modification has been a methodology used to estimate the model that the reference model was estimated by applying simple OLS method by ignoring non-stationary of the data series while we have employed ARDL model to estimate the model.

Since the aim of this study was to examine the relationship between thefinancial sector and sectoral output growth, the model for this study was re-specified as follows with some modification which is different from previous one.

Real GDP = f (HK, GI, FD, INFLATION, GCE, TO) ---------- (3.6)

Whereas GI is agross investment to GDP; FD is financial developmet;GCE is government consumption expenditure as % of GDP as aproxy for the size of the government; TO is trade openness (import plus export as apercentage of GDP) as a proxy for market liberalization and other variables are stated earlier.

As stated in the empirical literature review, many scholars such asDawson (2008), Huang & Lin (2009), Rousseau & Wachtel (2011), Anwar & Cooray (2012) and Petra et al. ,(2013) used financial development (FD) indicators in developing countries in which Ethiopia inclusive are adomestic credit to private sector as % of GDP, Broad money as a % of GDP, Deposit liabilities

and bank credit to economic sector among the others. As result, we usedBank credit to economic sectors mainly agriculture, industryand service sectors as proxy or indicators of financial development.

Finally, the modified model specified in each sector as follows.

A. In agricultural sector

RAGDP = f (HK, GI, BCA, INFLATION, GCE, TO) ---------- (3.7)

B. In industry sector

RIGDP = f (HK, GI, BCI, INFLATION, GCE, TO) ---------- (3.8)

C. In service sector

RSGDP = f (HK, GI, BCS, INFLATION, GCE, TO) ---------- (3.9)

Where in equation 3.7, 3.8 and 3.9, RAGD, RIGDP, and RSGDP are thereal gross domestic product of agriculture, Industry and service sector respectively while BCA, BCI and BCS are bank credit to agriculture, industry and service sectors respectively.

Sinceall the variables under study were transformed into Log data except inflation rate so as avoid heteroscedasticity(Gujarati., 2004) and to show elasticity of the variables; the growth function of equation 3.6-3.9 can be re-written as:-

Equation for relationship between financial development and economic growth at aggregate level by using domestic bank credit(BC) as a proxy for financial development;

$$LNRGDP_t = \beta_0 + \beta_1 LNHK_t + B_3 LNGI_t + B_3 LNBC_t + B_4 INFLATION_t + +\beta_5 LNGCE_t + B_6 LNTO_t + U_t \quad (3.10)$$

Linear equation for agricultural sector:

$$LNRAGDP_t = \beta_0 + \beta_1 LNHK_t + B_3 LNGI_t + B_3 LNBCA_t + B_4 INFLATION_t + +\beta_5 LNGCE_t + B_6 LNTO_t + U_t \quad (3.10)$$

The equation for Industry sector:

$$lnRIGDP_t = \beta_0 + \beta_1 LNHK_t + B_3 LNGI_t + B_3 LNBCI_t + B_4 INFLATION_t + +\beta_5 LNGCE_t + B_6 LNTO_t + U_t \quad (3.10)$$

Equation for service sector:

$$LNRSGDP_t = \beta_0 + \beta_1 LNHK_t + B_3 LNGI_t + B_3 LNBCS_t + B_4 INFLATION_t + +\beta_5 LNGCE_t + B_6 LNTO_t + U_t \quad (3.10)$$

3.3.1. Variable Description and Expected Sign

Real GDP is the real market value of the goods and services produced by an economy over time. It is conventionally definition is the increase in real Gross Domestic Product which means that adjusted for inflation.

RAGDP, RIGDP & RSGDP (real GDP of agriculture, industry and service sector) are the real market value of the goods and services produced by an economy in agriculture, manufacturing and service sectors respectively over time. Since most economists argue that economic growth can be measured as growth in real GDP, it included in the model as amain dependent variable in order to measure output growth at sectoral level. In order to avoid the inconsistency associated with different base year price while computing sectoral real GDP, this study was used the real GDP (constant value), which is deflated by Ministry of Finance and Economic Development (MoFED) based on the constant price of 2010/11.

HK (human capital): difficulty in measuring human capital as explained by adifferent economist. As a result, different researchers use different proxy of human capital such as school enrollment like primary, secondary and tertiary level; labor force age group from 15 up to 65; life expectancy; literacy rate; expenditure to education and health to indicate as major determinants of economic growth in long term(Tewodros, 2015). Therefore, this study usedgross

secondary school enrollment as aproxy of human capital and the sign of the coefficient was expected positive. Similar proxy used by Murty et al.(2012), Imoughele et al.(2013), Murty et al.(2015) to measure human capital.

GI (gross investment to GDP):- gross Investment is a powerful catalyst for economic growth in each economic sector through enhancing theproductive capacity of theeconomy as well as creating new opportunities for acquiring new and more efficient techniques of production thus increasing the rate of capital accumulation. It comprise both private and public investment. Therefore, gross investment to GDP is expected to have a positive sign for agriculture, industry and service sector.

BCA (bank credit to agricultural sector), BCI (bank credit to industry sector) and BCS (bank credit to service sector): This explanatory variable used as financial development measurement in analyzing its impact on sectoral output growth. This because credit provided by thefinancial institution is geared towards the achievement of fast economic growth in therespective sector through capital accumulation. Some of the scholars used bank credit to thesector as anindicator of financial development,for example, Yazdani(2008), Afangideh (2009),Sharif et al.(2009), Anthony (2010), Hyeand Wizarat(2011); and Yazd and Khanalizadeh (2012). The expected sign of variable was positive

Inflation: Inflation proxy by consumer price index is defined as an increase in the overall price level in a country and measured in percent. Ethiopian inflation has been given due attention as it becomes series problem since 2008 because it adversely affected economic growth. Therefore to analyze its effect on sectoral economic growth, it is included in this study as anindependent control variable. The coefficient of this variable was expected to be a negative sign.

GCE (government consumption expenditure) represents the total amount of government consumption as a percentage of GDP to proxy the size of government for the period under consideration have important variables affecting sectoral economic growth. This variable included in the model because increased governmentconsumption will imply that fewer resources are channeled towards developmental activities. Hence, as the government consumption inccreaseresults a decrease in economic growth of a country(Murty et al, 2015).The coefficient of this variable upon three sectors expected to be a negative sign.

TO (the openness to trade as a proxy for market liberalization), which is defined as the addition of export and import divided by GDP. Openness to trade is often hypothesized to raise growth in each sector through several channels, such as access to advanced technology from abroad, possibilities of catch-up, greater access to a variety of inputs for production, and access to broader markets that raise the efficiency of domestic production through increased specialization. Different measures of openness have been proposed and tested. But there is no standard measure emerged up to now. Scholars such asDurbarry et.al(1998) used to measure trade openness by the total trade as percentage of GDP and changes in the terms of trade. Murty et al. (2012) and Roman (2012) used Import plus export divided by GDP to measure trade openness. We were used the ratio of import plus export to nominal GDP. The expected sign of the variable was positive.

Table 3. 1: Summary of variable, expected relationship with dependent variables

Variable	Proxy/Measurement	Notation	Expected sign	Remark
Dependent variable				
Agricultural Real GDP	The value added of real total agricultural GDP	RAGDP		
Manufacturing Real GDP	The value added of real total manufacturing GDP	RMGDP		

Service Real GDP	The value added of total manufacturing GDP	RSGDP		
Independent variables(explanatory variables)				
Bank credit to Agriculture, manufacturing and service sector.	The amount of credit provided to each respective sector.	BCA, BCM & BCS receptively	Positive	Imoughele et.al. (2013) used to measure financial sector
Human capital	Hunan capital proxy by secondary school enrollment	HK	Positive	Murty et al. (2012) used gross enrollment of secondary school
Inflation	Consumer price index(CPI)	INF	Negative	
openness to trade	Adding the amount of export and import of good and service divided by GDP	TO	Positive	
Government consumption expenditure	the total amount of government expenditure as a percentage of GDP	GSE	Negative	.
Gross investment	Total amount of gross investment in billion birr	GI	Positive	

3.4. Estimation Procedure

As long as testing the long run relationship and causality between thedependent variable (sectoral output growth) and independent variables (human capital, gross investment, Bank credit to each sector, inflation, government consumption and trade openness)are concerned, the study applied Autoregressive Distributed Lag (ARDL) Model. The first task in this study was investigating the time series properties of our data by using Augmented Dickey-Fuller (ADF) and Philip-Perron (PP) tests. This mean that the unit root tests were used to check the stationarity of the variables and to check noneof the variables are not greater than order one (i.e. I (1)), as well as none of the dependent variables, were stationary at level which is precondition to applying ARDL model(Pesaran et al., 2001).

3.4.1. Unit Root Test

Unit root test is critical and mandatory to test for the statistical properties of variables when dealing with time series data. This is because of that time series data are rarely stationaryin level forms. Regression involving non-stationary (I.e., variables that have no clear tendency to return to a constant value or linear trend) time series often lead to the problem of spurious regression.This type of regression happens when the regression results come up with a high and significant relationship among variables but, actually, there is no relationship between variables. Moreover, the usual test statistics (t, F, DW, and R^2) will not possess standard distributions if some of the variables in the model have unit roots (Stock and Watson, 1988). The other necessary condition to be addressed for testing unit root test is to check whether the variables enter in the regression are not order two (I.e. I(2)) which is aprecondition in employing ARDL model. Therefore, running any sort of regression analysis is impossible without testing for time series variables. So, the first step in this study is testing unit root before running regression analysis.

The testing procedure for the ADF unit root test is specified as follows:

$$X_t = \alpha + \delta t + \mu X_{t-1} + \sum_{i=1}^{\rho} \lambda \Delta X_{t-i} + \varepsilon_t \quad (3.11)$$

Where is $\boldsymbol{X_t}$ a time series variables which are mentioned above in this model at time t, t is a time trend variable; Δ denotes the first difference operator; is the error term; $\rho$is the optimal lag length of each variable chosen such that first-differenced terms make ε_t a white noise. Thus, the ADF test the null hypothesis of no unit root (stationary) which is expressed as follows

$$H_0: \mu = 0;\ H_1: \mu \neq 0 \quad (3.12)$$

Regarding decision of unit root test, if the t value or t-statistic is more negative than the critical values, the null hypothesis (I.e. H0) is rejected and the conclusion is that the series is stationary. Conversely, if the t-statistic is less negative than the critical values, the null hypothesis is accepted and the conclusion is that the series is non-stationary.Failure to reject the null hypothesis of unit root test leads to take the test on the difference of the time series to come up out with stationary variable for analaysis.

3.4.2. The Autoregressive Distributed Lag Model (ARDL)

Most of past studies have used the Johansen co-integration and Engle-Granger causality technique to determine the long-term relationships between variables of interest. This is because many researchers confirms that most of theaccurate method to employ this method when the variables of interest are integrated in the same order. Recently, however, a series of studies by Pesaran et al. (2001); Pesaran and Shin(1999) and Nayaran(2004); have introduced an alternative co-integration technique known as the 'Autoregressive Distributed Lag (ARDL)' bound test. There are numbers of advantages of using ARDL model also called 'Bound Testing Approach' over conventional Engle-Granger two-step procedure, Maximum likelihood methods ofcointegration(Johansen, 1988; Johansen and Jtiselius, 1990). The advantages of using ARDL approach over other methods includes:-

First, the ARDL model is the more statistically significant approach to determine the the co-integration relation in small samples (Pesaran et al., 2001; Nayaran, 2004), while Johansen co-integration techniques require large data samples for valid estimation of the parameters. This means that the model avoids the problem of biases that arise from small sample size (Chaudhry and Choudhary, 2006). Therefor we employed ARDL approach because relatively the sampleused in thestudy is small.

Secondly, the estimation is free from the endogeneity problem. In this approach of Pesaran and Shin(1999) maintain that modeling ARDL with the appropriate number of lags will address autocorrelation and endogeneity problems because it is possible that different variables have different optimal numbers of laggs, whereas in Johansen-type models this is not possible rather take the same lag length for all variables. According to Jalil et al. (2008), no doubt on the problem of endogeneity if the estimated ARDL model is free of autocorrelation.

The third advantage of the ARDL approach is that the it can be applied whether the regressors are purely ordered zero [I(0)], purely order one [I(1)], or amixture of both. while other cointegration techniques require all of the regressors to be integrated of the same order. This means that the ARDL approach avoids the pre-testing problems associated with standard cointegration, which requires that the variables be already classified into I(1) or I(0) or mixture of both (Pessaran *et al.,* 2001).

Moreover, the other advantages of bound testing approach in the long run and short run is that parameters of the model in interested variables are determined simultaneously (Nasiru, (2012)Finally, applying the ARDL technique we can obtain unbiased and efficient estimators of the model (Narayan, 2004), (Pesaran & Shin 1995). Therefore, this approach becomes popular and suitable for analyzing the long-run relationship and extensively applied in empirical research in the recent years.

Hence, at the aggregate level, ARDL model can be specified as:

$$\Delta LNRGDP_t = \beta_0 + \beta_1 LNRGDP_{t-1} + \beta_2 LNHK_{t-1} + \beta_3 LNGI_{t-1} + \beta_4 LNBC_{t-1} + \beta_5 INFLATION_{t-1} + \beta_6 LNGCE_{t-1} + \beta_7 LNTO_{t-1} + \sum_{i=1}^{p} \alpha_i \Delta LNRGDP_{t-i} + \sum_{j=1}^{q} \alpha_j \Delta LNHK_{t-j} + \sum_{k=1}^{r} \alpha_k \Delta LNGI_{t-k} + \sum_{l=1}^{s} \alpha_l \Delta LNBC_{t-l} + \sum_{m=1}^{v} \alpha_m \Delta INFLATION_{t-m} + \sum_{n=1}^{y} \alpha_n \Delta LNGCE_{t-n} + \sum_{o=1}^{w} \alpha_0 \Delta LNTO_{t-o} + U_t \quad (3.13)$$

However, in sectoral output growth case:-

1. I**n agricultural sector output growth, the ARDL model** can be specified as:

$$\Delta LNRAGDP_t = \beta_0 + \beta_1 LNRAGDP_{t-1} + \beta_2 LNHK_{t-1} + \beta_3 LNGI_{t-1} + \beta_4 LNBCA_{t-1} + \beta_5 INFLATION_{t-1} + \beta_6 LNGCE_{t-1} + \beta_7 LNTO_{t-1} + \sum_{i=1}^{p} \alpha_i \Delta LNRAGDP_{t-i} + \sum_{j=1}^{q} \alpha_j \Delta LNHK_{t-j} + \sum_{k=1}^{r} \alpha_k \Delta LNGI_{t-k} + \sum_{l=1}^{s} \alpha_l \Delta LNBCA_{t-l} + \sum_{m=1}^{v} \alpha_m \Delta INFLATION_{t-m} + \sum_{n=1}^{y} \alpha_n \Delta LNGCE_{t-n} + \sum_{o=1}^{w} \alpha_0 \Delta LNTO_{t-o} + U_t \quad (3.14)$$

2. **In Industrial sector output growth,** the ARDL model can be specified as:

$$\Delta LNRIGDP_t = \beta_0 + \beta_1 LNRIGDP_{t-1} + \beta_2 LNHK_{t-1} + \beta_3 LNGI_{t-1} + \beta_4 LNBCI_{t-1} + \beta_5 INFLATION_{t-1} + \beta_6 LNGCE_{t-1} + \beta_7 LNTO_{t-1} + \sum_{i=1}^{p} \alpha_i \Delta LNRIGDP_{t-i} + \sum_{j=1}^{q} \alpha_j \Delta LNHK_{t-j} + \sum_{k=1}^{r} \alpha_k \Delta LNGI_{t-k} + \sum_{l=1}^{s} \alpha_l \Delta LNBCI_{t-l} + \sum_{m=1}^{v} \alpha_k \Delta INFLATION_{t-k} + \sum_{n=1}^{y} \alpha_n \Delta LNGCE_{t-n} + \sum_{o=1}^{w} \alpha_0 \Delta LNTO_{t-o} + U_t \quad (3.15)$$

3. **Similarly, in service sector output growth**, the ARDL model can be specified as

$$\Delta LNRSGDP_t = \beta_0 + \beta_1 LNRSGDP_{t-1} + \beta_2 LNHK_{t-1} + \beta_3 LNGI_{t-1} + \beta_4 LNBCS_{t-1} + \beta_5 INFLATION_{t-1} + \beta_6 LNGCE_{t-1} + \beta_7 LNTO_{t-1} + \sum_{i=1}^{p} \alpha_i \Delta LNRSGDP_{t-i} + \sum_{j=1}^{q} \alpha_j \Delta LNHK_{t-j} + \sum_{k=1}^{r} \alpha_k \Delta LNGI_{t-k} + \sum_{l=1}^{s} \alpha_l \Delta LNBCS_{t-l} + \sum_{m=1}^{v} \alpha_m \Delta INFLATION_{t-m} + \sum_{n=1}^{y} \alpha_n \Delta LNGCE_{t-n} + \sum_{o=1}^{w} \alpha_0 \Delta LNTO_{t-o} + U_t \quad (3.16)$$

- As represented in the three sector output growth and theaggregate output growth equation of the ARDL model, the symbol Δ is the first difference operator;*p, q, r, s, v,y*and*w*are the lag length with their respective variables and $U_t$error term which is assumed to be serially uncorrelated.

- $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6\ and\ \beta_7$indicates coefficients that measure long run elasticies between the variable whereas $\alpha_i, \alpha_j, \alpha_k, \alpha_l, \alpha_m, \alpha_n\ and\ \alpha_o$ indicates coefficients that measure short-run elasticities among the variable.

The first step involved in ARDL model is to testthe null hypothesis of no cointegration relationship which is defined as $H_O = \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_5 = \beta_6 = \beta_7 = 0$ against the alternative hypothesisof$H_1 \neq \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_5 \neq \beta_6 \neq \beta_7 \neq 0$of the existence of co integrating relationship between the variables.

The co-integration test has been undertaken on the F-statistic with help of thebound test of ARDL. The F-test has a non-standard distributionwhich depends on (1) whether the variables include in the model are I(0), or I(1), (2) the numbers of regressors, and (3) whether the model contains an intercept and/or a trend (Narayan, 2004). Thus Pesaran (1997) and Pesaran*et al.* (2001) have come up with two sets of critical values which are called upper and lower critical bound for cointegration test. The lower critical bound takes in to consideration that all the variables are stationary at level to evaluatethat there is no cointegration among the variables whereas existence of cointegration depicts when the upper bound takes that all the variables are stationary only at first difference.

Accordingly, when calculated the *F*-statisticis greater than the upper critical bound, then the null hypothesis will be rejected suggesting that there is apresence of long-run relationshipamong the variables while the F-statistics falls below the lower critical bound value, it implies that there is no long-run relationship. However, when the F-statistic lies within the lower and upper bounds, then we can have no decision made up on cointegration. In this case, unit root tests should be conducted to assure the order of integration of the variables(Pesaran *et al.*, 2001). This is due to the fact that ARDL bound testing is inapplicable when the variables are integrated of order 2 or higher order.

The standard test for aunit root is to use Augmented-Dickey (ADF) and Phillips-Perron (PP)t-test statistics. The selection of the lag length was based on Akaike Information Criterion (AIC) which was automatically selected by E-views software. Moreover, the researcher was not going to employ the bound critical value developed by Pesaran*et al.* (2001) because of the computed critical values are based on large sample size (500 and more) rather, we applied the bound

critical values developed by Narayan (2004) which was developed based on small sample size ranging from 30 to 80 observations in which eviews automatically produce critical value with crosponding comptuted F-statistic.To conduct the study our sample size was also relatively small which was 42 years observations.

After the testing in which existence of cointegration among the variables are confirmed,the long-run and error correction estimates of the ARDL model are obtained.

Before proceed to the estimation of selected model by using ARDL, the orders of the lags in the ARDL Model was selected by the Akaike Information criterion (AIC) or the Schwarz Bayesian criterion (SBC). According to Pesaran and Shin (1999) and later Narayan (2004) recommend to choose a maximum of 2 lags for annual data series. However, it is also possible to choose the maximum lag length for dependent and independent separately so as to avoid autocorrelation is choosen automatically in thelatest version of E-iews in which it was not included in theprevious version. From this, the lag length that minimizes Akaike Information criterion (AIC) was selected.

The diagnostic test was the mandatory tasks for selected ARDL model so as to examine validity of the short- run and long-run estimation in the ARDL model. The diagnostic test such as Heteroscedasticity test(Brush & Godfray LM test),Serialcorrelation test (Brush & Godfray LM test),Normality (Jaque-Bera test) and Functional form (Ramsey's RESET) test were undertaken. Similar to residual diagonastic test, the parameter stability test of the model was also conducted.

With the existence of cointegration, the short run elasticities can also be derived through constructing the error correction of the series in the following for in each sector respectively.

In agricultural sector:-

$$\Delta LNARGDP_t = \beta_0 + \sum_{i=1}^{p} \alpha_i \Delta LNRAGDP_{t-i} + \sum_{j=1}^{q} \alpha_j \Delta LNHK_{t-j} + \sum_{k=1}^{r} \alpha_k \Delta LNGI_{t-k} + \sum_{l=1}^{s} \alpha_l \Delta LNBCA_{t-l} + \sum_{m=1}^{v} \alpha_m \Delta INFLATION_{t-m} + \sum_{n=1}^{y} \alpha_n \Delta LNGCE_{t-n} + \sum_{o=1}^{w} \alpha_0 \Delta LNTO_{t-o} + \gamma ECM_{t-1} + U_t \quad (3.17)$$

In industry sector:

$$\Delta \mathrm{LNIGDP_t} = \beta_0 + \sum_{\mathrm{i}=1}^{\mathrm{p}} \alpha_{\mathrm{i}} \Delta \mathrm{LNIGDP_{t-i}} + \sum_{j=1}^{q} \alpha_j \Delta LNHK_{t-j} + \sum_{k=1}^{r} \alpha_k \Delta LNGI_{t-k} + \sum_{l=1}^{s} \alpha_l \Delta LNBCI_{t-l} + \sum_{m=1}^{v} \alpha_m \Delta INFLATION_{t-m} + \sum_{n=1}^{y} \alpha_n \Delta LNGCE_{t-n} + \sum_{o=1}^{w} \alpha_0 \Delta LNTO_{t-o} + \gamma \mathrm{ECM_{t-1}} + \mathrm{U_t} \quad (3.18)$$

In service sector:

$$\Delta \mathrm{LNSRGDP_t} = \beta_0 + \sum_{\mathrm{i}=1}^{\mathrm{p}} \alpha_{\mathrm{i}} \Delta \mathrm{LNSRGDP_{t-i}} + \sum_{j=1}^{q} \alpha_j \Delta LNHK_{t-j} + \sum_{k=1}^{r} \alpha_k \Delta LNGI_{t-k} + \sum_{l=1}^{s} \alpha_l \Delta LNBCS_{t-l} + \sum_{m=1}^{v} \alpha_m \Delta INFLATION_{t-m} + \sum_{n=1}^{y} \alpha_n \Delta LNGCE_{t-n} + \sum_{o=1}^{w} \alpha_0 \Delta LNTO_{t-o} + \gamma \mathrm{ECM_{t-1}} + \mathrm{U_t} \quad (3.19)$$

Where in each sector,the variable ECM_{t-1} is the error correction term which captures the long-run relationship whereas $\alpha's$ are the coefficients associated with short-run dynamics of the model coverage to equilibrium. For the model to converge to the long run equilibrium relationships, the coefficient of ECM should be negative and significant.

3.4.3. Granger Causality Test

once the cointegration for thelong-run relationship among the financial sector development and sectoral output growth mainly in Agriculture, industry and service sectors confirmed through bound test approach, the long-run and short-run causality can be examined separately. The long-run and short-run causality between financial development and output growth in Agriculture, industry and service sector were investigated by thevector error correction granger causality framework. The model of VECM was specified as a matrix form in the following four model:

A. Agricultural output growth equation

$$(1-L)\begin{bmatrix} LNRAGDP_t \\ LNBCA_t \end{bmatrix} = \begin{bmatrix}\mu_1\\ \mu_2\end{bmatrix} + \sum_{i=1}^{p}(1-L)\begin{bmatrix}\alpha_{11} & \alpha_{12}\\ \beta_{21} & \beta_{22}\end{bmatrix}\begin{bmatrix} LNRAGDP_{t-i} \\ LNBCA_{t-i} \end{bmatrix} + \begin{bmatrix}\delta_1\\ \delta_2\end{bmatrix}\begin{bmatrix} LNRAGDP_{t-1} \\ LNBCA_{t-1} \end{bmatrix}(ECM_{t-1}) + \begin{bmatrix}e_{1t}\\ e_{2t}\end{bmatrix} \quad (3.20)$$

Where (1-L) is the difference operators and the ECMt-1 is generated from long-run causality. The significant of the coefficient for lagged error term refers to long run causality and statistical significant of F-statistic using Wald test referring short run causality.

B. Industrial output growth equation

$$(1-L)\begin{bmatrix} LNRAGDP_t \\ LNBCA_t \end{bmatrix} = \begin{bmatrix}\mu_1\\ \mu_2\end{bmatrix} + \sum_{i=1}^{p}(1-L)\begin{bmatrix}\alpha_{11} & \alpha_{12}\\ \beta_{21} & \beta_{22}\end{bmatrix}\begin{bmatrix} LNRAGDP_{t-i} \\ LNBCA_{t-i} \end{bmatrix} + \begin{bmatrix}\delta_1\\ \delta_2\end{bmatrix}\begin{bmatrix} LNRAGDP_{t-1} \\ LNBCA_{t-1} \end{bmatrix}(ECM_{t-1}) + \begin{bmatrix}e_{1t}\\ e_{2t}\end{bmatrix} \quad (3.21)$$

C. Service sector output growth equation

$$(1-L)\begin{bmatrix} LNRSGDP_t \\ LNBCS_t \end{bmatrix} = \begin{bmatrix} \mu_1 \\ \mu_2 \end{bmatrix} + \sum_{i=1}^{p}(1-L)\begin{bmatrix} \alpha_{11} & \alpha_{12} \\ \beta_{21} & \beta_{22} \end{bmatrix}\begin{bmatrix} LNRSGDP_{t-i} \\ LNBCA_{t-i} \end{bmatrix} + \begin{bmatrix} \delta_1 \\ \delta_2 \end{bmatrix}\begin{bmatrix} LNRSGDP_{t-1} \\ LNBCS_{t-1} \end{bmatrix}(ECM_{t-1}) + \begin{bmatrix} e_{1t} \\ e_{2t} \end{bmatrix} - (3.22)$$

D. Aggregate output growth equation

$$(1-L)\begin{bmatrix} LNRGDP_t \\ LNBC_t \end{bmatrix} = \begin{bmatrix} \mu_1 \\ \mu_2 \end{bmatrix} + \sum_{i=1}^{p}(1-L)\begin{bmatrix} \alpha_{11} & \alpha_{12} \\ \beta_{21} & \beta_{22} \end{bmatrix}\begin{bmatrix} LNRGDP_{t-i} \\ LNBC_{t-i} \end{bmatrix} + \begin{bmatrix} \delta_1 \\ \delta_2 \end{bmatrix}\begin{bmatrix} LNRGDP_{t-1} \\ LNBC_{t-1} \end{bmatrix}(ECM_{t-1}) + \begin{bmatrix} e_{1t} \\ e_{2t} \end{bmatrix} - (3.23)$$

As specified above model, error correction term of vector error correction model cane used to estimate the direction of causality in long-run. When the sectoral output growth expressed in term of agricultural, industrial and service sector real GDP are taken as dependent variable, the t- ratio of lagged error correction term (ECMt-1) negative and significant or other word significant and negative coefficient of lagged error term in above four equation indicates that financial development is granger cause of sectoral output growth in agriculture, industry and service sector in the long-run. In order to determine short run causality relation, the Wald test was applied. As result, the coefficients related the lagged values of financial development indicator are found to significant as awhole, it can be stated that financial development granger cause of sectoral output growth in short-run.

Similarly, when financial development expressed as thedependent variable, the significant and negative coefficient of lagged error correction term indicates that direction of causality running from output growth in agriculture, industry and service sector to financial development. On another hand, the coefficient of lagged value of agricultural, industrial and service sector output growth indicates that sectoral output growth granger cause of financial sector development.

CHAPTER FOUR

STRUCTURE AND TRENDS OF FINANCIAL DEVELOPMENT AND SECTORAL GROWTH IN ETHIOPIA

4.1. Structure and Trends of Financial Development

4.1.1. Structure of financial sector development in Ethiopia

The organizational structure, management, and ownership of these financial institutions as well as their performance have been changing under the three regimes which are overviewed as follows.

4.1.1.1. Imperial Period

In Ethiopia history, Banking started in 1905, with the establishment of the Bank of Abyssinia that was owned by the Ethiopian government in partnership with the National Bank of Egypt then under British rule. But a modern well-structured banking system started in 1942 after the Italian departure, established by emperor charter as state bank of Ethiopia which had dual function of a central and commercial bank until 1963 and reorganized as two financial institution namely national bank of Ethiopia acting as central bank of Ethiopia and commercial bank of

Ethiopia in which commercial bank of Ethiopia aimed at to control overall activities of banking business with public mainly to mobilize saving in the country. Other than mentioned financial institution, from the 1960s onwards, there were around eight institutions that involved in saving mobilization in the country (Assefa, 2003).

The government had implemented five years development plan which includes major intervention in theallocation of financial resources towards fostering national overall development, basically bank credit allocation to priorities sectors set by theplan such as agricultural sector as leading sector followed by mining and manufacturing as targeted sectors.

In development plan, the government intervention was manifested on credit allocation and interest rate discrimination between productive investment project based on thepriority set by development plan and current transaction with irrespective public and private sector ownership in favoring investment. There was no credit access and interest rate discrimination among the private and public sector in which private sectors including foreign investors played important role in investing productive economic activities along with public sector.

According to Assefa (2003), the development plan efforts to support agriculture and small farmers through credit were not a success for a number of reasons including the collateral requirement involved, the landlord-tenant relationship and the like made the credit allocation to be ineffective in prioritized sector and diversion of loans to non-agricultural uses as well. As result of the fungibility problem of the funds, most of the loan was allocated towards industrial sector which observed 58% of thetotal loan while agriculture had anegligible amount of loan left over despite of different approaches geared to raise production in agriculture.

4.1.1.2. Derg period(pre-reform period)

During this period, prevoisly private-owned financial institutions including three commercial banks, thirteen insurance companies and two non-bank financial intermediaries were nationalized on January 1975[1].The government reorganized the financial system and formed one commercial bank (CBE), a national bank (NBE), two specialized banks (AIB & HSB) and one

[2]The commercial banks were Addis Ababa Bank, *Banco di Napoli and Banco di Roma*. The insurance companies were African Solidarity, Ethio-American life, Blue Nile, Ethiopian General, Imperial, Afro-Continental, Pan-African, Union, Ras, and Ethiopian Life and Rasi. The non-bank financial intermediaries were the Imperial Saving and Home Ownership Public Association and the Mortgage Corporation (Befekadu, 1995).

insurance company (EIC). AIB was mainly responsible for financing agricultural and industrial projects with medium and long growth period, while HSB used to lend for theconstruction of residential and commercial buildings. CBE was engaged in trade and other short term financing activities while EIC was the only insurance firm responsible for the provision of all types of insurance services. The National Bank of Ethiopia (NBE) was granted the power to provide loan and advances to the government whenever revenue falls under expenditure. Moreover, the NBE was delegated to formulate the credit policy and determine the interest and exchange rate as well (Roman, 2012).

Moreover,one of the government regulation up on financial sector was fixing deposit and lending rates for prolonged period. The intervestion of government was towards controlling financial sector through using adifferent financial instruments such as lowering the interest rate and discriminating the allocation of foreign exchange and credit. The allocation of foreign exchange was directed towards financing the fiscal deficit under the shortage of revenue as well as domestic credit was also in accordance with central government planning. The huge amount of loan and advance allocated to the centralized government from the NBE which raised its limitation to 70 percent from 15 percent in 1963 (MEDaC, 1999) cited in Roman (2012). Similarly,the share ofdomestic credit of the central government alone (excluding credit to public enterprises and state farmers) which was only 11% in 1974 averaged 47% between 1975 and 1990, and 50% between 1980 and 1990 (Assefa, 2003). The private sector was highly neglected. This implies that banking system geared towards government motive rather than boosting the productive sectors. On another hand, CBE was the dominated more than 90% of the total deposits mobilized in the country. The any credit policy and foreign exchange earnings framework were under the control of NBE in accordance with strengthening the power of the socialized sector (Alemayehu, 2006).

When come to sectoral bank credit allocation,55% of all commercial bank credit allocated to imports and domestic trade and services while remaining agriculture and industry absorbed only 6% and 13% of the commercial credit in 1988respectively (Wondaferahu, 2010). Loans and advances by financial institutions over the ten year period between 1981 and 1990 show that on average the government sector absorbed 37.4 percent of the total, while 51.3% went to public

enterprises while the private sector's share was only 9% of the total loans and advances made by the banking system during the Derg regime (NBE, 2016).

Overall, the financial system in Ethiopia was highly repressed due to nationalizing private sector, regulated interest rate and saving and intervention on limiting the credit allocation so as to serve the socialized sector which came up with inefficient and poor resources allocation towards public sector becausebanks have been enforced by the NBE to lend for non-viable investments in the public sector with low-interest rate. As result, large amount credit allocated to the public enterprises, especially state farms credit remained uncollected and banks system associated with low rate of growth of capital as well as reserves. Thus financial repression characterized by great distortions in the economy during this regime.

4.1.1.3. Post-reform period

With the overthrow of the Derg in 1991, the new government comes up with anew economic policy from socialized economic system to market-oriented economy. As result, financial liberalization in Ethiopia began in 1992. The strategy of government for financial development under liberalization rule is characterized by gradualism. This mean that one of the issues has been undertaken under thenew government is allowing private participation on financial intermediaries through new entry of domestic private rather than immediate privatizing of state-owned institution which was applied in Mozambique(Addison and Alemayehu, 2001).Following proclamation number 84/94 of the deregulation and liberalization of the financial sector, a number of private banks and insurance companies were established. For further development of thefinancial sector, gradual liberalizations of the interest rate, foreign exchange determination, and money market operation has been conducted as well (Roman,2012).

In 1992, the fist step that has undertaken by thegovernmentin the exchange rate reform was devaluating the domestic currency from 2.07 Birr per the dollar to 5 Birr per the dollar in order to achieve economic recovery through promoting export and discourage imports. The auction-system basically worked alongside with the official (fixed) exchange rate which was introduced in 1993. The main attention made by government was exchanges reform and trade system so as to correct the major policy distortions of the Derg era, particularly the policy reform removed the disincentive to produce exportable inherent in the pre-1992 because of currency overvaluation (Addison and Alemayahu, 2001). Despite of policy reform, NBE supply of the foreign exchange

through the auction-based exchange rate system was not inline with satisfiying the demand of banks.

During the financial sector reforms, the mandate given to the NBE is to supervise and administer the commercial banks activities so as to operate within thegeneral financial framework and introduce the competitive environment for banks and non-bank financial sector in order to encourage private sector involvement. According to Alemayehu (2006), the number of banks which were active before the 1974 revolution were only 9 with 113 branches altogether. However, there are 18 banks with 3197 branches of which 16 banks with 1,927 branches are private owned (NBE, 2016). Currently, about 34.4 percent of bank branches were in Addis Ababa and 60.5 percent of the total branches were private owned across the country as a result of a significant capital injection by the private banks (NBE, 2015/16). The expansion of banks plays a decisive role for theprocess of financial sector development in which the dynamic change of economy rely on the effective and efficient resource allocation made by baking industry(see appendix I).

The private banks establishment in the country gradually led to improved banking service such as longer banking servicehours, ATMs, electronic banking and improved facilities (Roman, 2012).

Regarding distribution of banking service over the country, bank branch to total population ratio declined from 1:126,258 in 2008/09[2] to 1:28,932 in 2015/16[3] which shows significant improvement in term of accessing banking service across the country. This expansion in banks leads to a fall in population per branch and improved access to financial services in the country. On another hand, the non-banking sector though remains largely undeveloped, at theyear of 2015/16 the number of insurance companies stood at 17 (1 public and 16 private) with their branches rising to 426 following the opening of new branches. Large concentration of insurance branches were in Addis Ababa wchich accounts about 53.5 percent and 83.6 percent of the total branches were private owned across the country. The total capital of insurance companies grew 25.3 percent to Birr 3.6 billion of which the share of private insurance companies was accounted 76.7 percent. Similarly, the number of micro-finance institutions remained at 35 while their total

[2]Taking total population as 80 million in 2008/09 as CSA estimation.
[3]Total population is 92,205,000 as CSA estimation for2016

capital and total asset increased significantlyby 23.5 and 20.0 percent and reached Birr8.9 billion and Birr 36.7 billion,respectively.This significant improvement in private banks and non-bank financial sector is in line with fast-growing economic growth recorded in Ethiopia (NBE, 2016)(see also appendix I and J).

The interbank foreign exchange and monetary market was etablished in 1998 through which the NBE issued directives so as to make the banking system to control over their foreign-exchange requirements more efficiently whereas money market framework enables banks and non-bank financial institutions can borrow and lend at market-determined rates which should reduce the existence of the excessliquidity in the banking system. However, the critical problem associated with thelow performance of inter money market is alack of collateral and presence of excess liquidity in thebanking system due toa fear of risk in lending directly to private enterprises (Alemayehu,2006). Treasury bills market is the only regular primary market where securities are transacted on a fortnightly basis. Long-term securities are not widely traded except for the occasional issuance of government bonds to finance government expenditure. No secondary market for these securities exists (Roman, 2012).

4.1.2. Trends of Financial Development Indicator

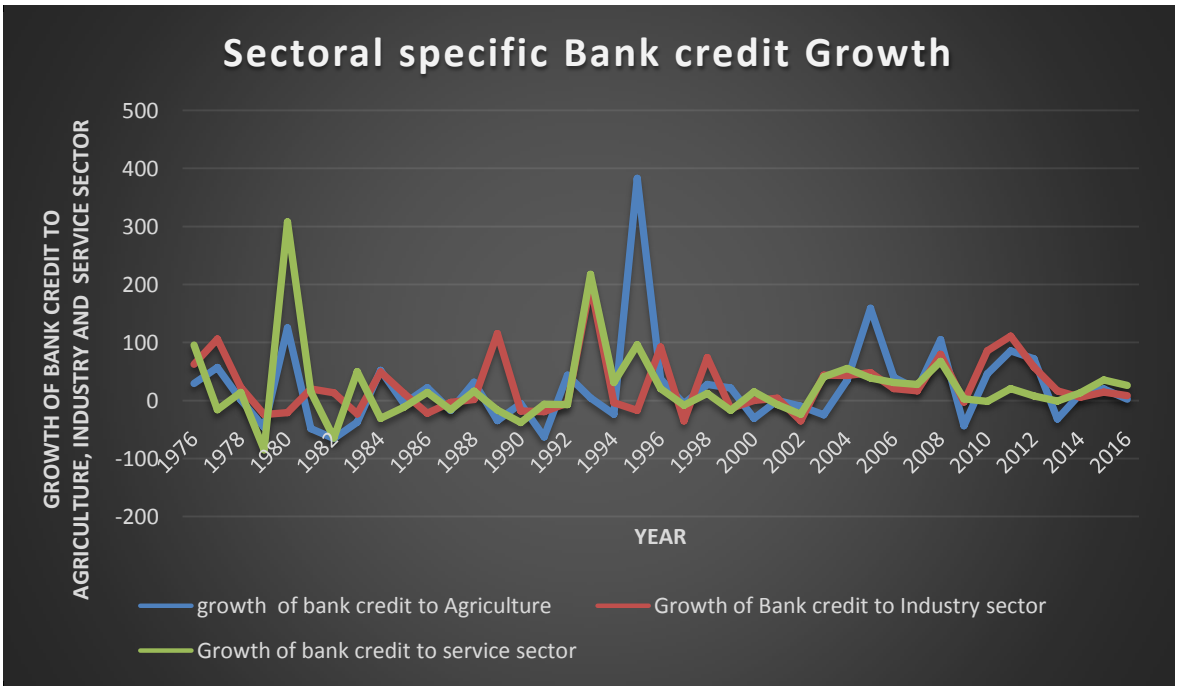
To assess the trend of the financial sector development indicator, we used bank credit to three economic sectorsas financial sector indicators to find the relationship between financial development and sector output growth. As result, the performance and the trend of bank credit to economic sectors in term growth and share of total credit in Ethiopia are discussed.

A sectoral based distribution of bank credit made by banking sector has important implication for sectoral output growth. For instance, providing aloan to productive sector rapid the sectoral output growth while loan disbursement toward consumption sector caters the output growth.

The loan disbursement during Derg regime was characterized by serving state based sector rather than prioritizing productive sector. Accordingly, there was declining trend of bank credit to agricultural sector from the year of 1979 to 1991 especially negative growth of agricultural bank credit recorded except for the year of 1980, 1984, 1986 and 1988. As the figure shows that there was also thepersistent decline of agricultural sector bank credit share in total loan disbursement from 60 percent in the year of 1979 to 14 % in 1983 and began to increase slightly to 31% share in 1988. This implies that overall decreasing performance of bank credit share of thetotal loan

during Derg regime in which lion's share of thecredit belongs to public enterprise and cooperative operated by thegovernment. This is the implication that most of the disbursed credit to stated owned enterprise and cooperatives remained uncollected which empeded further credit expansion. During thepost-reform period, the liberalization of financial sector come up with encouraging theprivate sector in economic activities, the loan disbursement to agricultural sector has observed relatively positive growth from 1992 to 1999 with exception of negative growth recorded in 1994 and 1997. There is also successive declining performance observed from the year of 2000 to 2003 due the occurrence of drought. From the year onwards from 2004, the growth of theagricultural sector has been seen a negligible growth of bank credit towards agricultural sector except for the year of 2009 and 2013. Regarding total bank credit share of this sector, thelargest share in total credit has observed in 2012 with ashare of 25% and lowest share is 5.4% in 1994 during post-reform period. This implies that the low share of agricultural credit in total credit, as well as the poor growth of bank credit, is the implication of weak attention given to agricultural sector to promote commercialization of sector which is a part of GTP -2 by thecurrent government.

Figure 4.1 growth of Bank credit allocation to Agriculture, industry and service sector

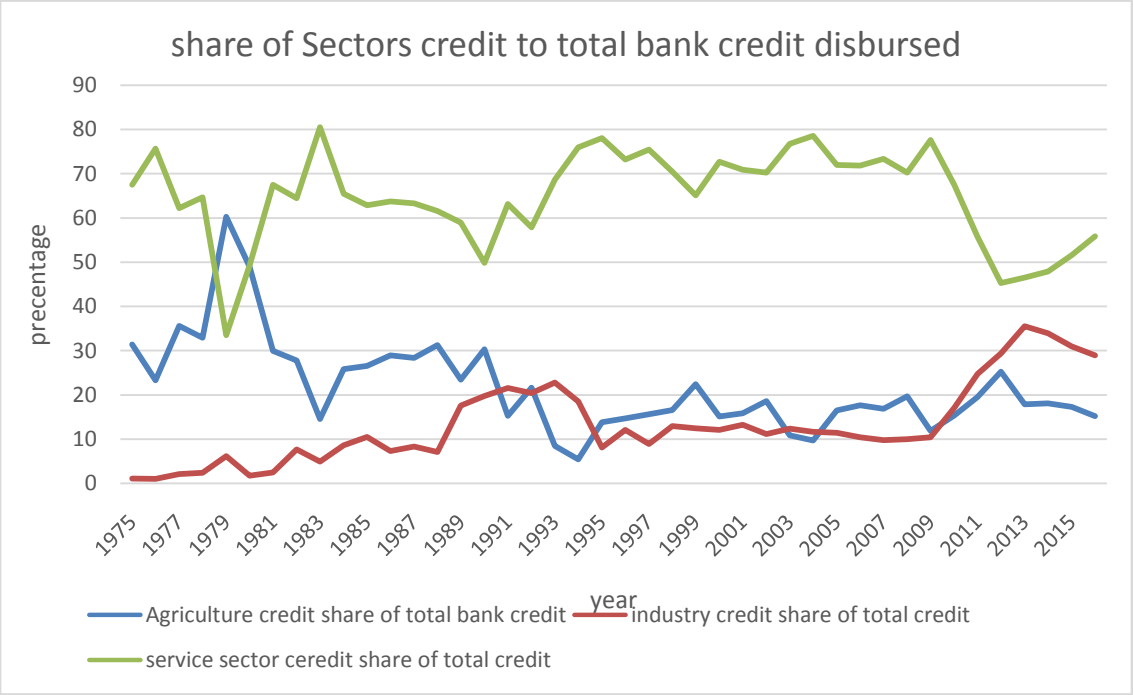


Source: author computation from national bank of Ethiopia abstracts, 2017

The commercial bank credit to the industry sector shares in atotal loan under pre-reform with an average of 8.2%. The maximum value was 19.7% in 1990 while the least value was 1.7% in 1980 as shown in figure 2. This implies that there was anincreasing trend in theshare of bank credit to industry sector as compared to theagriculture sector. However, when we see from annual growth of industrial credit, there was negative growth observed in the year of 1980, 1983, 1986-87 and 1990 which indicates large fluctuation of industrial sector bank credit growth during the pre-reform period due to less attention given to this sector. Furthermore, industrial sector bank credit share in total loan under the post-reform period shows increasing trend from 1992 to 2002 with slight fluctuation in the year of 1995 and 1997 which was observed as ashare of 8.1% and 8.7% to total credit respectively. With strong government encouragement to promote manufacturing sector for economy transformation through active private sector involvement, there is increasing trend in theshare of bank credit to industry in total loan observed from the year 2003 onwards in which Ethiopia experienced fast economic growth. From the year starting from 2003, theSlight upward increasing trend is depicted with the average share in total bank credit of 17.2%. The maximum value was 35.5% in 2014 while the least value was 8.7% in 1995 as shown in figure 4.2.

The bank loan and advanced to the service sector share in total credit average 62% and the maximum value was 80.5% in 1979 while the least was 33.2% in 1983 during the pre-reform period. As depicted from thefigure, there was upward and downward trend observed due to underdevelopment of financial sector under theregulation of socialized government and restriction imposed on the economic activities of the private sector. Similarly, even though high shares observed, the growth of service sector bank credit was slightly declined for overall pre-reform period except the year of 1983, 1986 and 1988. After the economic reform, however, bank credit to service sector began to increase due to increasing participation of the private sector. During post-reform period a large amount of loan and advance allocated to this sector with anaverage share of 66.7% and maximum credit share recorded is 78.5% in 2004 the least value was 45.3% in 2012. The share of total credit is shown declining trend after 2011 due to increasing share of industry sector. This implies that as compared to other sectors the service sector shares a large proportion of commercial bank credit in the Ethiopia economy.

Figure 4.2: the share of agriculture, industry and service sectors credit to total bank credit

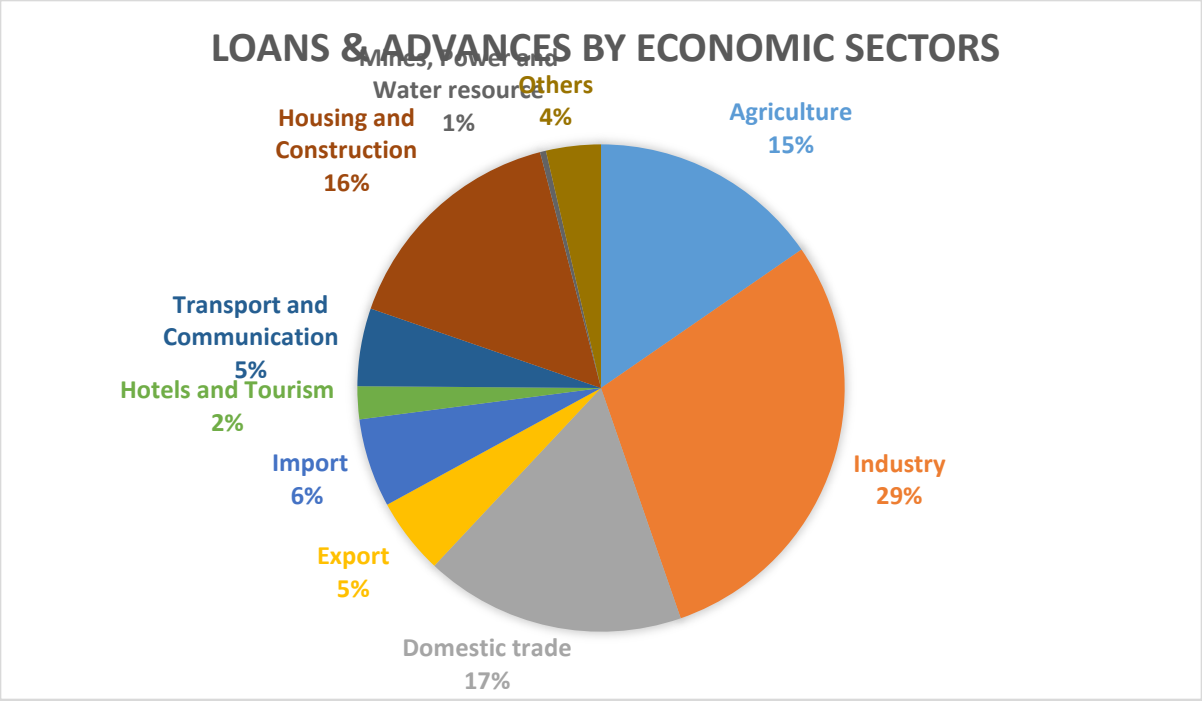


Source: author computation from national bank of Ethiopia abstract, 2016

Comparatively, using the average credit allocation to the sector, the service sector received the highest credit allocation in Ethiopia economy followed by the industrial sector while the agricultural sector received the least share of total credit during the study period.

Moreover, as shown in figure, About 29.0 percent of the loans went toindustry followed by domestic trade (17percent), housing and construction (16percent), agriculture (15 percent) andinternational trade (11 percent) andothers (12 percent) during the year of 2016 (see appendix J). This implies that increasing share of bank credit is allocated to industry in which government has given due attention for transformation of economy through working on industrial sector. However, the dominant sector has neglected the attention in making investment through credit expansion for which financial sector intended to link with other sectorthan agriculture.

Figure 4.3: Loans & Advances by Economic Sectors in 2016

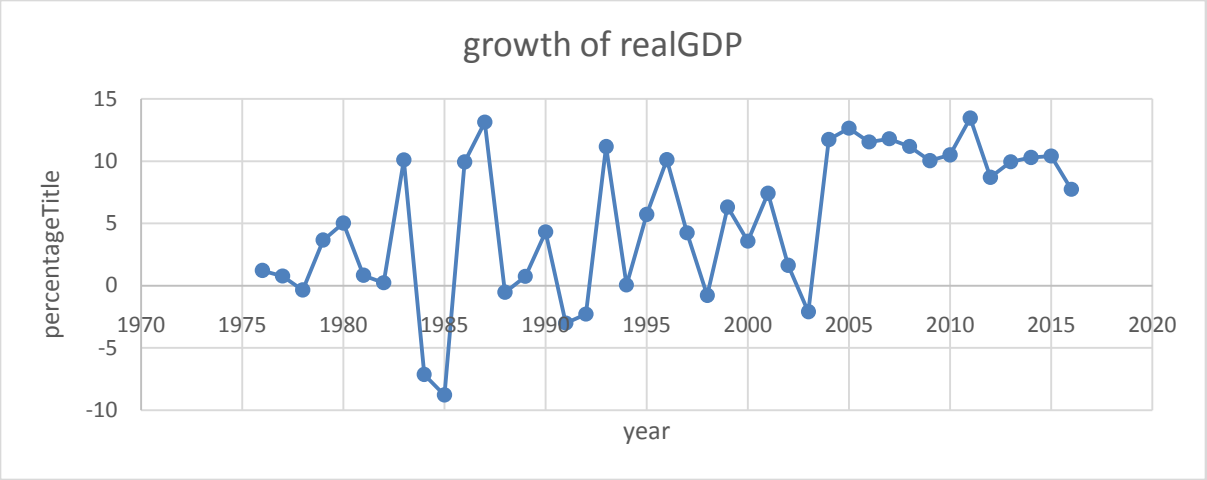


Source: author computation from national bank of Ethiopia abstracts, 2017

4.2. The trend of output growth at aggregate and sectoral level in Ethiopia

Ethiopia has experienced tangible progress in key economic and social indicators and also known as one of Africa's fastest-growing economies, with near double-digit GDP growth over the past decade and huge infrastructural development since the early 2000s. Average annual real GDP growth increased from 2.5% during the 1980s to over 10.7% in the period from 2003/04 to 2015/16. The country registered an average annual growth rate of 8.8% between 2000/01 and 2015/16, and as the the population growth rate of 2.6% implying real GDP per capita increased by about 6.9%. Largest growth rate recorded during pre-economic reform was 13.1% in 1987 while least growth was -8.7% in 1985 due to frequent drought and civil war along with distorted economic policy followed by the socialist governmentwhereas there has been positive growth and fluctuation trend observed after the economic reform took place except for the year of 1998 and 2003 in which Ethiopia economy has challenged by external shocks such as famine and Eritrean war devastated the economic growth.

Figure 4.4. The growth rate of real GDP



Source: author computation from national bank of Ethiopia abstracts and MOFEC data

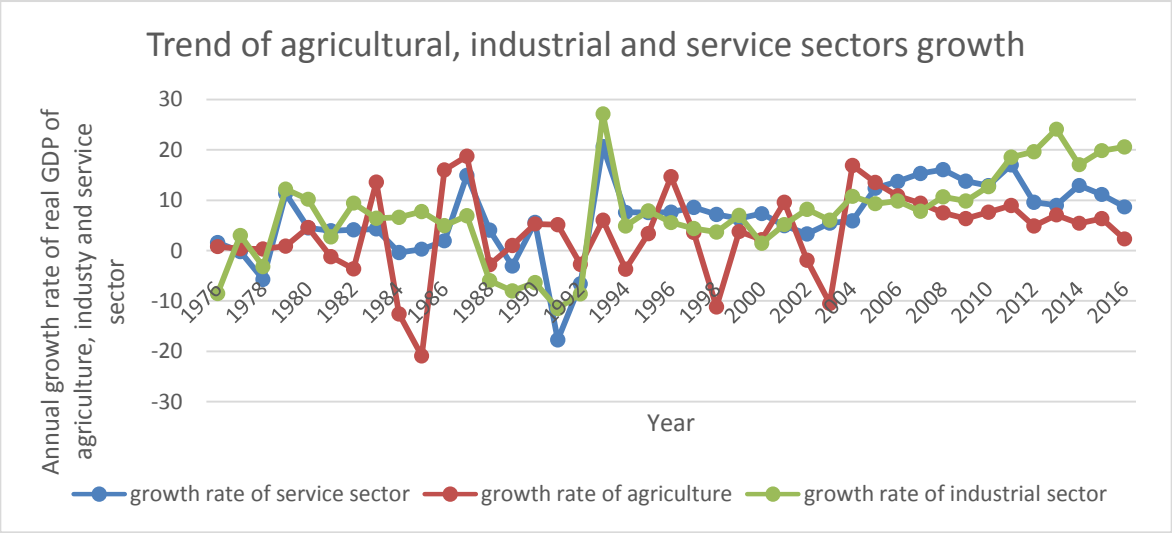
Regarding the trend of agricultural growth as shown in above figure 4.4, The agricultural growth of Ethiopia, as measured by the real agricultural GDP as shown in Figure 4.4, is full of ups and downs fluctuating from positive to negative growth. In between 1975 and 1992, the real GDP growth rate of agriculture recorded negative growths in 1978, 1981-82, 1984-85 and 1988 with average growth of 1.3% during the pre-reform period due to unfavorable agroeclogical climate and unstable political situation. After 1992 there was thepositive growth of agriculture observed in thecountry with maximum growth of 16.9% in 2004 and lowest value of -10.8% in 2003. On average 4.8 % of agricultural growth recorded.

As we can see in the figure, industrial sector showed an increasing trend. The large decline in industrial growth observed from 1975 to 1978 and from 1988 to 1992 as result of asocialized economic system that discouraged private sector involvement in theindustry sector. However, after economic reform, there was slightly continuous increasing trend showed in industry sector up to 2002 which was not as expected. Since 2003, government massive engagement in social and infrastructure development intended to increase industrial output growth more than previous slow growth. During this period on average 13.6% growth is recorded from 2003 to 2016 as compared to 6% after economic reform took place. The substantial growth in theindustrial sector is as aresult of various incentives by government to attract private participation in industry sector with side by side improvement in efficiency and effectiveness of government-owned industries.

Regarding the trend of service sector output growth as shown in above figure 4.4, Average annual real GDP growth of the sector increased from 1.3% during the 1980s to over 9.5% in the

period from 1992 to 2015/16. The growth of service sector is experienced some of ups and downs fluctuating from positive to negative growth during the pre-reform period. In between 1975 and 1992, the real GDP growth rate of agriculture recorded negative growths in 1977-78, 1984, 1989 and 1991-92 with average growth of 1.3% during the pre-reform period. After 1992, full of study period there is thecontinuous and positive growth of service sector observed in thecountry with maximum growth of 17% in 2004 and lowest value of 3.3 % in 2003.

Figure 4.5. Trend of agricultural, industrial and service sectors growth



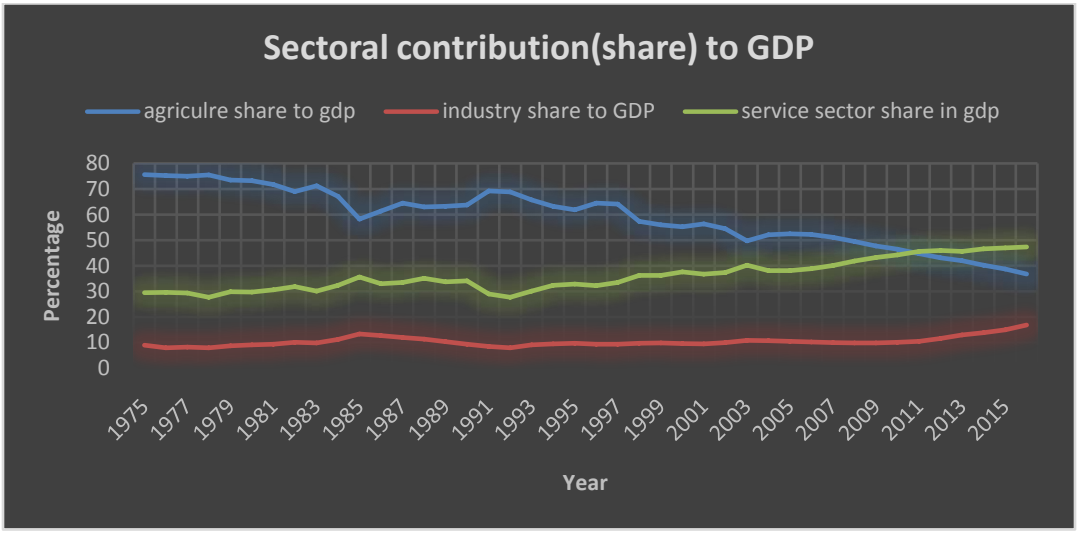
Source: author computation from national bank of Ethiopia abstracts and MOFEC data

Figure 4.5 also shows the contribution of agriculture, manufacturing and service sectors to the overall growth. During the periods of 1975-1992, on average 68.8% of the overall growth was contributed by the agriculture sector. The manufacturing sector contributed 9.8% of the growth and the service sector contributed 31.2%. This shows that slow increment on service sector share made the overall growth to be positive while agricultural sector share indicates declining trend. The larger share in the growth fluctuation was attributed to the poor performance of agriculture because of drought and instability. In between 1993- 2016, However, on average the service sector has contributed increasingly and agricultural sector decreasingly contribute to economic growth while until implementation of Growth and Transformation plan I, industry sector showed aslow trend in contribution to economic growth. The average contribution of agriculture to the total economy growth was just 51.8%, the industry and the service sector contributed 10.7% and 39.5% of the growth respectively. The large contribution of theagricultural sector in Ethiopia

history was overtaken service sector since 2011. Specipically,The share of agricultural value added in GDP has declined by about 10 percentage points between 1990 and 2016 (from 63 to 36 percent; see Figure 4.5). In response to these trends, the Ethiopian government, as part of its Growth and Transformation Plan II, has focused on both rapid industrialization and structural transformation.

Generally, Even though there is strong policy emphasis on agriculture, its contribution to overall growth has been not only limited but also declining: declined from 56% in 2000/1 to 36% in 2015/16. The growth contribution of the manufacturing has remained minimal. The service sector continued to be the main engine of growth of the economy, accounting for 47% of the growth of overall GDP in 2015/16.

Figure 4.6. Sectoral growth contribution to overall growth



Source: author computation from national bank of Ethiopia abstracts and MOFEC data

The implication of changes in the growth contributions from the main sector is changing in the structure of the economy occurring across sectors, from agriculture to service and industry. According to thestudy of Yared et. al. (2015), Crop production, traditionally a dominant contributor, has been overwhelmed by construction and wholesale and retail trade sub-sectors. The increase in the industrial sector's contribution to growth especially first phase of GTP has largely originated in the construction sub-sector. He also pointed out that note that the more productive manufacturing sector has not grown enough to contribute to sustainable growth.

CHAPTER FIVE

RESULTS AND DISCUSSION

The previous chapter dealt with the research methodology employed to achieve the objectives of the study and to test the research hypothesis. In this chapter, the study analyzes the collected data using statistical tool to present the result and discussions accordingly.

The main objective of this paper was to investigate the dynamics of the link between financial development and sectoral output growth mainly the case of agriculture, industry and service sector using time series data over the period 1974/75- 2015/16.The data was obtained from Ethiopia Economic association, ministry of education, Ministry of Finance and Economic Cooperation and National bank of Ethiopia data, different publications of both NBE and MoFED Macroeconomic data as well as World Bank Development Indicator database.

5.1. Unit Root Test (stationary test) Analysis

The bounds test approach to cointegration does not need pre-testing for stationary of the variables included in the model, but still, it is important to carry out stationary tests on all the series. The justification behind the unit root test is to take a care on the order of integration not aboveI(1) in which we can not apply ARDL bounds test to co-integration. Therefore, it was necessary to test for stationary of the series before any econometric analysis was done. It is notable that stationary properties of time series are investigated by testing for unit roots. There are several methods for testing for stationary. Thus, this study used the commonly used Augmented Dickey-Fuller (ADF) and the Phillip-Perron (PP) unit root tests. The unit root tests results are presented in Table 5.1 while the p-value for each unit root test at thelevel and first difference are located in appendix A.

Table 5.1. Augmented Dickey-Fuller (ADF) and the Phillip-Perron (PP) unit root tests.

Augmented Dickey- Fuller test statistics(ADF Test)							
S no.	variable	With intercept			With intercept and trend		
		At level	1st difference	Order of integration	At level	1st difference	Order of integration
1	LNRAGDP	2.196460	-6.280815*	I(1) at 1%	-0.729586	-7.477271*	I(1) at 1%
2	LNRIGDP	0.829641	-5.447617*	I(1) at 1%	-1.685658	-5.764391*	I(1) at 1%
3	LNRSGDP	2.535875	4.195327*	I(1) at 1%	-0.050121	-3.956798*	I(1) at 1%
4	LNRGDP	2.112647	-3.910562**	I(1) at 1%	0.060639	-6.381490*	I(1) at 1%
5	LNHK	-0.471985	-8.334196*	I(1) at 1%	-2.203255	-8.222654*	I(1) at 1%
6	LNGI	2.142599	3.397457**	I(1) at 5%	-1.006428	-6.994511*	I(1) at 1%
7	LNBCA	-0.341015	-6.272054*	I(1) at 1%	-1.506647	-6.545390*	I(1) at 1%
8	LNBCI	0.091415	-6.747213*	I(1) at 1%	-1.632923	-6.826212*	I(1) at 1%

9	LNBCS	-0.311543	-8.075730*	I(1) at 1%	-2.339567	-3.63367**	I(1) at 5%
10	LNBC	0.226791	-7.032534*	I(1) at 1%	-1.796762	-7.679448*	I(1) at 1%
11	LNGCE	-1.661185	-3.799159*	I(1) at 1%	0.222683	-4.498330*	I(1) at 1%
12	INFLATIO N	2.185980	-8.74945*	I(1) at 1%	-2.325543	-8.644499*	I(1) at 1%
13	LNTO	-1.038031	-5.905394*	I(1) at 1%	-1.922031	-5.821702*	I(1) at 1%
Phillip-Perron (PP) unit root tests							
1	LNRAGDP	2.050779	-5.793101*	I(1) at 1%	-1.816944	-9.049249*	I(1) at 1%
2	LNRIGDP	3.534304***	-3.570237**	I(1) at 5%	0.737494	-4.338335*	I(1) at 1%
3	LNRSGDP	3.341312	-4.203350*	I(1) at 1%	-0.432652	-5.229904*	I(1) at 1%
4	LNRGDP	4.702768*	-4.376905*	I(1) at 1%	0.193928	-5.914190*	I(1) at 1%
5	LNHK	-0.755757	-8.334196*	I(1) at 1%	-2.203308	-8.222654*	I(1) at 1%
6	LNGI	3.407240***	-6.044900*	I(1) at 1%	-0.955732	-7.168203*	I(1) at 1%
7	LNBCA	-0.315797	-6.272920*	I(1) at 1%	-1.494100	-6.550832*	I(1) at 1%
8	LNBCI	0.354959	-6.871234*	I(1) at 1%	-1.623274	-8.144045*	I(1) at 1%
9	LNBCS	0.034090	-8.015881*	I(1) at 1%	-2.080937	-8.856516*	I(1) at 1%
10	LNBC	0.431082	-6.984970*	I(1) at 1%	-1.453084	-7.862728*	I(1) at 1%
11	LNGCE	-2.86967***	-7.828324*	I(1) at 5%	-2.559159	-8.102100*	I(1) at 5%
12	INFLATIO	-4.295450*	-	I(0) at 1%	-4.260110*	-	I(0) at 1%
13	LNTO	-1.067997	-5.903376*	I(1) at 1%	-2.018279	-5.818601*	I(1) at 1%

Source: Author's computation of E view 9 result, 2017

Notes: The sign of ***, ** and * represents the rejection of the null hypothesis of non-stationary at 10%, 5% and 1% significant level respectively.The null hypothesis is that the series is non-stationary or the series has a unit root against alternative hypothesis that the series are stationary.Akaike info criterion (AIC) is used to determine the lag length while testing thestationarity of all variables.

Table 5.1 above deals with unit root results of the series at thelevel and first differences including constant only and intercept with trend specification so as to capture the variables stationary. According to ADF test, all the variable are non-stationary at level and become stationary at the first difference with intercept, and intercept with trend at one percent level of significance except total investment in intercept specification and service sector bank credit in intercept with trend specification become stationary at 5% level of significance under Augmented Dickey- Fuller test statistics (ADF Test).

Similarly,the PP test implies that industrial real GDP, gross investment and government consumption expenditure as % of GDP are level stationary at 10% level of siginificace and real GDPand inflation rate are also level stationary at 1% level of significant while remaining

variables are fist difference stationary at 1% of significance means that the null of nonstationarity is rejected under thePhillip-Perron (PP) unit root tests with intercept specification only. In this case, eight of the variables are I (1) and four of them are I (0) though less significant except for real GDP and inflation. However, other than inflation, other variables are non-stationary at their level and stationary at their first difference under intercept with trend specification. These results indicate that, with both types of specifications, inflation series is stationary at level with rejection rule of 1% which would not allow us to apply the Johansen approach of co-integration. This is the critical justification for the reason why we are using the ARDL approach (bounds test approach of cointegration) developed by Pesaran, Shin, and Smith (2001).

Moreover, the precondition of using ARDL model is that the dependent variable must be non-stationary at alevel which confirmed on the above table under the ADF test.

5.2. Long Run ARDL Bounds Tests for Cointegration

As far as we determined the stationary nature of the variables, the next task in the bounds testapproach of co-integration is estimating the ARDL model using the appropriate lag length selection criterion . In other word, ARDL bounds analysis is used to investigate the presence of long-run relation among the variables included in the model. In order to undertake cointegration test with help of ARDL bound test, the maximium lag length must be determined. This is because an important issue addressed in employing ARDL is selecting optimium lag length. The model was estimated by ARDL and the optimal lag was selected by Akaike Information criterion (AIC) method.

According to Pesaran and Shin (1999) and Nayaran(2004) recommend choosing a maximum of 2 lags for annual data seriesTherefore, we set recomanded the maximuim lag length at 2 years for agricultural output growth, service sector output growth and aggregate output growth equation which are sufficiently long enough for annual data series to investigate the variable relationship and then AIC is employed to choose at the best ARDL mode(Lutkephl, 2005). However, it is also possible to choose maximum lags forvariables in automatic lags selection option thereby specify different lags length for dependent variables and independent variables in accordance with whether residuals are correlated or not. As result, for industrial output growth equation, we set maximium lag length at 4 for dependent variable and 3 for independent variables so as to avoid serial autocorrelation in the model. EViews will search through every

possible combination of ARDL model for four Equation that is less than maximum lag value specified by user.To this end, top 20 models selected automatically by software are presented for four output growth model interm of minimizing AIC(see appendix G).

Table 5. 2: bound test for cointegration

Sectoral output growth model	Selected ARDL	F- Statistics	Result
Agricultural output growth model	ARDL(2,0,0,0,0,1,0)	3.318210***	Cointegration
Industrial output growth model	ARDL(4,3,3,2,2,3,3)	4.389037**	Cointegration
Service sector output growth model	ARDL(2,1,0,2,2,0,0)	4.968829*	Cointegration
Aggregate output growth model	ARDL(2,0,0,2,0,1,0)	7.220155*	Cointegration
Critical value bounds	1%	2.5%	5% 10%
I(0) Bound	3.15	2.75	2.452.12
I(1) Bound	3.23	3.61	3.994.43

Source: Author's calculation, 2017

Notes: ARDL Models selected on Akaike info criterion (AIC) automatically, intercept and no trend for $k = 6$; the sign of *, ** and *** indicate the level of significance at 1%, 5%, and 10% to reject the null hypothesis of No long-run relationships exist respectively

According to the result shown in the table 5.2, we have the upper and lower Narayan (2004) critical values to compare with crossponding F statistics in order to reject or accept the null hypothesis of no log-run relationship among the variables. As we have discussed earlier, for small sample ranging from 30 to 80 years data, we have been used Narayan (2004) critical values in which Eviews soft ware provided it automaticaly.

As the result observed from the table 5.2depicts that F-statistic of agricultural output growth model is 3.3182 which is greater than theupper bounds critical value at 10 percent significance level. This clearly evidenced that there is aweaklong-run relationship between agricultural output growth and explanatory variables. The less evidence of long-run equilibrium relationship might be attributed to the fact that agricultural output growth is explained by weather condition mainly uncomfortable rainfall situation.

Moreover, the F statistics for theindustrial sector, service sector, and aggregate output growth model are 4.389 and 4.9688 and 7.220155 respectively which are greater than theNayaran upper bound critical value at 1% level of significance. This implies that the null hypothesis of no long-run relationship is rejected at 1% level of significance and alternative hypothesis of the existence oflong run relationship between the variables is accepted.. This indicates the variables included in the model have long run relationship which is abase for estimating the long-run impact of theexplanatory variable on sectoral output growth at large.

Therefore, there is acointegration relationship among the variables in long run for four model specified separately. In other words, the test statistics reject the null hypothesis of no cointegration in favor of the co-integration relationships between the variables. This result reveals that the dependent and independent variables are both co-integrated and have long-run relationships.

5.3. Long-Runand Short-Run ARDL Model Estimation

The most appropriate methodology for checking the existence of the long run relationship among the variables and thereby long-run estimation of coefficient and is known as ARDL bound test to cointegration technique (Pesaran, 2001). Accordingly, as long as the existence of along-runcointegration relationship among the variables is confirmed, thenext step is running the appropriate ARDL model to find out the long run coefficients along with short run error correction model, which isreported as follows for four output growth equations.

5.3.1. Long-runand short-run estimation for Agriculture output growth equation

Once cointegration among dependent variable which is agricultural output growth and all explanatory variables through bound test are confirmed, then long-run estimation of the model comes next. Accordingly, The ARDL(2,0,0,0,0,1,0) for agricultural output growth can be estimated for long-run and similarly, the short-run error correction model is also drived.

5.3.1.1. Long-runestimation for Agriculture output growth

Table 5.3. Long Run Coefficients for agricultural output growth

Variable	Coefficient	Std. Error	t-Statistic	Prob.

LNGI	0.166534	0.031437	5.297379	0.0000*
LNHK	0.082977	0.057938	1.432177	0.1624
LNBCA	0.042726	0.023950	1.783995	0.0845***
LNGCE	-0.062955	0.125439	-0.501874	0.6194
INFLATION	0.004134	0.002303	1.795264	0.0827***
LNTO	-0.081671	0.075050	-1.088228	0.2852
C	8.982751	0.576665	15.577060	0.0000*

Source: Author's calculation from E view 9 results, 2017

Note: the sign *,** and *** indicate that the variables are siginificant at the level of 1%, 5% and 10% repectively.

The results from the long run estimation indicate that exception for human capital, governmet consumption and trade openness which havefound to be insignificant impact on agricultural output growth, other variables mainly gross investment, bank credit to agriculture and inflation are positively determined agriculture output growth in the long-run. Contrary to what is expected from economic theory, trade openness and inflation are found to be unexpected sign signed.

The coefficient of long-run results showed in the table 5.3 depicts that financial development has found to be a positive and marginal impact on agriculture output growth. This is consistent with prior expectation. All things remain constant, a 1 percent increase in financial development proxy by a bank credit to agriculture sector will rise agricultural output growth by 0.042726 percent which is less significant evidenced by 10% level of significance. This positive effect of the bank credit to agriculture sector as anindicator of financial development is consistent with the predictions of the endogenous growth theorist's deal that financial development affects growth through investment as well as the significant relationship between financial development and agriculture output growth. The finding is consistent with the study of Afangideh (2009), Aka(2011),Muhammad et al.(2011),Anthony et.al (2012)and Joseph and Daniel(2015)but, not consistent with the finding of Yazdi and Khanalizadeh (2012) for Iran. However, theless significant effect of financial development towards agricultural sector is the evidence of less attention given to agricultural sector in term of credit allocation to boost overall economic growth. This justification is consistent withAng and McKibbin(2007) who argued that the

importance of financial development depend on the mobilization of savings and allocation of funds to productive investment projects, however, in developing countries there is market imperfection mainly information asymetry, high transaction costs and improper allocation of resources resulted weak the interaction between savings and investment and its link with economic growth.

The total investment as % of GDP which comprises bothprivate and public investment exerts a positive and statistically significant impact onagricultural sector output growth in the long run. The result of estimation provides that a one percent increase in gross investment leads to a respective agricultural sector GDP increase of 0.163. The implication of the finding is that making conducive environment for the investment exapansion is an important action to accelerate sectoral output growth in Ethiopia. The study is harmony with the study of Joseph and Daniel (2015) for South Africa.

According to the result obtained from theregression, human capital has a positive long-run impact on the agricultural output growth and statistical insignificant impact as evidenced by high probability value of 0.1624. The findings of this research dealing the long run positive impact of the human capital on output growth of the sector, are consistent with the endogenous growth theories as of Lucas (1988) and Romer (1990) which argue that improvement in human capital leads to improving productivity that enhances output growth. However, the human capital having insignificant in the long run might be due to the migration of agricultural labor to another sector of the economy in search of relatively higher wage returns and seasonal characterestics of agricultural sector associated with migration of education people to other sector. On other hand, non-availability of acomfortable environment for workers for example, lack of capital, land and other agricultural related facilities are non-existence to boost agricultural productivity. Other justification may be most agricultural labor tend to engage off-farm activities as a means of income generation because of seasonal characteristics of agricultural production. Despite my own justification, further studies should be conducted whether human capital has to be significant impact or not in the case of sectoral output growth. The finding is also in line with Imoughele et.al, (2013) who found thepositive and insignificant effect of human capital development on agricultural growth and justified the reason for it was thepoor development of human capital for the case of Nigeria.

The effect of total government consumption expenditure as % of GDP on agriculture real GDP is negative and statistical insignificant affects agricultural output which consistent with prior expectation. The implication of this finding is that government expansionary fiscal policy would hampers the growth of agriculture output in Ethiopia. The inverse nature of relationship indicates that there is a crowding out theeffect of government consumption expenditure in the sector in one hand and fewer resources were left for investment and infrastructure provision in this sector. The finding is not consistent with finding of Yazdi and Khanalizadeh (2012) for Iran and Imoughele et al. (2013) for Nigeria.

The positive and statistically less significant effect of inflation is inconsistent with theoretical expectation. Theoretically, a high inflation rate is expected to be deleterious to growth in real GDP of thesector as it raises the cost of borrowing which in turn dampens the rate of investment by the private sector and thus decreases real output growth. Accordingly,the inflation is increased by 10% the real agriculture GDP will be raised by 0.004134 percent and it significantly affects the sector in the long run at 10% level of significance. As long as the Ethiopia economy depends on agriculture, the justification behind for positive impact inflation might be that producer are highly initiated for further production when price of the agricultural commodities are going to be raised thereby increase GDP of the sector as well, on other words, producers are motivated to do better in the economy during a period of inflation but at the same time consumers' purchasing power declines. This implies that inflation does not cause macroeconomic instability it serves as growth enhancing factor in theagriculture sector. This is because there is anincentive for investors and producers to invest or produce more once they assume that there is no demand deficiency in the economy. As result, more production and investment could generate new jobs contributing to economic growth for the country. This finding is also consistent withImoughele et.al (2013), Melkamu (2015),andYazdi andKhanalizadeh (2012).

From the results, there is a negative and insignificant effect of trade openness on agricultural output growth in thelong-run which was not harmony with prior expectation. This result is inconsistent with the classical view that free trade would cause world resources to be utilized most efficiently, promote economic growth and maximize world welfare at large. This finding is consistent with Sakyi(2011), Matadeen, and Seetanah (2011), Yazdi and Khanalizadeh (2012)

and Agyei (2015). This negative relationship between agricultural real GDP and trade openness might be fluctuation in growth of exports of goods and service which is associated with the agricultural commodity export since particularly in the Ethiopian case, the high price volatility for agricultural export goods resulted in an unstable export performance in one hand and growth in exports, dominated by coffee, oilseeds has slowed since 2008 and even declined in 2013 onwards. Such fluctuating performance was also affected by deteriorating terms of trade and balance of payments problems on another hand.

5.3.1.2. Short run error correction model for Agricultural Output Growth

As the regression results in theco-integratingform above shows that the coefficients of the model indicate theshort-run relation between the dependent variable and independent variables. The adjusted Rsquare for the model indicates that 98.4% of the total variation in thevalue of the dependent variable is explained by the independent variables in the short run and long run (see appendepix C) . All variables in the short run model have expected result except trade openness and inflation which have come up with anunexpected sign. Regardless of siginificance, the result reveal that the lagged value of agricultural real GDP, gross investment to GDP, human capital and bank credit to agricultural sector are positively determined agricultural output growth in short run whereas government consumption expenditure as % of GDP, inflation and trade openness negatively affect the agricultural output growth in Ethiopia.

Table 5.4: short-run coefficients for agricultural output growth equation

Short run coefficients (Cointegrating Form)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNRAGDP(-1))	0.326375	0.149723	2.179857	0.0372**
D(LNGI)	0.119328	0.040063	2.978493	0.0057*
D(LNHK)	0.059456	0.037415	1.589115	0.1225
D(LNBCA)	0.030615	0.018221	1.680209	0.1033

D(LNGCE)	-0.045110	0.089583	-0.503550	0.6183
D(INFLATION)	-0.001129	0.001235	-0.913741	0.3681
D(LNTO)	-0.058521	0.057385	-1.019790	0.3160
CointEq(-1)	-0.716539	0.154637	-4.633671	0.0001*

Cointeq = LNRAGDP - (0.1665*LNGI + 0.0830*LNHK + 0.0427*LNBCA

-0.0630*LNGCE + 0.0041*INFLATION -0.0817*LNTO + 8.9828)

Source: Author's calculation from E view 9 results, 2017

Note: the sign *,** and *** indicate that the variables are siginificant at the level of 1%, 5% and 10% repectively.

In agricultural output growth model, ECM coefficient in the short run was negative and statistically significant at one percent levels with a value of -0.716539. This implies that 71.65 percent of the disequilibrium in the long-run relationship was corrected in the current year and it would take ashort period for full restoration back to the equilibrium after a short-run distortion which meansthat correcting any deviations from the long-run equilibrium. The significance of the error correction mechanism (ECM) supports co-integration and suggests the existence of a long-run steady-state equilibrium relationship between agricultural output growth and explanatory variables including financial development indicator.In other words, the coefficient of the error correction term which measures the speed of adjustment back to anequilibrium whenever the system is disturbed indicates that adjustment is relatively fast.

The most important short-run determinants of agricultural output growth in Ethiopia are found to be a one-year lagged value of agricultural real GDP and gross investment. According to the result, as a one percent increase in gross investment to GDP leads to increase agricultural real GDP by 0.119328 percent with strong evidence of 1% level of significance, being other thing constant. This indicates that the productive investment in an economy is highly accelerate agricultural output growth even in short run.

The results of the short run model seem to suggest that bank credit to agriculture sector has apositive relationship but, statistically insignificant impact on real GDP of theagriculture sector. The implication of this result implies that the channeling of credit to agricultural sector for

investment through financing entrepreneurial and agricultural projects are not satisfactory for fostering agricultural output growth due to underdevelopment of financial sector and less linkage between thefinancial sector and agricultural sector despites of huge contribution of agriculture sector towards economic development of thecountry. This result is also consistent withAkpaeti, (2010) for Nigeria andImoughele et.al, (2013) who found that positive and insignificant effect of bank credit to agriculture on output growth in the agricultural sector as represented by real GDP of thesector. However, similar to long-run finding the impact of human capital as indicated by gross secondary enrollment on agricultural output growth is found to be positive and insignificant. In our justification, theinsignificant result might be that in the human capital development through education might take alonger period to affect output growth than would be within short period of time. Our finding is similar with Imoughele et.al, (2013) for Nigeria too.

As expected prior, government consumption as % of GDP is found to be thenegative and insignificant impact on agricultural output growth in the short run. This finding is also similar to what we obtained from long run result.The insignificant result may imply that government consumption in Ethiopia could not as much crowding out effect the growth of agricultural output growth through affecting private investment which is contrary to the controversy over theimpact of the size of the government on economic growth. This finding partially supports Keynesians argument for thesize of the government on economic growth.

Unlike long run result, inflation has anegative and insignificant effect on agricultural sector output growth in theshort- run. The agricultural sector is not affected by inflation in short run.

Similar to long run estimation, short run error correction model reveals that the relationship between trade openness and real agricultural GDP is found to be negative and statistically insignificant effects on agricultural output growth in theshort run. The reason behind the negative relationship between trade openness and economic growth rates is probably due to the high imports and declining trend of agricultural product export because of international price shock which has created negative trade balance position and depreciating exchange rates which make importing capital goods to become expensive thereby decline domestic output growth. However, in short run, there is theinsignificant marginal effect of trade openness in explaining agricultural output growth in Ethiopia. This result is also consistent withYazdi and Khanalizadeh (2012) for

Iran. Ali and Abdullah (2015) has been justified the negative impact of trade openness which might occur due to the raw material exports instead of final goods.

5.3.2. Long-Run and Short-Run Dynamics of Industrial Output

5.3.2.1. Long run Industrial Output Growth ARDL Estimation

After confirming the existence of along run relationship between the industrial output growth and its determinant, we have proceded to estimate the long-run impact of independent variables on industrial output growth. Accordingly, the ARDL(4,3,3,2,2,3,3)for industrial output growth model can be estimated for long-run as follows.

Table 5.5: the long run coefficient of industrial output growth

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGI	-0.288911	0.199714	-1.446628	0.1759
LNHK	0.307999	0.105807	2.910944	0.0142*
LNBCI	0.584275	0.187680	3.113137	0.0099*
LNGCE	-0.720947	0.318953	-2.260353	0.0451**
INFLATION	-0.026921	0.007118	-3.782304	0.0030*
LNTO	-0.149233	0.096674	-1.543674	0.1509
C	7.039751	1.096299	6.421379	0.0000*

Source: Author's calculation from E view 9 results, 2017

Note: the sign '*' and '**' indicate that the variables are siginificant at the level of 1%and 5% repectively.

Since we have specified the growth model in a log-linear form except for inflation because it is expressed in growth rate at the very beginning, the coefficients can be interpreted as elasticity with respect to real GDP of thesector. The result from long run dynamics of industrial sector estimation indicates that human capital expressed in term of secondary school gross enrollment, bank credit to industrialsector and government consumption as theratio of GDP and inflation found to have expectedsignand aresignificant determinants of industrial output growth in the

long-run. Contrary to theoretical expectations, the coefficient gross investment and trade openness have unexpected sign and statistically insignificant at the conventional level of significance.

As regression shows in above, the impact of human capital as expressed by gross enrollment on industrial real GDP is positive and statistically significant in the long run at 1 percent level of significance. Accordingly, holding other things constant, as a 1 percent increase in gross enrollment will lead0.307999 percent rise in the industrial real GDP. This finding reveals that human capital investment is crucial for determining industrial sector growth that absorbs more probable skilled manpower so as to enhance growth through adopting new technology and innovation in theproduction process. The finding is consistent with the endogenous growth theories as of Lucas (1988) and Romer (1990) which argue that development in human capital leads to improving productivity through adopting technology and innovation that enhances economic growth.

However, the gross investment as % of GDP has anegative but, insignificant effect on industrial output growth which is not consistent with the finding of Embiale, (2015). In our opinion, there might be possible reason behind the result is that the gross investment allocated to industrial sector are engaged in theproduction of final consumption goods and service(unproductive goods and services) than for capital goods to facilitate further investment, which is used to accelerating economic growth and have multiplier effect on the other sectors. If so, it does not have any impact on industrial sector output growth due to no value add to thesector in the long run. With respect to the impact of gross investment on anaggregatelevel, the study result has similar with the findings of Martha (2008), Tadese(2011), Adekunle and Aderemi (2012),Kidanemariam(2014)andIheanacho (2016). However, regarding industrial sector output growth, it is difficult to justify the exact reason behind such unexpected result using this research.

The long-run estimation results revealed that financial development (bank credit to theindustrial sector) is found to be a positive and significant impact on industrial output growth which confirmed what we have expected from economic theory. All other things remain given, a 1 percent increase in financial development proxy by bank credit to industrial sector will rise industrial real GDP by 0.584275 percent which is highly significant at 1% level of significance.

The result showsits consistency with the theoretical justification that the financial sector promotes long-run output growth of sector through two major channels namely the volume of investment and the efficiency of investment in term of efficient resource allocation to theproductive sector. This finding is similar tostudies done byOluwafemi(2014), Akpansung and Gidigbi (2014) and Embiale (2015) who found that the bank credit has asignificant impact on industrial output growth in the long run. However, the result contradicts the finding of Udoh and Ogbuagu (2012) for Nigeria.The result confirms that financial development play adecesive role in accelerating industrial output growth in long run. In other words, an evidence shows that for providing strategic bank credit to infant domestic manufacturing industries foster industrial output growth in the Ethiopia.

According to the the result presented in the table, government consumption expenditure as a % of GDP is found a negative effect on industrial growth and its effects is alsostatistically significant. This is because when the government increases its expenditure on consumption which means increasing size of government, then little resources will be left for this sector towards proving infrastructure service and facilitating sectoral growth. Specifically, the result of this study indicates that a 1 percent increase in government consumption to GDP leads to 0.720947 percent decrease in output growth of industrial sector.This result is similar to the finding of Adelakun (2010). The significant finding contradicts Keynesians argument for thesize of the government on economic growth.

The regression results revealed that in long run inflation has anegative and significant influence on industrial output growth in Ethiopia. The coefficient of this variable is -0.026921, showing that negative relationship between inflation and industrial output growth, and the estimates of the coefficient suggesting that when the inflation is increased by 1% the manufacturing output will be decline by 0.026921%. A negative relationship between inflation rate and industrial output growth as measured by real industrial GDP implies that increasing in general price level raise thecost of production which adversely affects the industrial sector performance. Hence, its significant effect on industrial output growth in the long run is consistent with the study ofImougheleet.al (2013).

The result of this study suggested that the impact of trade openness on Ethiopian industrial output growth during the study period negative and statistically insignificant.Trade openness

appears not to be robust determinants of industrial growth as its coefficients alternate signs as the specification is changed. In our opinion, there are two possible reasons behind negative estimated result. The first case is that liberalizing trade may have encouraged foreign competition which is well established and organized economy of scale that hampers Ethiopia infant industry which leads to negative effect on long-term real GDP of industrial growth. secondly, Ethiopia export performance is associated with theagricultural primary product as well as semi-finished manufacturing goods (this is because as data of MoFED(2016) show that more than 68 percent export level in the country comes from theagricultural primary product), which suffered from international price shock. This comes up with anegative balance of payment and depreciation of currency which makes imported capital goods for investment to be expensive thereby retard industrial output growth in long run. The same result is obtained in theagricultural sector. The finding is similar with Bibi and Rashid (2014) for Pakistan and Adhikary(2011) for Bangladesh and they found the negative relationship which was appeared due to the devaluation of currency and adverse effect of balance of payment.

5.3.2.2. Short run error correction model for industrial output growth

After the confirmation of long-run coefficients of the growth equation, the short-run ECM model is estimated. The following table shows the daynamics of short-run error correction model coefficients so as to examine the relationship between industrial output growth and its determinants.

Table 5.6: short-run coefficient for industrial output growth Equation

Short run error correction model(Cointegrating Form)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNRIGDP(-1))	0.840502	0.276647	3.038180	0.0113*

D(LNRIGDP(-2))	0.439361	0.308239	1.425391	0.1818
D(LNRIGDP(-3))	0.637516	0.274827	2.319699	0.0406**
D(LNGI)	-0.135146	0.124322	-1.087060	0.3003
D(LNGI(-1))	-0.118936	0.110761	-1.073805	0.3059
D(LNGI(-2))	-0.146567	0.088910	-1.648485	0.1275
D(LNHK)	0.139913	0.108751	1.286537	0.2247
D(LNHK(-1))	0.076314	0.120527	0.633166	0.5396
D(LNHK(-2))	0.112141	0.089127	1.258214	0.2344
D(LNBCI)	0.197474	0.046651	4.233026	0.0014*
D(LNBCI(-1))	-0.087520	0.047713	-1.834314	0.0938***
D(LNGCE)	-0.387140	0.235942	-1.640829	0.1291
D(LNGCE(-1))	-0.175592	0.115519	-1.520021	0.1567
D(INFLATION)	-0.004714	0.001963	-2.400745	0.0352**
D(INFLATION(-1))	0.006167	0.002839	2.172124	0.0526**
D(INFLATION(-2))	0.003727	0.001994	1.868757	0.0885***
D(LNTO)	-0.026248	0.158752	-0.165341	0.8717
D(LNTO(-1))	0.529675	0.172116	3.077425	0.0105*
D(LNTO(-2))	0.291291	0.109945	-2.649432	0.0226**
CointEq(-1)	-0.649022	0.255208	-2.543113	0.0273**

Cointeq = LNRIGDP - (-0.2889*LNGI + 0.3080*LNHK + 0.5843

*LNBCI -0.7209*LNGCE -0.0269*INFLATION -0.1492*LNTO + 7.0398)

Source: Author's calculation from E view 9 results, 2017

Note: the sign *,** and *** indicate that the variables are siginificant at the level of 1% and 5% repectively

The estimation of error correction model shows us that the lagged value of all level variables which we call the error-correction term is retained in the ARDL model. The coefficient of

determination (adjusted R-squared) is high explaining that about 72.6% of thevariation in the real GDP of theindustrial sector is attributed to variations in the explanatory variables in the model. Moreover, the DW statistic does not suggest autocorrelation and the F-statistic is quite robustwhich is indicated in appendix C.

The estimated coefficient of error correction term found to be -0.649022 and statistically significant at 5% level of significance which has the correct sign, and indicates a relatively high speed of adjustment to equilibrium after theoccurrence of shock. Approximately 64.9 percent of the disequilibrium from the previous year's shock converges back to the long-run equilibrium in the current year. This significant Error correction term is another proof for the existence of a stable long-run relationship among the variables (Banerjee and Duflo, 2003).

The estimated short-run model reveals that both human capital through education and gross investment are not the main contributor to real industrial GDP which is insignificant at theconventional level of significance. Particularly, gross investment is negatively affecting output growth of industrial sector. On another hand, except two period lags, remaining period lagged value of manufacturing real GDP has a significant positive impact on the future economy of thesector. Specifically, when one period lagged value of real GDP of industrial sector increases by one percent, industrial output increases by 0.840502 percent while the same percentage change in its three periods lagged value resulted in about 0.637516 percent rise in real GDP of the sector.

Unlike to long run impact, human capital development has no significant short-run impact on industrial sector economy. The insignificant result of human capital could be due to the reason that human capital development may have abig impact on the people who are not capable engaging in theindustrial sector in term of educational status and creative ability that is essential for adopting new technology to enhance thegrowth of the sector in short run. The other possible reason could be ahigh rate of unemployment which meansthat even though theeducational status of the labor force increases in the short run until it is employed it will consume resources that would have been allocated for new investment.

As depicted from theresult shown in the table, the coefficient of bank credit to industrial sector has confirmed it's expected theoretical or hypothesized signs. In other wors, the results exerts that the coefficient of bank credit to industrial the sector as a measure of financial development is

found to be positive and statistically significant at 1 percent level of significance in the short run. Numerically,it implies that a 1 percent increase in bank credit, an industrial real GDP will increase by 0.19747 percent.. The impilication for positive relationship reflects that financial development facilitates the allocation of credit for productive activities which influences output growth through increased investment in the economy. This finding supports the finding ofUdoh and Ogbuagu(2012) for Nigeria. However, one period lag of the bank credit has the theoretical unexpected negative sign and less significantly affects output growth of sector as evidenced by the probability value of 0.0938. The implication of this finding is that total bank credit to industry in the lagged period has no robustly effect manufacturing performance. The finding is consistent with the study done by Imoughele et.al (2013) for Nigeria, and Emaile (2015) for the case of Ethiopia.

The estimated coefficient of inflation rate bears a negative sign and significant at 5% level of significance which is also consistent with the a priori expectation. This represents that a one percent increase in inflation rate will lead to 0.004714 percent decrease in industrial sector output. The robustness of this variable is an indication that macroeconomic instability reduces industrial sector output mainly through rising cost of production. However, the coefficient of inflation rate has positive and significant at 5% and 10% level of significance in the one and two periods lagged repectively. This implies that inflation induces industrial growth through making anincentive for further production at least in the short-run.

As consistent with a priori expectation, there is aninsignificant and inverse relationship between government consumption as theratio of GDP and industrial sector output. This result indicates that expansionary fiscal policy through government consumption does not adversely affect the growth of industrial sector. Moreover, trade openness has negative coefficient and statistically insignificant effect on industrial real GDP due to the challenge made by theforeign competition. But there is still non-robust impact on industrial sector output growth. However, the coefficient of trade openness has positive and significant at 5 % level of significance in the one and two lagged period. This implies that liberalizing trade induces industrial growth through importing capital goods and new technology for further production.

5.3.3. Long-Run and Short-Run Dynamics of Service Sector Output Growth Model

5.3.3.1. Long run ARDLestimation for Service sector output growth

As long as we have along-runcointegration relationship among the variables, it is possible to run the appropriate ARDL model to find out the long run coefficients, which isreported in thetable below for service sector output growth equation.

Table 5.7: estimated long-run coefficient of service sector output growth

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNHK	0.322441	0.061597	5.234662	0.0000*
LNGI	0.219638	0.037685	5.828212	0.0000*
LNBCS	0.090983	0.048770	1.865546	0.0744***
INFLATION	-0.004077	0.001848	-2.205489	0.0372**
LNGCE	-0.439819	0.191450	-2.297308	0.0306**
LNTO	0.086412	0.138675	0.623125	0.5391
C	4.714454	0.587969	8.018199	0.0000*

Source: Author's calculation from E view 9 results, 2017

Note : the sign of *,**, and *** represents the level of significance at 1%, 5% and 10% respectively

The result represents that all independent variables other than trade openness have long run siginificantly determine service sector output growth and consistent with the theoretical justification. As it can be observed from the above-estimated result, irrespective of the their statistical siginificance, the long-run equation suggested that human capital, gross investment, bank credit, and trade openness positively affecting the service sector output growth whereasgovernment consumption as theratio of GDP and inflation rate negatively affect the service sector output growth in the long run.

The estimated long-run model depicts that human capital through education is the main contributor to real GDP of service sector which has positive and statistically significant as strongly evidenced by one percent level of significance. Human capital as aproxy by enrollment increases by one percent, real GDP of service sector increases by 0. 322441 percent. This could be due to the reason that government attention toward education for human capital development have abig impact on the people who have apositive impact on the economy in which accumulation of knowledge and learning ability increase theproductivity of resources.

As prior hypothesized sign, gross investment to GDP variable has the expected positive sign. The level of investment has found to be a positive and statistically significant impact on service sector output growth in the long run as strongly evidenced by 1 percent significance level. The result of estimation provides that a 1 percent increase in gross investment leads to a respective real service sector GDP increase of 0.22 percent. This indicates that investment is an important determinant of service sector output growth in Ethiopia.

The impact of total bank credit to the service sector is positive and significant at 10 percent level of significance. All other things remain constant, 1 percent increase in bank credit will increase the service sector real GDP growth by 0.090983percent in the long run which implies that financial sector development is conducive to long-run output growth of service sector in Ethiopia.Therefore, the regression results confirm the acceptance of the alternative hypothesis that bank credit has significant positive impact on the long-run output growth of service in Ethiopia.

The coefficient of government final consumption variable as apercentage of GDP resulted with hypothesized sign and statistically significant at 5 percent level of significance.The results suggest that a one percent increase in government consumption leads to the decrease in real GDP of service sector by 0. 439819 percent. The logical behind the negative relationship between government final consumption and real GDP of this sector is that governments use expansionary fiscal policy through government spending during poor economic conditions to boost the economy and this crowd out the investment which ultimately affects sectoral output growth. Another logical explanation is that increasing government consumption expenditure would lead little resources left to developmental activities including infrastructure that is vital for accelerating overall economic development.

The general inflation rate as presented in the above table has anegativeimpact on service sector output growth and statistically significant. However, despite the fact that the level of inflation come up with a negative and statistically significant impact on service sector real GDP in the long run, the relationship between them in term of elasticities remains very weak that is a one percent increase in inflation leads to decrease a respective real GDP of service sector of 0.001297 only. This indicates that inflation rate is not an important determinant of service sector output growth. In the Ethiopian history, until 2002/03 inflation remained at a reasonable low-level rate. However, after 2004, the inflation rate continuously increased and climbed to 36.4 percent in 2009 (NBE, 2015/16), which was particularly caused by food inflation and affect the day to day consumption of the society than affecting the macroeconomic performance. In another word, the justification behindthe marginal effects of inflation on Ethiopian service sector is that output growth might be associated with the reasonable low level (single digit) inflation rate registered until 2003 and after 2010 during the study period.

As we have expected from economic theory, openness to trade measured as the sum of exports and imports as a ratio of nominal GDP has a positive and insignificantly affects service sector output growth as a evidenced by high probability value of 0.5391. Therefore, trade openness is not an important ingrident to accelerate long-run output growth of service sector in Ethiopia.

5.3.3.2. Short run error correction model for Service sector output growth

The overall goodness of the model as shown by the adjusted coefficient of determination is 0.997, which shows that about 97 percent of the variation experienced in the service sector output for the study period being investigated may be explained by the independent variables included in our model. Similarly, the F-statistic is quite ruboust and the model is free from serial autocorrelation as evidenced by DW test(see appendix C).

Table 5.8: short run coefficients (short run error correction model or Cointegrating form)

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNRSGDP(-1))	-0.105705	0.155054	-0.681730	0.5019
D(LNHK)	0.127323	0.050486	2.521968	0.0187**
D(LNGI)	0.128270	0.039327	3.261630	0.0033*
D(LNBCS)	0.009882	0.021081	0.468772	0.6435
D(LNBCS(-1))	-0.028683	0.020379	-1.407487	0.1721
D(INFLATION)	-0.002381	0.000973	-2.447277	0.0221**
D(LNGCE)	-0.103551	0.079902	-1.295982	0.2073
D(LNGCE(-1))	0.110654	0.072966	1.516521	0.1424
D(LNTO)	0.050465	0.075749	0.666213	0.5116
CointEq(-1)	-0.584009	0.132996	-4.391168	0.0002*

Cointeq = LNRSGDP - (0.3224*LNHK + 0.2196*LNGI + 0.0910*LNBCS

-0.0041*INFLATION -0.4398*LNGCE + 0.0864*LNTO + 4.7145)

Source: Author's calculation, 2017

Note : the sign of '*' and '**' represents the variables are significanc at the level of 1% and 5% respectively.

As depicted from above results, all variables in the short run model have come up with their prior expectation. accordingly, as the result reveal that in the short run gross investment, human capital and bank credit to theagricultural sector and trade openness are positive affects service sector output growth whereas government consumption expenditure as % of GDP and inflation negatively affect the service sector output growth in Ethiopia.

According to the result shown in the above that the coefficient of error correction mechanism (ECM) is negative and statistically significant as evidenced by the low probability value of 0.0000. Its coefficient is found to be -0.584009 which indicates that about 58.4 percent disequilibrium in service sector output in the previous year are corrected for thecurrent year. The

significance of the ECM is an indication and a confirmation of the existence of a stable long-run equilibrium relationship between service sector output and all the explanatory variables.

Similar to the long-run result, the estimated short-run model reveals that human capital proxy by secondary gross enrollment is the main contributor to real GDP of service sector change. It has a positive and statistically significant effect on service sector output growth in theshort run. Other thing being constant, when human capital increases by one percent, real GDP of service sector increases by 0. 127323 percent. On the same manner, the coefficient of gross investment as the ratio of GDP has astrong positive effect on this sector in short run as prior expectation. Accordingly, when gross investment increased by one percent, real GDP of service sector increases by 0. 128270 percent as strongly evidenced by 1 percent level of significance.

In short run, empirical evidence shows that financial development proxy bank credit to thesector has apositive and statistically insignificant effect on service sector output growth in the current period. The implication of this insignificant empirical evidence is that total bank credit to service sector in the current period has no significant effect service sector performance. Moreover, positive nature of this variable represents that the possibility to induce the growth of service sector performance given the crucial importance of credit facility to service business facilitation and overall economic development. However, in one-year lag financial development has inverse and insignificant effect on service sector development which is acontrast to theoretically expected sign. This implies that a one percent increase in a year period lag of bank credit will lead to 0.028683percent decrease in service sector output. In both cases, the implication shows us that financial development has not animmediate contribution towards service sector's development due underdevelopment of thefinancial system and inefficient allocation resources to productive activities to boost sectoral output growth.

The short-run estimated coefficient of government consumption expenditure to GDP was found to be -0.103551. As expected, it has anegative relationship with service sector output growth. The variable is not significant at conventional levels of significance due to the high value of the probability of 0.2073. This result indicates that expansionary fiscal policy through government consumption does not have anadverse effect on the growth of service sector output. However, in one year period lag, the coefficient of government consumption as % of GDP was positive and

insignificant. This insignificant result indicates that consistent expansion of fiscal policy has not crowdingout effect on service sector output performance all things being equal in the short run.

Similar to the long-run result, the inflation rate variable coefficient bears a negative sign and significantly affecting sectoral output growth at 5% level of significance which is in line with the a priori expectation. This implies that there is an indirect relationship between inflationary rate and service sector output. As result reveal that a one per cent increase in inflation rate will lead to 0.002381 percent decrease service sector output. The significance of this variable is an implication that macroeconomic instabilityreduce service sector output growth in theshort run. The finding is also similar with Imoughele et.al, (2013) for Nigeria.

Just like short run estimation result, the estimated coefficient of trade openness was found to be 0.050465. Unlike to the result found in agricultural and industrial output growth, a positive relationship exists between trade openness and service sector output growth as measured by real GDP of theservice sector. The result is consistent with a priori expectation. The variable is not significant as evidenced by the high value of the probability of 0.5116. This result indicates that trade liberalization does not induce the growth of service sector. The existence of positive relationship implies that consistent encouragement of trade liberalization policy has the capacity to promote service sector output performance but is not contributing robustly at the point of thestudy.

5.3.4. Long-Run and Short-Run ARDL Model Estimation for Aggregate Output Growth Equation

5.3.4.1. Long runAggregate Output Growth ARDL model estimation

Once cointegration among dependent which aggregate output growth and all explanatory variables through bound test are confirmed, then long-run estimation of the model comes next. Accordingly, The ARDL(1,0,0,2,0,1,0) for aggregate output growth model can be estimated for long-run.

Table 5.7: estimated long-run coefficient of aggregate output growth

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNHK	0.201258	0.038358	5.246815	0.0000*
LNGI	0.186115	0.025705	7.240335	0.0000*
LNBC	0.122105	0.028268	4.319514	0.0002*
LNGCE	-0.072154	0.090884	-0.793914	0.4337
INFLATION	-0.000764	0.001547	-0.493793	0.6252
LNTO	-0.150391	0.064027	-2.348873	0.0259**
C	7.295826	0.400715	18.207028	0.0000

Source: Author's calculation from E view 9 results, 2017

Note : the sign of "*" and "**" represents the level of significance at 1% and 5% respectively

In long run, most of thecoefficient of explanatory variables have their expected theoretical or hypothesized signs except for trade openness similar with theshort run result. Consistent with theory, gross investment to GDP in Ethiopia has a positive sign on real GDP. Specifically, an increase in the level of gross investment by 1 percent will lead a 0.186115percent increase in real GDP which is strong evidence with 1% level of significance. Similarly human capital has positive and significantly determine economic growth in Ethiopia which confirms endogenous growth model that incorporate human capital development as anengine for economic growth. Due to this fact an exception of agriculture sector,human capital determine sectoral output growth as evidenced by the result both in short run and long run.

As the results depict that the coefficient of bank credit (a measure of financial development) has apositive sign as predicted by the theory and statistically significant at 1 percent level. This result is also similar to long run effect of domestic bank credit to on economic growth in Ethiopia. It indicates that a 1 percent increase in bank credit lead to increase0.122105percent in aggregate output growth as measured the real GDP. This is implythat financial development as proxy by

domestic creditfacilitate supply of investible funds to productive sector which influences overall outpt growth through increased investment in the economy. This finding is consistent with those of Levin *et al.* (2000), Afangideh (2009), Adelakun (2010),Murty et al. (2012),Helmi et al. (2013)andMercy et.al, (2015). From the theoretical perspective, this finding is also consistent with the theory of Schumpeter which argued the importance of financial development on the economic growth of a country. Conversely, this result is not consistent with the finding of Fozia (2014) and Dejene (2016) for the case of Ethipia. To this end, bank credit is highly significant impact on aggregate output growth implying that financial development is an engine for long-run economic growth. Overall output growth result provides an evidence that financial sector development does play a positive and significant role in enhancing production growth in the agriculture, industrial and service sectors in the long run.

The results also reveal that even though not significant, government consumption expenditure as a ratio of GDP has a negative effect on economic growth as theoretical justification. This is due to the fact that as the government increases its expenditure on consumption, then little resources will generated towards productive economic sector. In addition, due to thehuge amount of government borrowing from the domestic market to finance governmet consumption leads to crowding out of private sector which is negatively influencing economic growth. This result is consistent with those of Mercy et al (2015) and Melkamu (2015). Moreover, the regression result depicts that inflation rate has negative long-run effects on the real GDP but insignificantly affect economic growth due to thefact that a presence macroeconomic instability in the short run will be adjusted in long run.

The long-run estimated coefficients of trade openness hasfound tobe anegative sign and significant (not marginal) effect on economic growth as confirmed by 1 percent level of significance. In our opinion, justification forinverse relationship is that the liberilazing trade might have exposed the country's infant industry to foreign competition thereby adverse effect on long-run real GDP. In this case, domestic investors who are engaged in the non-exportable economic activities were forced to exit from domestic market. This result is also evidenced by sectoral output growth excluding service sector. Hence, a percentage increase in the ratio of import plus export to GDP which is trade openness will reduce overall output growth by 0.150391percent. The finding is similar to the finding conducted by Adebiyi (2006) for Nigeria,

Adu et.al. (2013) for Ghana: Mercy et.al, (2015) for Keniya, Agyei(2015) for Ghana andOkafor and Shaibu(2016)for Benin. According toBibi and Rashid(2014),trade openness could be manifested either positive or negative depending on the values of determinants of trade openness.

5.3.4.2. Short run error correction model for Aggregate Output Growth

In anaggregate economic growth model, ECM coefficient in the short run was negative and statistically significant at one percent levels with a value of -0.605457. This implies that 60.5 percent of the disequilibrium in the short-run was corrected in the current year which meansthe short run distortion is to be corrected towards the long-run equilibrium path. In other words, we found that the deviations in the short run towards the long run equilibrium are corrected by 60.5% each year. Relatively better speed of adjustment in aggregate output growth might be due to the developing competitiveness of thefinancial sector through wide spread involvement of private sector and fast economic growth recorded since 2003/4 in Ethiopia. The short-run coefficient of the model explain short-run relationship between overall output growth and explanatory variables are depicted as follows.

Table 5.9: short run coefficients (short run error correction model) for aggregate output growth

Short-run error correction estimation orCointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNHK)	0.121853	0.027502	4.430733	0.0001*
D(LNGI)	0.112685	0.030833	3.654686	0.0010*
D(LNBC)	0.048429	0.017838	2.714876	0.0110*
D(LNBC(-1))	-0.033721	0.014885	-2.265473	0.0311**
D(LNGCE)	-0.043686	0.052167	-0.837427	0.4092
D(INFLATION)	-0.001836	0.000643	-2.855161	0.0079*
D(LNTO)	-0.091055	0.050021	-1.820352	0.0790***
CointEq(-1)	-0.605457	0.131184	-4.615334	0.0001

Cointeq = LNRGDP - (0.2013*LNHK + 0.1861*LNGI + 0.1221*LNBC

-0.0722*LNGCE -0.0008*INFLATION -0.1504*LNTO + 7.2958)

Source: Author's calculation from E view 9 results, 2017

Note : the sign of *, **, and *** represents the variables are significanc at the level of 1%, 5% and 10% respectively.

In short run, economic growth represented by real GDP is determined by human capital, gross investment and bank credits as aproxy for financial development which are positive and statistically significant at 1% level of significance. The significant impact of domestic bank credit on aggregate output growth is consistent with the finding of Dejene (2016). However, one period lagged bank credit has aninverse relation with output growth at aggeregate level which is confirmed by 5 percent significance level.This time lag contribution of the bank credit to economic growth might be justified that the financial development takes time to benefit aggregate output growth near the futureand other reason may be the underdevelopment of the financial sector in the short-run.

The result revealed that trade openness has negative and statistically significant impact aggregate output growth which is acontrast to theoretical expectation. The justification behind for this result may be traded openness leads to competition between foreign investors and domestic investors which havea negative effect on domestic investors that need the protection during aninfant stage and another explanation might be acontinuous decline of export performance. This result is consistent with the finding of Mercy et.al (2015) for Kenya,Iheanacho(2016) for Nigeria and Ofori-Abebrese et.al(2017) for Ghana**.** On another hand, as expected prior Government consumption expenditure as aratio of GDP has anegative and insignificant effect on economic growth, whereas inflation rate affects economic growth negatively and significant at 1% level of significance. Other than service sector, the negative relationship between trade openness and economic growth in theshort run is also confirmed in agriculture and industrial sector as well.

5.4. Diagnostic Test and Model stability

In order to check the verification of the estimated model, diagnostic testing is important prior to undertaking any econometric data analysis. In addition, to test the stability of model, some of thediagnostictests such as Heteroscedasticity test,Serialcorrelation test (Brush & Godfray LM test),Normality (Jaque-Bera test) and Functional form (Ramsey's RESET) test were undertaken so as to proceed the analysis of the model result.Therefore, diagnostic tests are representing that

long-run and short-run estimates are free from serial correlation, misspecification of the short runmodel, non-normality of the error term, and heteroscedasticity which are indicated as follows for four output growth equation.

Table 5.10: Long runARDL (2, 0, 0, 0, 0, 1, 0) Diagnostic Tests for agricultural output growth equation

Test	LM-version		*F*-version	
	statistic	P-value	statistic	P-value
A:Serial Correlation: Breusch-Godfrey serial correlation LM test	χ2(2)=0.075530	0.7834	*F*(2, 29)=0.054863	0.8165
Heteroskedasticity: Breusch-Godfrey serial correlation LM test	χ2 (9)=10.27220	0.3289	*F*(9, 29)= 1.151807	0.3596
Normality: Jarque-Bera test	χ2(2)=0.634550	0.728129	Not applicable	-
Functional Form: Ramsey RESET test	χ2(2)=1.089742	0.28487	*F*(1, 29)= 1.187538	0.28487

Source: Author's computation of E view 9 result, 2017

Table 5.11:Long-runARDL (4, 3, 3, 2, 2, 3, 3) Diagnostic Tests for industrial output growth equation

Tests	LM-version		*F*-version	
	statistic	P-value	statistic	P-value
:Serial Correlation: Breusch-Godfrey serial correlation LM test	χ2 (2)= 1.556643	0.0876	*F*(2, 9)= 1.556643	0.2627
Heteroskedasticity: Breusch-Godfrey serial correlation LM test	χ2(26)=25.54424	0.4884	*F*(26, 11)= 0.867645	0.6357
Normality: Jarque-Bera test	χ2(2)= 0.332727	0.846738)	Not applicable	
Functional Form: Ramsey RESET test	χ2(10)=0.510446	0.6208	*F*(1, 10)= 0.260555	0.6208

Source: Author's computation of E view 9 result, 2017

Table 5.12:Long-runARDL (2, 0, 1, 2, 2, 0, 0) Diagnostic Tests for service sector output growth equation

tests	LM-version		*F*-version	
	statistic	P-value	statistic	P-value
Serial Correlation: Breusch-Godfrey serial correlation LM test	$\chi 2$ (2)= 3.181577	0.2038	*F*(2, 22)= 0.977077	0.3922
Heteroskedasticity: Breusch-Godfrey test	$\chi 2$ (14)= 17.80720	0.2157	*F*(14, 24)= 1.440425	0.2092
Normality: Jarque-Bera test	$\chi 2$(2)= 1.304446	0.520887	Not applicable	
Functional Form: Ramsey RESET test	$\chi 2$(23)=0.542812	0.5925	*F*(1,23)=0.294645	0.5925

Source: Author's computation of E view 9 result, 2017

Table 5.13: Long run ARDL (1,0,0,2,0,1,0) Diagnostic Tests for aggregate output growth equation

Tests	LM-version		*F*-version	
	statistic	P-value	statistic	P-value
A:Serial Correlation: Breusch-Godfrey serial correlation LM test	$\chi 2$ (2)= 3.047792	0.0695	*F*(2, 27)= 2.887369	0.0731
Heteroskedasticity: Breusch-Godfrey test	$\chi 2$ (10)= 6.360444	0.7841	*F*(10, 29)= 0.548321	0.8411
Normality: Jarque-Bera test	$\chi 2$(2)= 0.116470	0.943428	Not applicable	
Functional Form: Ramsey RESET test	$\chi 2$(1)=.281947	0.7799	*F*(1, 31)= .079494	0.7799

Source: Author's computation of E view 9 result, 2017

5.4.1. Test for Heteroskedasticity

The presence of heteroscedasticity has been checked for the efficiency model to ensure that the standard errors are not wrong and any inferences made could not be misleading. It is assumed that the errors are homoscedastic or their variance is constant. The null hypothesis is the error terms are homoscedastic. Breusch-Pagan-Godfrey test has been made, to ensure that this assumption is no longer violated. The p-value of both the F- and$\chi 2$ (_LM‘) versions of the test statistic and the p-value of Scaled explained SS must be higher than 0.05 to reject the null hypothesis of heteroskedasticity. As we have seen from the above table, we can reject null hypothesis of heteroscedasticity at 5% significant level due to the fact that its p-value associated with the test statistics are greater than the standard significance level for each sector output growth.

5.4.2. Test for Serial Autocorrelation

The presence of Serial correlation is the result of either model misspecification or genuine autocorrelation of the model error term. As result, test for serial correlation in the residuals is amandatory task to undertake the model estimation properly.

According to the result obtained in above tables, for all four models, the null hypothesis of no serial correlation (Brush God fray LM test) is failed to reject because of that the p-values corresponding with test statistic is greater than the standard significant level (I.e. 0.05). Here LM test for testing serial correlation is applied because contrast to the traditional Durbin-Watson test statistic which is totally inapplicable when the lagged dependent variable appears as regressors, LM test avoid such limitation of DW test.

5.4.3. Test for Functional Form and Normality

Besides on aforementioned testing, testing whether the model is thefunctional form of the model correctly specified or not, we can decide it by looking the p-value associated with t statistics greater or less than 5% significant level. Similarly, normality test of residual is acrucial diagnostic test prior togoing any analysis of the model.

As we can see from the table, theresult represents that we could not reject the null hypothesis which says that the residuals are normally distributed, because the p-value associated with the Jaque-Berra normality test is larger than the standard significance level (see normality test graph at appendix B). Regarding functional form test, we could not reject the null hypothesis test for

Ramsey's RESET test, which tests whether the model suffers from omitted variable bias or not. As the test result indicates that we can't reject Ramsey's test, which means that the model is correctly specified.

5.4.4. Test of Parameter Stability

The stability of the model for long run and short run relationship is detected by usingthe cumulative sum of recursive residuals (CUSUM) which helps as to show if coefficient of the parameters are changing systematically and the cumulative sum of squares ofrecursive residuals (CUSUMSQ) tests which is useful to indicate if the coefficient of regression are changing suddenly. Accordingly, if the blue line cross redline which is critical line and never returns back between two critical line, we accept the null hypothesis of the parameter instability whereas the cumulative sum goes inside the area (can returns back) between the two critical lines, then there is parameter stability in theshort run and long run.

A. Agriculture output growth equation

Figure 4.1: Plot of Cumulative Sum of Recursive Residuals (i)

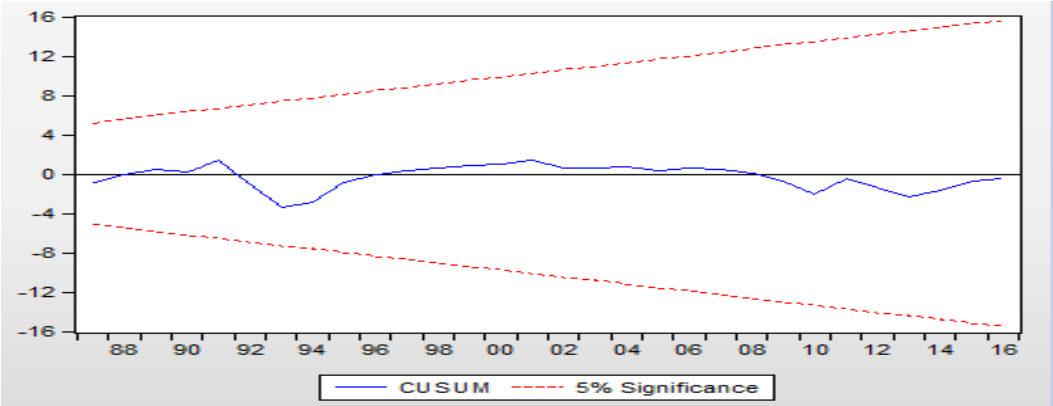
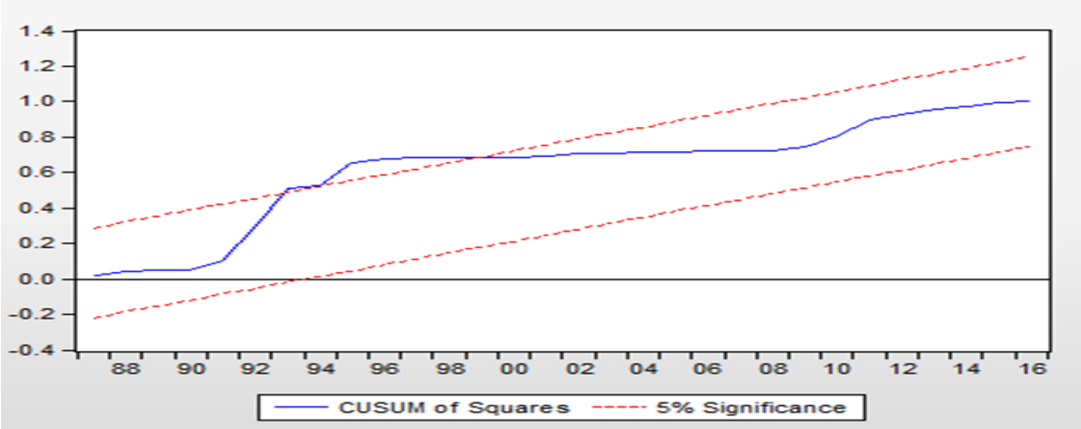


Figure 4.2: Plot of Cumulative Sum of Squares of Recursive Residuals (ii)



B. Industrial output growth equation

Figure 4.3: Plot of Cumulative Sum of Recursive Residuals (i)

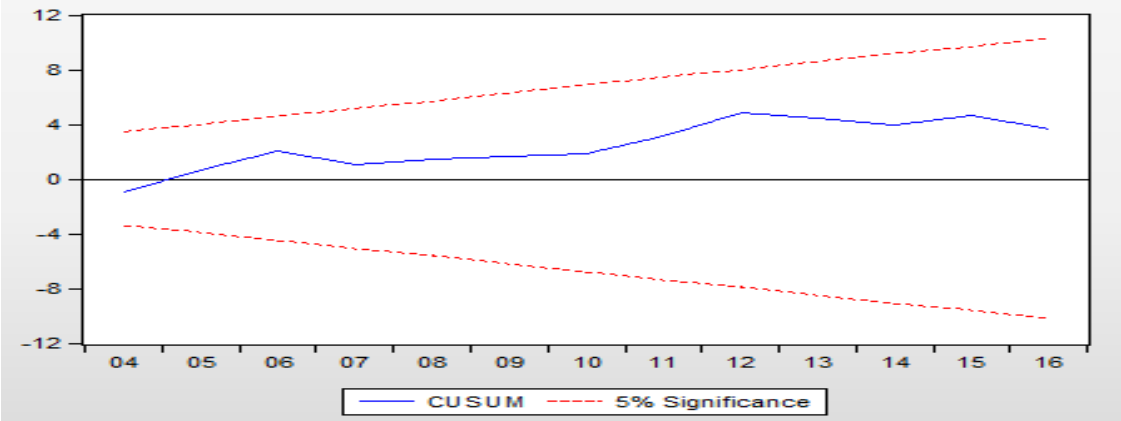
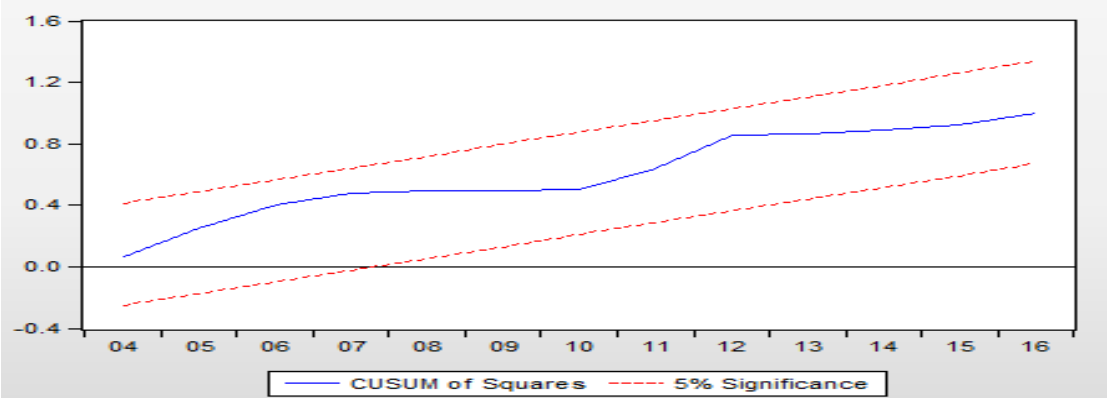


Figure 4.4: Plot of Cumulative Sum of Squares of Recursive Residuals (ii)



C. Service sector output growth equation

Figure4.5: Plot of Cumulative Sum of Recursive Residuals (i)

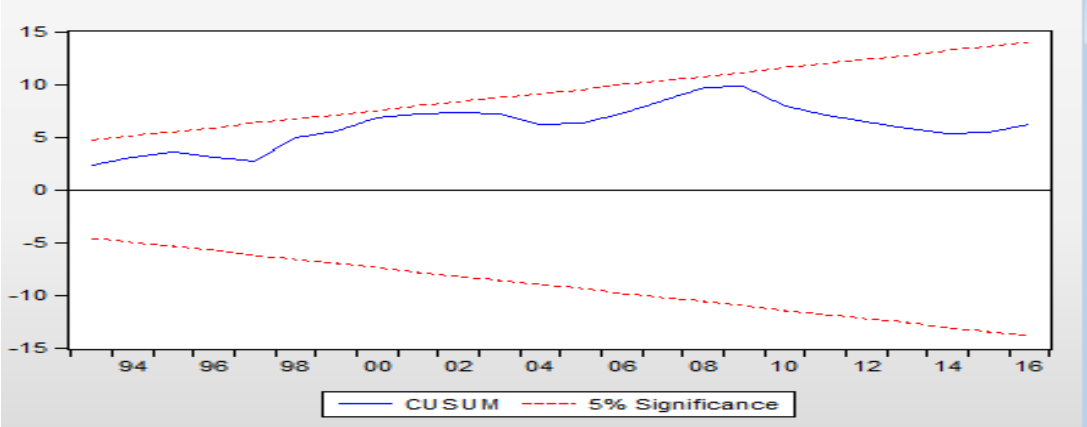
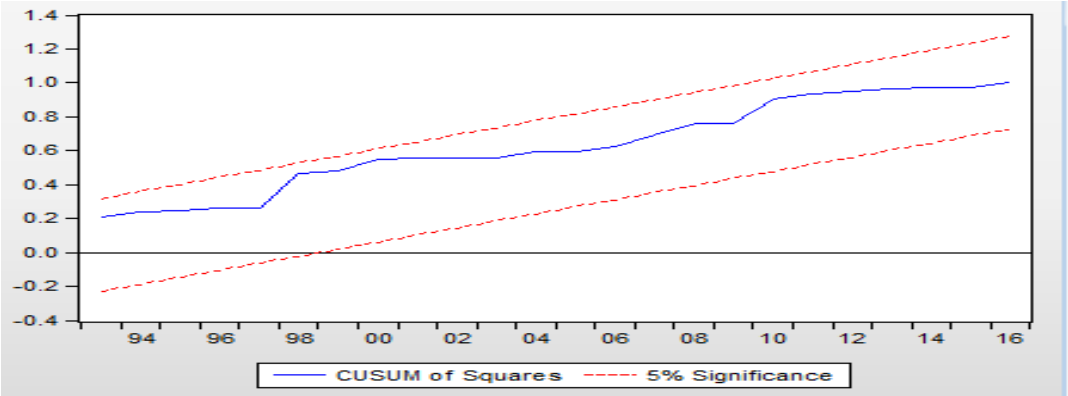


Figure 4.6: Plot of Cumulative Sum of Squares of Recursive Residuals (ii)



D. Aggregate output growth equation

Figure 4.7: Plot of Cumulative Sum of Recursive Residuals (i)

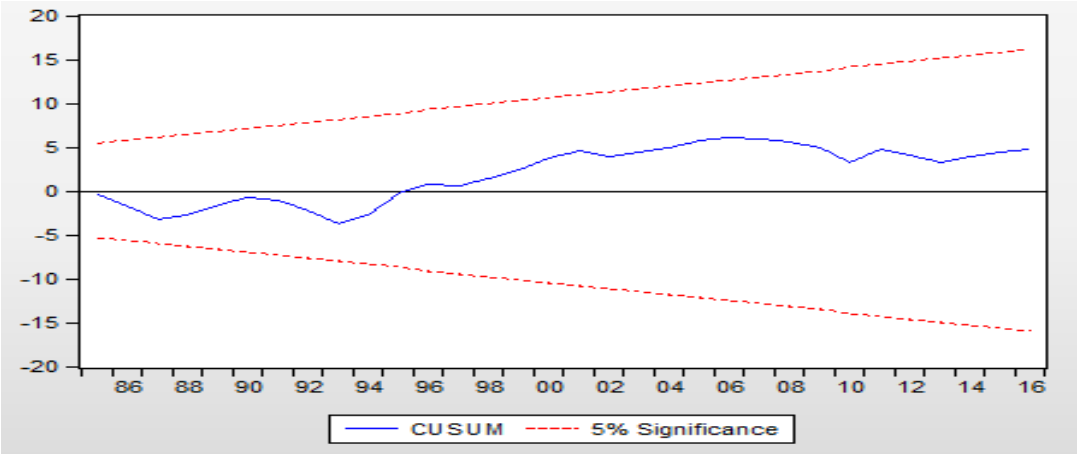
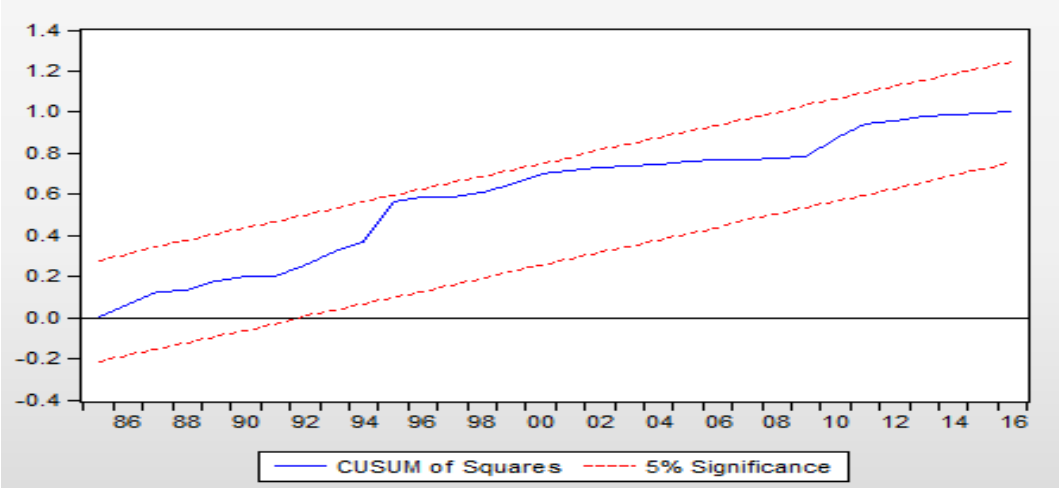


Figure 4.8: Plot of Cumulative Sum of Squares of Recursive Residuals (ii)



As the result seen from the figure for three equation, the plot of CUSUM test did not cross the critical limits. In the same manner, the CUSUMSQ test shows that the graphs do not cross the lower and upper critical limits. So, we can conclude that long-run estimates are stable and there is no any structural break.

In addition to the confirming model stability by employing CUSUM and CUSUMSQ test mentioned in above figure, we can look at goodness of fit statistics of the model containing the explanatory variables that was proposed actually explain variations in the dependent variable because it is important to have some measure of how well the regression model actually fits the data. Accordingly, adjusted R^2 of output growth equation for agriculture, industry and service sector 99.7 percent, 99.8 percent and 99.2 percent of the model have been explained by the regressors respectively (see appendix C). Hence the results of the estimated model are reliable and efficient.

5.5. Granger Causality Test Result

This studyhave employed the Granger causality test to determine the direction of causality between cointegrated variables applying the vector error correction model (VECM) which would enable us to track the longrun and short-run causality among interested variables (Kyophilavong et.al., 2016). In other words,in the Vector Error Correction Model (VECM), thelong run association can be deduced from the significance of the lagged errorcorrection terms, while theshort run association is deduced from the coefficient of the lagged differenced variables. Therefor, the requirement for long-run causality is that ECT coefficients must be negative and sitastically significant. The short run causality has been tested using the Wald test (x2).

Table 5.13: long run Granger Causality Test using ECM procedures

Null Hypothesis of direction of causality	Included obs.	coefficients of ECt-1	t-ratio of ECM (-1)	Prob.
A. Agricultural sector				
LNBCA does not Granger cause LNRAGDP	There is no co-integration between bank credit and agricultural growth by bound test to cointegration			
LNRAGDP does not Granger cause LNBCA	There is no co-integration between agricultural growth and bank credit by bound test to cointegration			
B. Industrial sector				
LNBCI does not Granger cause LNRIGDP	39	-0.140389	-2.895885	0.0067*
LNRIGDP does not Granger cause LNBCI	39	0.004374	0.013407	0.9894
C. Service sector				
LNBCS does not Granger cause LNRSGDP	39	-0.051508	-2.788624	0.0087*
LNRSGDP does not Granger cause LNBCS	39	-0.225594	1.588869	0.1216
D. Aggregate output growth				
LNBC does not Granger cause LNRGDP	39	-0.019617	-3.950194	0.0004*
LNRGDP does not Granger cause LNBC	39	0.011698	0.253470	0.8015

Source: Author's computation of E view 9 result, 2017

Note: The signs *, ** and *** indicate the significance of the coefficients at 1%, 5% and 10% level of significance to reject the null hypothesis of thedirection of causality respectively.

The precondition for testing granger causality in the long-run based on vector error correction depends on whether two variables are cointegrated or not((Tamba et.al, 2014; Balago, 2014). Accordingly, the financial development and agricultural output growth are not cointegrated based on bound test (see appendex D).This imply that there is no long run causality between financial development and agricultural output growth in Ethiopia.

In the industrial sector, the finding revealed that there is long run uni-directional causality running from financial development to industrial output growth This result suggests that supply leading hypothesis in the long run which argues that financial development is an important engine for industrial output growth through creating investable funds for investment that enhance economic growth. This supply lead growth hypothesis finding is consistent with the finding of Tongo (2014) that found the causality between financial development and manufacturing sector output growth in South Africa. Conversely, industrial output growth does not cause financial development in the long run implying that industrial output growth does not cause bank credit to industrial sector.

On the other hand, the result in the table 5.13 reveals a similar long-run uni-directional causality running from bank credit to service sector output growth or supply leading growth hypothesis like that of industrial sector. The impilication for this finding is that the bank credit to service sector cause to accelerate service sector output growth in ethiopia. However, service sector output growth does not cause financial sector development in the long-run.

Granger causality test based on aggregate output growth indicated from above result reveals that financial development is essential for the economic growth in Ethiopia that confirms the augment of supply lead growth hypothesis in long run.This result is in line with early causality study done by Mckinnon (1973) and Shaw(1973) as well as similar with the works of King and Levine (1993), and the later study by Helmi et al.(2013) and Agyei(2015)whereas, the finding is contradicts with Patrick's (1966) and Roman, (2012) and Ofori-Abebrese et al.(2017)who found the Demand-following hypothesis which postulates a causal relationship from economic growth to financial development, that is an increasing demand for financial services might lead to an expansion in the financial sector as the economy continous to grows.

Table 5.14: short-run Granger Causality Test using ECM procedures

Null Hypothesis of direction of causality	Included obs.	lags	$\chi 2$ for lagged coeff.s	Prob
A. Agricultural sector				
LNBCA does not Granger cause LNRAGDP	39	2	0.077722	0.7804
LNRAGDP does not Granger cause LNBCA	39	2	0.089826	0.7671
B. Industrial sector				
LNBCI does not Granger cause LNRIGDP	39	2	15.02001	0.0018*
LNRIGDP does not Granger cause LNBCI	39	2	2.568475	0.4630
C. Service sector				
LNBCS does not Granger cause LNRSGDP	39	2	1.129357	0.5685
LNRSGDP does not Granger cause LNBCS	39	2	5.911250	0.0520**
D. Aggregate output growth				
LNBC does not Granger cause LNRGDP	39	2	4.993702	0.0823***
LNRGDP does not Granger cause LNBC	39	2	0.483305	0.7853

Source: Author's computation of E view 9 result, 2017

Note: The signs * and ** indicate the significance of the coefficients at 1% and 5% level of significance to reject the null hypothesis of the direction of causality respectively.

The results of wald test also confirms that there is not short-run causality between financial sector development and agricultural output growth in ethiopia. This finding is consistent with the

finding of of Tongo (2014) for South Africa. The implication of absence of causality both in the lon- run and short-run is that neither bank credit disbursed to agricultural sector in ethiopia cause agricucultural output growth nor does increase in agricultural output growth contributes to increase in diposits of bank and hence credit to sector.

Similar to long-run, there is a unidirectional causality running from financial development to industrial output growth or supply leading growth hypothesis holds in the short-run. However, there is no short-run causality running from industrial output growth to financial development which demand leading credit hypothesis.

However, unlike industrial sector, it is the output growth of service sector that trigets financial development in Ethiopia in the short run. This finding is in line with confirming demand lead hypothesis in short run. Therefore, output growth of service sector plays an important role in facilitating financial sector development in short run.However, from table 5.14, the finding exerts that there is no short-run causality running from financial development to service sector output growth.

Similar with the long-run causality, the result from the table reveals that there also is uni-directional causality running from total bank credit (domestic credit) to aggregate ouput growth in the short-run. This finding is also confirms supply lead growth hypothesis that means inorder to acceerate economic growth, there is a need of financial sector development in the short run.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusions

This study examined the linkage between financial development and sectoral output growth with themain focus on agriculture, industry and service sectors in Ethiopia during the period from 1975 to 2016. The study relied on economic theory which indicates that financial developmentis an essential ingredient for accelerating economic growth in the country. In other words, financial sector development affects sectoral output growth through efficient mobilization of saving for investment, allocation of resources to productive activities, reducing risks, generation of liquidity, and trade facilitation, monitoring entities and enforcement of corporate governance.

The study employed ARDL bound test approach to examine the long run and short run relationship between sectoral output growth and explanatory variables and VECM used to investigate the direction of causality between financial development and output growth in agriculture, industry and service sectors. Before employing ARDL model, we have tested stationarity properties of the variables by using ADF and PP tests. The results of unit root test reveals that an exception for inflation rate all variables are stationary after the first difference. However, inflation rate is stationary at alevel under PP test only. From ADF unit root test, all variables are stationary after first difference took place. Regarding to diagnostic and stability test, the result revealed that the model of agriculture, industry, service sector and overall output growth were stable and desirable in long run; we have no evidence of serial autocorrelation; functional form was specified well(no functional form problem); the residual is normal

distributed and no problem of heteroscedasticity evidence. A bound test approach to cointegration indicated that bound test(F-statistic) value is greater than theupper critical value which implies there is along run relationship between output growth in agriculture, industry and service sectors and their respective determinants as well as for comparison purpose aggregate output growth cointegration was also addressed during the study period.

The empirical results implied evidence of a long-run positive impact of financial development on agricultural output growth, industrial output growth, service sector output growth in Ethiopia. This evidence is also confirmed at theaggregate level of output growth in Ethiopia. However, except for industry sector and aggregate level, financial sector has not asignificant impact on agricultural and service sector output growth in theshort run. This implies inefficient financial sector and underdevelopment of financial institution to support agricultural and service sector output growth at least in short.

According to the results, there is evidence of apositive and significant relationship between human capital development and output growth in industry and service sectors as well as aggregate output growth in theshort run and long run except for agricultural sector. Similarly, other than industry sector the result showed an evidence of long-run and theshort-runpositive relationship between gross investment and sectoral output growthin the agriculture and service sector.

With regard to other control variables, theexception of theagricultural sector, the influence of inflation rate on industry and service sector output growth in the economy is found negative and significant in the long-runand short-run as we have expected from economic theory. The positive evidence of inflation rate on agricultural output growth in thelong run may be due to the fact that producers are motivated to do betterin the economy during a period of inflation which represents inflation does not cause macroeconomic instability rather it serves as growthenhancing factor in theagriculture sector. The government final consumption as theratio of GDP has anegative and significant impact on industrial and agricultural output growth only in the long run. Similarly, there is thenegative and insignificant impact of trade openness on industrial output growth and service sector output growth in both short run and long run. However, there is ashort run and long run positive relationship existed though not significant, in theagricultural sector. Furthermore, the negative relationship between trade openness and economic growth at

theaggregate level is highly significant at 1% level of significance. The implication of insignificant impact of trade openness and its negative relationship might be explained by the fact that domestic private investors are exposed to foreign competitionin which it may affect most infant industries engaged in the non-exportable goods and this leads to anadverse effect on long-termreal GDP.

Furthermore, VECM granger causality tests show that there is no causality between financial development and agricultural output growth both in long run and short run. However, uni-directional causality running from (1) financial development to industrial output growth both in long run and short run (2) financial development to service sector output growth in thelong run(supply leading) and in short run running from service sector to financial development which supports demand leading hypothesis. At theaggregatelevel, the direction of causality is running from financial development to economic growth both in short run and long run. This study found the 'supply-leading' hypothesis held in thecase of Ethiopia. Exept for service sector, the causality result indicates that promotion of financialsectors could contribute to sectoral output growth as well as overall output growth in thelong run and short run. In the case of service sector, demand leading growth hypothesis explain that improving output growth contribute financial development only in the short run.

6.2. Recommendation

According to empirical results, it is observed that financial sector development has long run impact on sectoral output growth in Ethiopia. Therefore, based on the finding of this result the following policy implication are forwarded.

- Bank credit to agriculture, industry, and service sectors have to be given high attention so as to boost investment and thereby reduce foreign borrowing. Commercial banks are providing anegligible amount of loan to theagricultural sector as compared to another remaining sector while thelarge contribution of GDP comes from agriculture next to service sector. Therefore, the government should give priority to agricultural sector through making access to adequate credit for productive activities to enhance modernization of agricultural production.In Growth and Transformation Plan II, industry mainly manufacturingsector in Ethiopia play the major role in structuraltransformation in the country. To achieve the desired objective, the government should strengthen its

current effort on development of financial sector to support industrial sector in the country.

- In order to enhance the development financial sector, the policy makers should focus long run policies mainly improving financial markets so as to make theefficient and effective allocation of resources among productive sector which affects long-run sectoral output growth. On another word, in order to promote economic growth, it is important to improve banking function and competition by liberalizing the banking sector and promotion of private banks in Ethiopia.
- Human capital development has positively affect sectoral output growth in Ethiopia. Therefore, in order to enhance the contribution of human capital, thegovernment should give attention to allocate adequate resources that will help to improve the endeavor on thequality of education which will come up with technology and innovation for competition.

Future research direction

Generally, the bank credit to agriculture, industry, and service sectors are used for financial development indicators may not capture thefull concept of financial development variable. Therefore, further study can be exerted through the use of different financial development indicators in Ethiopia context and incorporating important sub sector and expanding long data seriesshould be included for thefurther study area.

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Appendix

Appendix A: unit root test

A. Agricultural sector output growth

Null Hypothesis: LNRAGDP has a unit root

Exogenous: Constant

Lag Length: 2 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		2.196460	0.9999
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNRAGDP) has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on AIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.280815	0.0000

Test critical values:	1% level	-3.610453
	5% level	-2.938987
	10% level	-2.607932

*MacKinnon (1996) one-sided p-values.

B. Industrial **sector output growth unit root test**

Null Hypothesis: LNRIGDP has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		2.262735	0.9999
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNRIGDP) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.450795	0.0148
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

*MacKinnon (1996) one-sided p-values.

C. Service sector output growth unit root test

Null Hypothesis: LNRSGDP has a unit root

Exogenous: Constant

Lag Length: 4 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		2.535875	1.0000
Test critical values:	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNRSGDP) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.195327	0.0020
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

*MacKinnon (1996) one-sided p-values.

D. Economic growth Unit root test

Null Hypothesis: LNRGDP has a unit root

Exogenous: Constant

Lag Length: 3 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		2.112647	0.9999
Test critical values:	1% level	-3.615588	

	5% level	-2.941145
	10% level	-2.609066

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNRGDP) has a unit root

Exogenous: Constant

Lag Length: 2 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.910562	0.0241
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	

*MacKinnon (1996) one-sided p-values.

E. Human capital development

Null Hypothesis: LNHKENL has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.471985	0.8862
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNHKENL) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*

Augmented Dickey-Fuller test statistic		-8.334196	0.0000
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

*MacKinnon (1996) one-sided p-values.est

F. Total investment as % of GDP unit root test

Null Hypothesis: LNGI has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		2.142599	0.9999
Test critical values:	1% level	-3.600987	
	5% level	-2.935001	
	10% level	-2.605836	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNGI) has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.397457	0.0171
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

*MacKinnon (1996) one-sided p-values.

G. Agricultural bank credit

Null Hypothesis: LNBCA has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.341015	0.9096
Test critical values:	1% level	-3.600987	
	5% level	-2.935001	
	10% level	-2.605836	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNBCA) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.272054	0.0000
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

*MacKinnon (1996) one-sided p-values.

H. bank credit to industrial sector unit root test

Null Hypothesis: LNBCI has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.091415	0.9612
Test critical values:	1% level	-3.600987	
	5% level	-2.935001	

	10% level	-2.605836

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNBCI) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.747213	0.0000
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

*MacKinnon (1996) one-sided p-values.

I. Service sector bank credit

Null Hypothesis: LNBCS has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.311543	0.9143
Test critical values:	1% level	-3.600987	
	5% level	-2.935001	
	10% level	-2.605836	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNBCS) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=9)

	t-Statistic	Prob.*

Augmented Dickey-Fuller test statistic		-8.075730	0.0000
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

*MacKinnon (1996) one-sided p-values.

J. Bank credit to sector(Domestic credit) unit root test

Null Hypothesis: LNBC has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.226791	0.9711
Test critical values:	1% level	-3.600987	
	5% level	-2.935001	
	10% level	-2.605836	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNBC) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.032534	0.0000
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

*MacKinnon (1996) one-sided p-values.

K. Government expenditure as% of GDP

Null Hypothesis: LNGCE has a unit root

Exogenous: Constant

Lag Length: 9 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.661185	0.4407
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNGCE) has a unit root

Exogenous: Constant

Lag Length: 8 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.799159	0.0070
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

L. Inflation unit root test

Null Hypothesis: INFLATION has a unit root

Exogenous: Constant

Lag Length: 2 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.185980	0.2144
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	

	10% level	-2.607932

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(INFLATION) has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.749455	0.0000
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

*MacKinnon (1996) one-sided p-values.

M. Trade openness(import plus export as % of GDP)

Null Hypothesis: LNTO has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.038031	0.7306
Test critical values:	1% level	-3.600987	
	5% level	-2.935001	
	10% level	-2.605836	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNTO) has a unit root

Exogenous: Constant

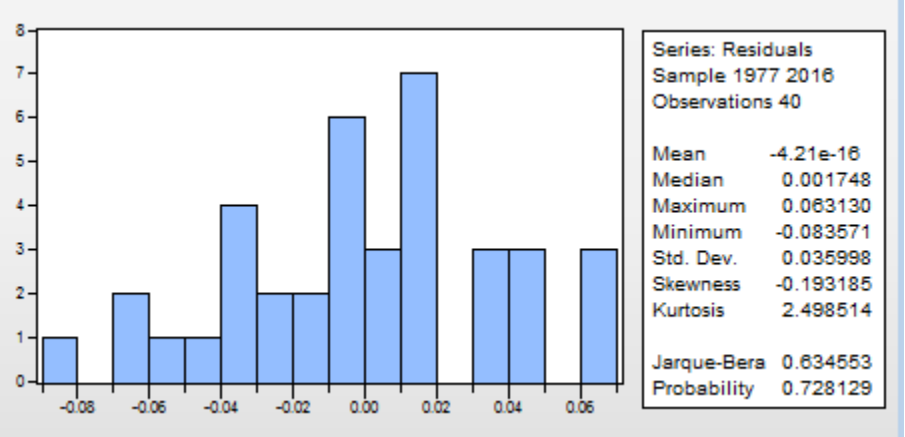
Lag Length: 0 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.905394	0.0000
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

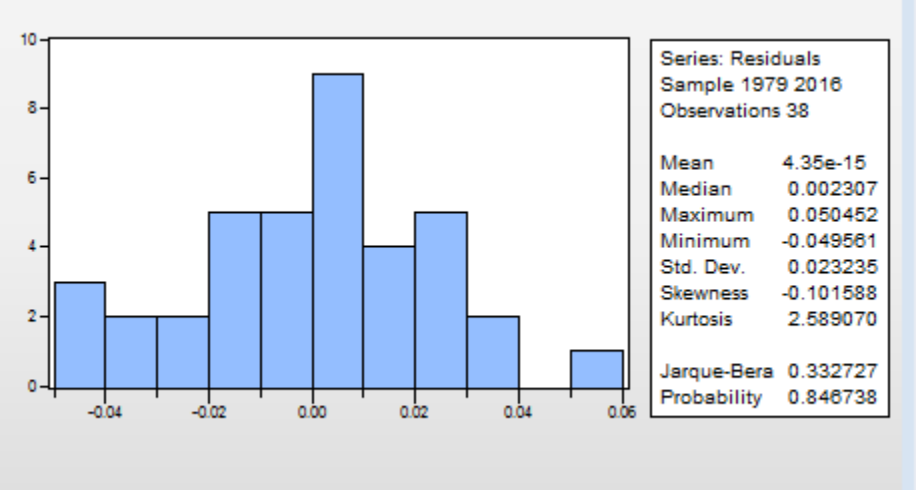
*MacKinnon (1996) one-sided p-values.

Appendix B: Normality test for four model

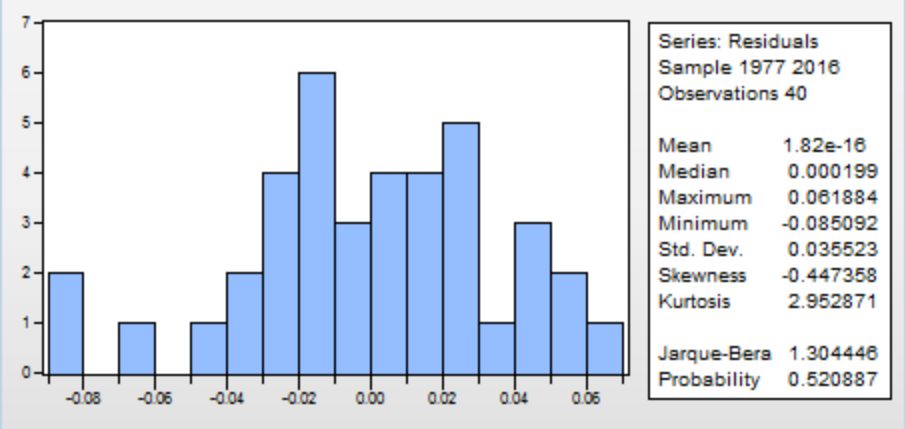
Normality test for agriculture output growth model



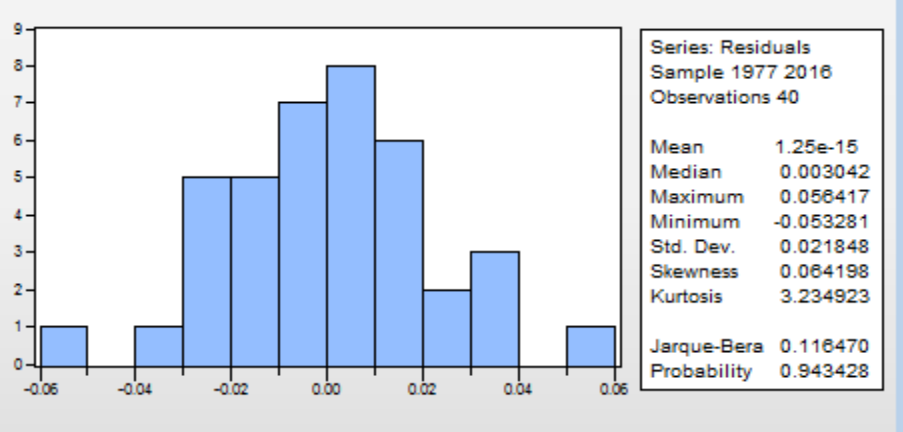
Normality test for industrial output growth model



Normality test for service sector output growth model



Normality test for aggregate output growth model



Appendix C: ARDL Model

A. Agriculture sector

Dependent Variable: LNRAGDP

Method: ARDL

Date: 05/03/17 Time: 03:35

Sample (adjusted): 1977 2016

Included observations: 40 after adjustments

Maximum dependent lags: 2 (Automatic selection)

Model selection method: Akaike info criterion (AIC)

Dynamic regressors (2lags, automatic): LNGI LNHKENL LNBCA LNGCE

INFLATION LNTO

Fixed regressors: C

Number of models evaluated: 12288

Selected Model: ARDL(2, 0, 0, 0, 0, 1, 0)

Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNRAGDP(-1)	0.609835	0.143287	4.256053	0.0002
LNRAGDP(-2)	-0.326375	0.149723	-2.179857	0.0372
LNGI	0.119328	0.040063	2.978493	0.0057
LNHKENL	0.059456	0.037415	1.589115	0.1225
LNBCA	0.030615	0.018221	1.680209	0.1033
LNGCE	-0.045110	0.089583	-0.503550	0.6183
INFLATION	-0.001129	0.001235	-0.913741	0.3681
INFLATION(-1)	0.004091	0.001173	3.485906	0.0015
LNTO	-0.058521	0.057385	-1.019790	0.3160
C	6.436492	1.629336	3.950379	0.0004

R-squared	0.985628	Mean dependent var	11.62048
Adjusted R-squared	0.981316	S.D. dependent var	0.426872
S.E. of regression	0.058349	Akaike info criterion	-2.632430
Sum squared resid	0.102138	Schwarz criterion	-2.210210
Log likelihood	62.64860	Hannan-Quinn criteria.	-2.479769
F-statistic	228.5926	Durbin-Watson stat	1.942808
Prob(F-statistic)	0.000000		

B. Industrial sector

Dependent Variable: LNRIGDP

Method: ARDL

Date: 05/03/17 Time: 09:57

Sample (adjusted): 1979 2016

Included observations: 38 after adjustments

Maximum dependent lags: 4 (Automatic selection)

Model selection method: Akaike info criterion (AIC)

Dynamic regressors (3lags, automatic): LNGI LNHKENL LNBCI LNGCE INFLATION LNTO

Fixed regressors: C

Number of models evaluated: 16384

Selected Model: ARDL(4, 3, 3, 2, 2, 3, 3)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNRIGDP(-1)	1.191480	0.238442	4.996947	0.0004
LNRIGDP(-2)	-0.401141	0.331183	-1.211239	0.2512
LNRIGDP(-3)	0.198155	0.317806	0.623510	0.5457
LNRIGDP(-4)	-0.637516	0.274827	-2.319699	0.0406
LNGI	-0.135146	0.124322	-1.087060	0.3003
LNGI(-1)	-0.317866	0.107708	-2.951175	0.0132
LNGI(-2)	0.118936	0.110761	1.073805	0.3059
LNGI(-3)	0.146567	0.088910	1.648485	0.1275
LNHKENL	0.139913	0.108751	1.286537	0.2247
LNHKENL(-1)	0.248441	0.103481	2.400838	0.0352
LNHKENL(-2)	-0.076314	0.120527	-0.633166	0.5396
LNHKENL(-3)	-0.112141	0.089127	-1.258214	0.2344
LNBCI	0.197474	0.046651	4.233026	0.0014
LNBCI(-1)	0.094214	0.046533	2.024693	0.0679
LNBCI(-2)	0.087520	0.047713	1.834314	0.0938
LNGCE	-0.387140	0.235942	-1.640829	0.1291
LNGCE(-1)	-0.256363	0.185283	-1.383627	0.1939
LNGCE(-2)	0.175592	0.115519	1.520021	0.1567
INFLATION	-0.004714	0.001963	-2.400745	0.0352
INFLATION(-1)	-0.002865	0.002346	-1.221262	0.2475
INFLATION(-2)	-0.006167	0.002839	-2.172124	0.0526
INFLATION(-3)	-0.003727	0.001994	-1.868757	0.0885

LNTO	-0.026248	0.158752	-0.165341	0.8717
LNTO(-1)	0.167777	0.200418	0.837133	0.4203
LNTO(-2)	-0.529675	0.172116	-3.077425	0.0105
LNTO(-3)	0.291291	0.109945	2.649432	0.0226
C	4.568955	1.431798	3.191060	0.0086

R-squared	0.998915	Mean dependent var	9.950758
Adjusted R-squared	0.996350	S.D. dependent var	0.705341
S.E. of regression	0.042614	Akaike info criterion	-3.291927
Sum squared resid	0.019975	Schwarz criterion	-2.128379
Log likelihood	89.54662	Hannan-Quinn criteria.	-2.877946
F-statistic	389.4578	Durbin-Watson stat	2.088495
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

C. Service sector output growth model

Dependent Variable: LNRSGDP

Method: ARDL

Date: 05/03/17 Time: 09:53

Sample (adjusted): 1977 2016

Included observations: 40 after adjustments

Maximum dependent lags: 2 (Automatic selection)

Model selection method: Akaike info criterion (AIC)

Dynamic regressors (2 lags, automatic): LNGI LNHKENL LNBCS LNGCE INFLATION LNTO

Fixed regressors: C

Number of models evaluated: 2916

Selected Model: ARDL(2, 0, 1, 2, 2, 0, 0)

Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNRSGDP(-1)	0.310286	0.187920	1.651161	0.1117
LNRSGDP(-2)	-0.168664	0.204023	-0.826690	0.4166
LNGI	0.128270	0.039327	3.261630	0.0033
LNHKENL	0.127323	0.050486	2.521968	0.0187
LNHKENL(-1)	0.060986	0.050231	1.214107	0.2365
LNBCS	0.009882	0.021081	0.468772	0.6435
LNBCS(-1)	0.014570	0.024545	0.593589	0.5583
LNBCS(-2)	0.028683	0.020379	1.407487	0.1721
LNGCE	-0.103551	0.079902	-1.295982	0.2073
LNGCE(-1)	-0.042653	0.082251	-0.518574	0.6088
LNGCE(-2)	-0.110654	0.072966	-1.516521	0.1424
INFLATION	-0.002381	0.000973	-2.447277	0.0221
LNTO	0.050465	0.075749	0.666213	0.5116
C	2.753285	0.792892	3.472457	0.0020

R-squared	0.997803	Mean dependent var	11.17196
Adjusted R-squared	0.996521	S.D. dependent var	0.757854
S.E. of regression	0.044698	Akaike info criterion	-3.094039
Sum squared resid	0.047951	Schwarz criterion	-2.454207
Log likelihood	75.33375	Hannan-Quinn criter.	-2.864473
F-statistic	778.5542	Durbin-Watson stat	2.110077
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

D. Aggregate output growth model

Dependent Variable: LNRGDP

Method: ARDL

Date: 05/03/17 Time: 04:18

Sample (adjusted): 1977 2016

Included observations: 40 after adjustments

Maximum dependent lags: 2 (Automatic selection)

Model selection method: Akaike info criterion (AIC)

Dynamic regressors (2 lags, automatic): LNHKENL LNGI LNBC LNGCE INFLATION LNTO

Fixed regressors: C

Number of models evalulated: 1458

Selected Model: ARDL(1, 0, 0, 2, 0, 1, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNRGDP(-1)	0.394543	0.131184	3.007554	0.0054
LNHK	0.121853	0.027502	4.430733	0.0001
LNGI	0.112685	0.030833	3.654686	0.0010
LNBC	0.048429	0.017838	2.714876	0.0110
LNBC(-1)	-0.008220	0.019923	-0.412604	0.6829
LNBC(-2)	0.033721	0.014885	2.265473	0.0311
LNGCE	-0.043686	0.052167	-0.837427	0.4092
INFLATION	-0.001836	0.000643	-2.855161	0.0079
INFLATION(-1)	0.001373	0.000724	1.897810	0.0677
LNTO	-0.091055	0.050021	-1.820352	0.0790
C	4.417312	1.065318	4.146474	0.0003

R-squared	0.997959	Mean dependent var	12.17735
Adjusted R-squared	0.997256	S.D. dependent var	0.610119
S.E. of regression	0.031961	Akaike info criterion	-3.820188
Sum squared resid	0.029624	Schwarz criterion	-3.355746

Log likelihood	87.40377	Hannan-Quinn criter.	-3.652261
F-statistic	1418.298	Durbin-Watson stat	2.156789
Prob(F-statistic)	0.000000		

Appendix D: bound test to cointegration between financial development and sectoral output growth

A. agriculture sector output growth and bank credit to agriculture sector

ARDL Bounds Test

Date: 05/01/17 Time: 16:53

Sample: 1979 2016

Included observations: 38

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	0.685536	1

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	4.04	4.78
5%	4.94	5.73
2.5%	5.77	6.68
1%	6.84	7.84

B. Industrial output and bank credit to manufacturing sector

ARDL Bounds Test

Date: 05/01/17 Time: 16:55

Sample: 1977 2016

Included observations: 40

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	5.798296	1

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	4.04	4.78
5%	4.94	5.73
2.5%	5.77	6.68
1%	6.84	7.84

C. service sector output growth and bank credit bound test

ARDL Bounds Test

Date: 05/01/17 Time: 16:57

Sample: 1978 2016

Included observations: 39

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	5.955908	1

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	4.04	4.78
5%	4.94	5.73
2.5%	5.77	6.68
1%	6.84	7.84

D. aggregate output growth and bank credit (domestic bank credit) bound test

ARDL Bounds Test

Date: 05/01/17 Time: 16:59

Sample: 1979 2016

Included observations: 38

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	9.198851	1

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	4.04	4.78
5%	4.94	5.73
2.5%	5.77	6.68
1%	6.84	7.84

Appendix E: long run VECM granger causality test

A. Industrial sector

Dependent Variable: D(LNRIGDP)

Method: Least Squares (Gauss-Newton / Marquardt steps)

Date: 05/01/17 Time: 11:20

Sample (adjusted): 1978 2016

Included observations: 39 after adjustments

D(LNRIGDP) = C(1)*(LNRIGDP(-1) - 0.470317482823*LNBCI(-1) -
6.95263397806) + C(2)*D(LNRIGDP(-1)) + C(3)*D(LNRIGDP(-2)) +
C(4)*D(LNBCI(-1)) + C(5)*D(LNBCI(-2)) + C(6)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.140389	0.048479	-2.895885	0.0067
C(2)	0.310482	0.158313	1.961193	0.0583
C(3)	0.210054	0.150384	1.396789	0.1718
C(4)	-0.028650	0.030402	-0.942357	0.3529
C(5)	-0.028690	0.027787	-1.032524	0.3093
C(6)	0.046688	0.016418	2.843765	0.0076

R-squared	0.489080	Mean dependent var	0.069813
Adjusted R-squared	0.411668	S.D. dependent var	0.082080
S.E. of regression	0.062957	Akaike info criterion	-2.552079
Sum squared resid	0.130800	Schwarz criterion	-2.296147
Log likelihood	55.76555	Hannan-Quinn criter.	-2.460253
F-statistic	6.317885	Durbin-Watson stat	2.049053
Prob(F-statistic)	0.000324		

B. Service sector

Dependent Variable: D(LNRSGDP)

Method: Least Squares (Gauss-Newton / Marquardt steps)

Date: 04/30/17 Time: 06:10

Sample (adjusted): 1978 2016

Included observations: 39 after adjustments

D(LNRSGDP) = C(1)*(LNRSGDP(-1) - 0.970785833232*LNBCS(-1) -
3.419766067) + C(2)*D(LNRSGDP(-1)) + C(3)*D(LNRSGDP(-2)) +
C(4)*D(LNBCS(-1)) + C(5)*D(LNBCS(-2)) + C(6)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.051508	0.018471	-2.788624	0.0087
C(2)	0.146278	0.162421	0.900609	0.3743
C(3)	-0.309898	0.177333	-1.747553	0.0898
C(4)	0.014637	0.022607	0.647472	0.5218
C(5)	0.014695	0.021102	0.696402	0.4911
C(6)	0.071217	0.017005	4.188058	0.0002

R-squared	0.352651	Mean dependent var	0.063953
Adjusted R-squared	0.254568	S.D. dependent var	0.070718
S.E. of regression	0.061057	Akaike info criterion	-2.613392
Sum squared resid	0.123021	Schwarz criterion	-2.357459
Log likelihood	56.96114	Hannan-Quinn criteria.	-2.521565
F-statistic	3.595434	Durbin-Watson stat	2.020449
Prob(F-statistic)	0.010498		

C. aggregate output growth

Dependent Variable: D(LNRGDP)

Method: Least Squares (Gauss-Newton / Marquardt steps)

Date: 04/30/17 Time: 17:46

Sample (adjusted): 1978 2016

Included observations: 39 after adjustments

D(LNRGDP) = C(1)*(LNRGDP(-1) + 1.21468272003*LNBC(-1) -
22.3107556685) + C(2)*D(LNRGDP(-1)) + C(3)*D(LNRGDP(-2)) +
C(4)*D(LNBC(-1)) + C(5)*D(LNBC(-2)) + C(6)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.019617	0.004966	-3.950194	0.0004
C(2)	-0.010548	0.168744	-0.062507	0.9505
C(3)	-0.509305	0.168847	-3.016370	0.0049
C(4)	0.000138	0.020243	0.006835	0.9946
C(5)	0.023393	0.019534	1.197583	0.2396
C(6)	0.074410	0.013837	5.377598	0.0000

R-squared	0.428951	Mean dependent var	0.051624
Adjusted R-squared	0.342428	S.D. dependent var	0.057308
S.E. of regression	0.046471	Akaike info criterion	-3.159319
Sum squared resid	0.071267	Schwarz criterion	-2.903386
Log likelihood	67.60671	Hannan-Quinn criteria.	-3.067492
F-statistic	4.957677	Durbin-Watson stat	1.976226
Prob(F-statistic)	0.001707		

Appendix F: Summary of short run granger causality of financial development and sectoral output

A. agriculture sector

VEC Granger Causality/Block Exogeneity Wald Tests

Date: 04/28/17 Time: 09:25

Sample: 1975 2016

Included observations: 39

Dependent variable: D(LNRAGDP)

Excluded	Chi-sq	df	Prob.
D(LNGI)	2.572029	2	0.2764
D(LNHKENL)	2.995400	2	0.2236

D(LNBCA)	0.639681	2	0.7263
D(LNGCE)	1.876240	2	0.3914
D(INFLATION)	7.186210	2	0.0275
D(LNTO)	2.849535	2	0.2406
All	14.97446	12	0.2428

Dependent variable: D(LNBCA)

Excluded	Chi-sq	df	Prob.
D(LNRAGDP)	3.078369	2	0.2146
D(LNGI)	2.148011	2	0.3416
D(LNHKENL)	0.670186	2	0.7153
D(LNGCE)	0.350640	2	0.8392
D(INFLATION)	1.092276	2	0.5792
D(LNTO)	2.955498	2	0.2282
All	13.24905	12	0.3512

B. Industrial sector

VEC Granger Causality/Block Exogeneity Wald Tests

Date: 04/28/17 Time: 11:25

Sample: 1975 2016

Included observations: 39

Dependent variable: D(LNRIGDP)

Excluded	Chi-sq	df	Prob.
D(LNGI)	24.68834	3	0.0000

D(LNHKENL)	7.758623	3	0.0513
D(LNBCI)	15.02001	3	0.0018
D(LNGCE)	5.934131	3	0.1149
D(INFLATION)	4.798411	3	0.1872
D(LNTO)	12.54152	3	0.0057
All	39.26566	18	0.0026

Dependent variable: D(LNBCI)

Excluded	Chi-sq	df	Prob.
D(LNRIGDP)	2.568475	3	0.4630
D(LNGI)	4.617458	3	0.2020
D(LNHKENL)	0.510982	3	0.9165
D(LNGCE)	4.422030	3	0.2194
D(INFLATION)	0.636497	3	0.8880
D(LNTO)	1.553840	3	0.6699
All	24.33568	18	0.1443

C. Service sector output growth equation

VEC Granger Causality/Block Exogeneity Wald Tests

Date: 04/28/17 Time: 11:36

Sample: 1975 2016

Included observations: 40

Dependent variable: D(LNRSGDP)

Excluded	Chi-sq	df	Prob.

D(LNGI)	7.453931	2	0.0241
D(LNHKENL)	0.885108	2	0.6424
D(LNBCS)	1.129357	2	0.5685
D(LNGCE)	5.834078	2	0.0541
D(INFLATION)	0.308636	2	0.8570
D(LNTO)	0.792182	2	0.6729
All	18.84476	12	0.0923

Dependent variable: D(LNBCS)

Excluded	Chi-sq	df	Prob.
D(LNRSGDP)	5.911250	2	0.0520
D(LNGI)	0.631770	2	0.7291
D(LNHKENL)	1.435749	2	0.4878
D(LNGCE)	1.594142	2	0.4506
D(INFLATION)	0.083180	2	0.9593
D(LNTO)	1.066608	2	0.5867
All	10.10954	12	0.6064

VEC Granger Causality/Block Exogeneity Wald Tests

Date: 04/28/17 Time: 11:59

Sample: 1975 2016

Included observations: 39

Dependent variable: D(LNRGDP)

Excluded	Chi-sq	df	Prob.

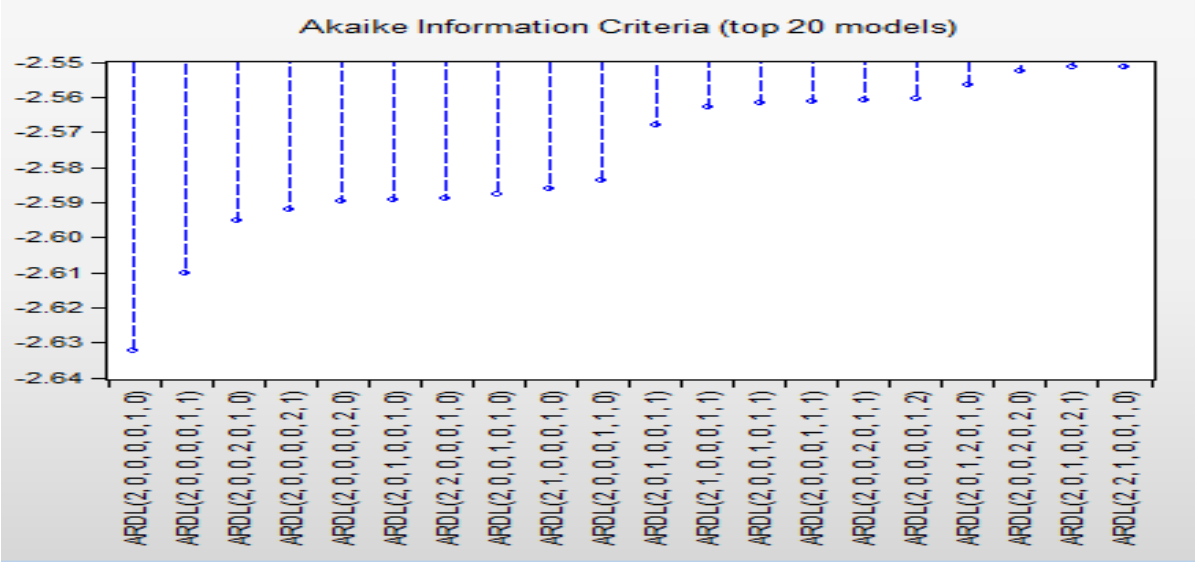
D(LNGI)	4.263719	2	0.1186
D(LNHKENL)	2.955501	2	0.2282
D(LNBC)	4.993702	2	0.0823
D(LNGCE)	3.220052	2	0.1999
D(INFLATION)	2.574429	2	0.2760
D(LNTO)	0.091116	2	0.9555
All	19.24236	12	0.0828

Dependent variable: D(LNBC)

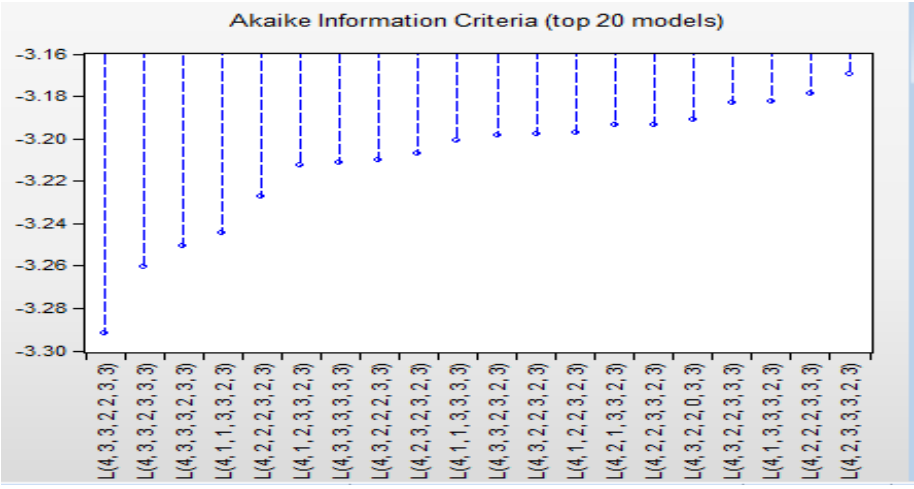
Excluded	Chi-sq	df	Prob.
D(LNRGDP)	0.483305	2	0.7853
D(LNGI)	0.225696	2	0.8933
D(LNHKENL)	0.200009	2	0.9048
D(LNGCE)	0.934903	2	0.6266
D(INFLATION)	0.270616	2	0.8734
D(LNTO)	0.221836	2	0.8950
All	3.111928	12	0.9947

Appendix G: model selection by Akaike information criteria for four sector output growth equation

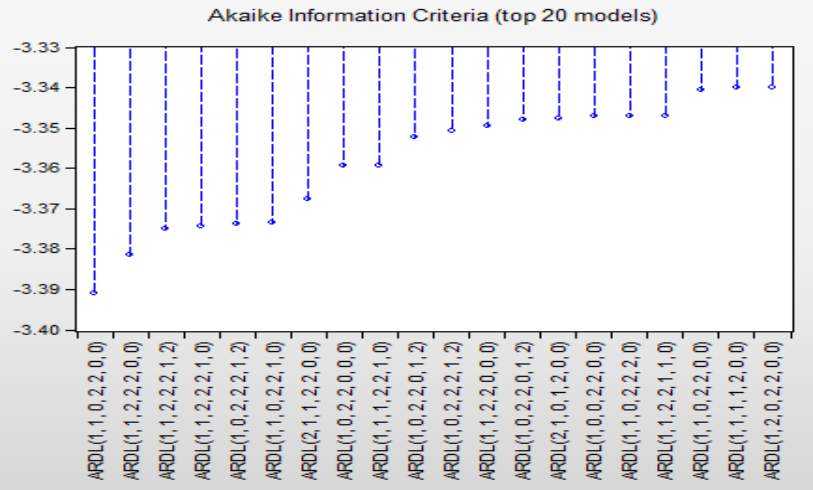
A. Agriculture output growth model



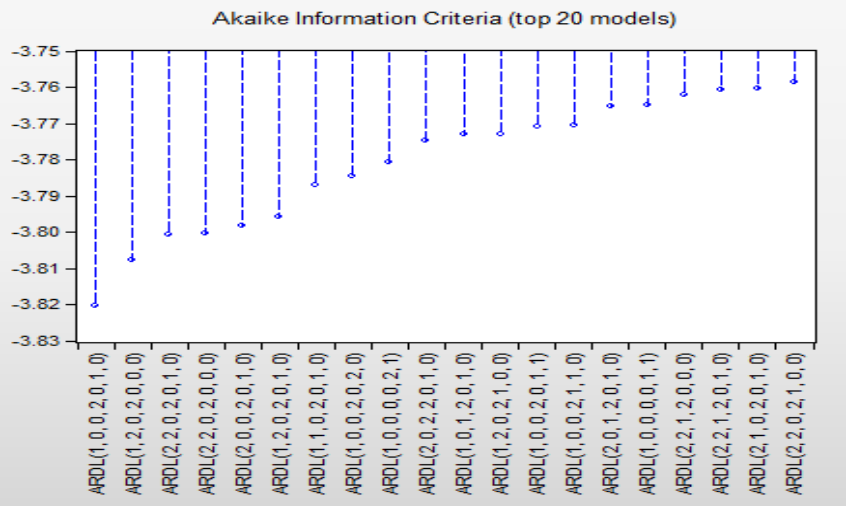
B. Industrial output growth equation



C. Service sector output growth model



D. Aggregate output growth model



Appendix H: ARDL bound test for cointegration for four models

ARDL Bounds Test for agriculture sector

Date: 05/03/17 Time: 03:37

Sample: 1977 2016

Included observations: 40

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	3.318210	6

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.12	3.23
5%	2.45	3.61
2.5%	2.75	3.99
1%	3.15	4.43

ARDL Bounds Test for Industrial output growth equation

ARDL Bounds Test

Date: 04/20/17 Time: 06:53

Sample: 1979 2016

Included observations: 38

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	4.389037	6

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.12	3.23
5%	2.45	3.61
2.5%	2.75	3.99
1%	3.15	4.43

ARDL Bounds Test for service sector output growth model

ARDL Bounds Test

Date: 04/08/17 Time: 05:17

Sample: 1977 2016

Included observations: 40

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	4.968829	6

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.12	3.23
5%	2.45	3.61
2.5%	2.75	3.99
1%	3.15	4.43

ARDL Bounds Test for Aggregate output growth equation

ARDL Bounds Test

Date: 05/03/17 Time: 10:34

Sample: 1977 2016

Included observations: 40

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	7.220155	6

Critical Value Bounds

Significance	I0 Bound	I1 Bound

10%	2.12	3.23
5%	2.45	3.61
2.5%	2.75	3.99
1%	3.15	4.43

Appendix I: Loans & Advances by EconomicSectors

Economic Sectors	2014/15			2015/16			Percentage Change		
	D*	C*	O/S*	D*	C*	O/S*	D*	C*	O/S*
	A	B	C	D	E	F	D/A	E/B	F/C
Agriculture	13,077.1	11,456.2	18,579.8	13,375.7	12,863.40	20,377.5	2.3	12.3	9.7

	0	0	0	0		0			
Industry	23,437.40	11,782.90	86,212.30	25,495.60	15,954.10	106,164.00	8.8	35.4	23.1
Domestic Trade	15,589.00	12,183.20	25,336.40	15,040.50	15,297.70	28,550.60	-3.5	25.6	12.7
International Trade	8,415.00	11,790.80	43,303.90	9,528.00	15,707.90	51,900.40	13.2	33.2	19.9
Export	3,780.40	5,587.30	17,581.30	4,404.90	8,429.60	23,028.40	16.5	50.9	31
import	4,634.60	6,203.50	25,722.60	5,123.10	7,278.30	28,872.00	10.5	17.3	12.2
Hotels and Tourism	1,620.30	1,510.90	3,590.60	1,893.80	2,406.50	4,818.80	16.9	59.3	34.2
Transport and Communication	3,625.50	2,340.60	7,289.00	4,494.10	3,336.80	10,026.10	24	42.6	37.6
Housing and Construction	6,720.10	7,040.40	22,529.10	13,641.90	8,422.30	28,080.80	103	19.6	24.6
Mines, Power and Water resource	165.2	83.4	844.7	341.2	145.5	851.8	106.5	74.4	0.8
Others	2,163.80	1,449.80	7,827.70	3,160.80	2,393.90	10,297.70	46.1	65.1	31.6
Personal	667.5	363.4	1,796.90	1,051.40	652.9	2,779.60	57.5	79.7	54.7
Interbank Lending	-	12.66	57.8	-	5.72	54.3	-	-54.8	-6.2
Total	83,895.90	71,805.06	260,672.10	97,551.00	92,894.62	315,802.00			

Source: National Bank of Ethiopia Annual

Abstract 2016

D*=Disbursement, C*=Collection, O/S*= Outstanding Credit

Appendix J: Capital and Branch Network of the Banking System at the Close of June 30, 2016

Banks	Branch Network								Capital(in million birr)			
	2014/15				2015/2016				2014/15		2015/2016	
	Regions	Addis Ababa	Total	% Share	Regions	Addis Ababa	Total	% Share	Total Capital	% Share	Total Capital	% Share

Commercial Bank of Ethiopia	785	192	977	36	888	262	1150	36.1	10,716.40	34.8	13,557.50	31.5
Construction & Business Bank	69	51	120	4.5	0	0	0	0	-	-		0
Development Bank of Ethiopia	31	1	32	1.2	106	4	110	3.5	2,269.20	7.4	7,500.80	17.4
Total Public Banks	885	244	1129	42	994	266	1260	39.5	12,985.50	42.1	21,058.30	48.9
Total Private Banks	851	713	1,564.00	58	1,096.00	831	1,927.00	60.5	17,822.80	57.9	22,002.50	51.1
.Grand Total Banks	1736	957	2693	100	2,090.00	1097	3187	100	30,808.30	100	43,060.80	100

Source: National Bank of Ethiopia Annual Abstract -2016