ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

THE LINK BETWEEN FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH IN ETHIOPIA

BY

ROMAN TESFAYE

A Thesis Submitted to the School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirements for the Degree of Masters of Science in Economics (International Economics)

June, 2012

Addis Ababa

The Link Between Financial Development and Economic Growth in Ethiopia

Roman Tesfaye

A Thesis Submitted to the Department of Economics

Presented in Partial Fulfillment of the Requirements for the

Degree of Master of Science in Economics (International Economics)

Addis Ababa University

Addis Ababa, Ethiopia

June 2012

Addis Ababa University

School of Graduate Studies

This is to certify that the thesis prepared by Roman Tesfaye, entitled: *The Link between Financial Development and Economic Growth in Ethiopia* and submitted in partial fulfilment of the requirements for the degree of Master of Science (International Economics) complies with the regulations of the University and meets the accpted standards with respect to originality and quality.

Signed by the Examining Committe:

Examiner Girum Abebe Signature _____ Date 15/06/2012

Examiner Seid Hasan Signature _____ Date 15/06/2012

Advisor Girma Estifanos Signature _____ Date June 15/2012

Department of Economics

ADDIS ABABA UNIVERSITY

Chair of Department or Graduate Program Coordinator

ABSTRACT

The Link Between Financial Development and Economic Growth in Ethiopia

Roman Tesfaye

Addis Ababa University, 2012

The paper examines whether a long-run relationship between financial development and economic growth exist in Ethiopia. It employs Co-integrated Vector Autoregressive (CVAR) approach to asses how the financial sector contributes to growth. It further used the granger causality test so as to find the direction of causality between financial development and economic growth. Impulse response and variance decomposition tests are also applied so as to see the interaction between financial development and economic growth. The study utilized time-series data of Ethiopia over the period 1980-2010.

The findings support the existence of a uni-directional causality from economic growth to financial development. The emperical evidence, in addition, shows the presence of positive and significant long-run relationship between financial development and economic growth and an insignificant effect in the short-run. The results of Impulse response and variance decompositions also indicate the permanent effect of financial development on economic growth. The policy implication is that long-run policies of financial development are believed to provide significant effect on economic growth.

Acknowledgment

First and foremost, I wish to thank my Lord God to whom nothing was impossible. Second, I wish to extend my heartfelt gratitude and respect to my Advisor, Dr. Girma Estiphanos for his continuous guidance and constructive comments. My sincere gratitude also goes to Ato Zerayehu Sime who has helped me throughout this process.

Third, I wish to extend my warm appreciation to my parents Ato Tesfaye G/Medhin and W/o Sirgut Cherinet for their undying support throughout my journey. I would also like to thank my friends and family who have always stood behind me.

Finally, I wish to acknowledge Addis Ababa University for granting me this prestigious scholarship that has made it all possible. I have attained unfathomable knowledge and skill.

Table of Contents

List of Tables

List of Figures

List of Appendices

List of Acronyms and Abbrevations

ADF	Augmented Dickey-Fuller
AIB	Agriculture and Industrial Bank
AIC	Akaike Information Criteria
CBE	Commercial Bank of Ethiopia
ECM	Error Correction Model
EIC	Ethiopian Insurance Company
EPRDF	Ethiopian People's Revolutionary Democratic Front
FPE	Final Predicition Error
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
HQIC	Hannan-Quinn Information Criteria
HSB	Housing and Savings Bank
IRF	Impulse Response Function
MEDaC	Ministry of Economic Development and Cooperation
MFI	Micro Finance Institutions
NBE	National Bank of Ethiopia

OECD	Organization for Economic Co-operation and Development
OLS	Ordinary List Squares
SIC	Schwarz Information Criteria
SVAR	Structural Vector Auto Regressive
TGE	Transitional Government of Ethiopia
VAR	Vector Auto Regressive
VEC	Vector Error Correction Model
UNCTAD	United Nations Conference on Trade and Development

Chapter One : Introduction

1.1 Background

Ethiopia has passed through three politically distinct regimes since 1930: The Imperial Government (1930-1974), The Pre-reform period/ The Derg Regime (1974-1991) and the Post-Reform period (1991-present). The Ethiopian economy has been controlled by the state through a series of industrial development plans since the Imperial Government of Haile Selassie. From 1974-1991, the socialist government controlled the economy. The post-1991 government transformed the economy to a market-based system. During the Imperial regime, the government adopted a centrally adminstered development plans which is beleieved to have failed due to the government's adminstrative and technical capabilities. But the efforts made by Emporer Haile Selassie to bring Ethiopia into the 20th century enjoyed some success in limited areas. However on the whole, the economic policies adopted by the government must be judged as a failure (MEDaC, 199).

Between 1974-1975, the Derg regime carried out a wide range of political, social and economic reforms. Unfortunately, these reforms also promised more than they delivered. The goverenment's expenditure was higher than its revenue generation capability which led to the poor performance of the economy (MEDaC, 1999). Extensions of credit to sectors other than the central government grew slowly because of the restrictions on the economic activities of the private sector.

The national plan adopted by the goverment regulated and directed the activities of financial institutions to only finance the public projects. The Derg policy of expanding the public and socialized sector at the expense of the private sector also proved to be a failure because of inadequate monetary policy which impaired the development of the financial sector. Relative stability in macroeconomic situations was achieved at the cost of overall economic growth because of the restriction on private sector participation and low productivity of the social sector (MEDaC, 1999).

In 1991 the EPRDF came to power with a variety of reforms that are aimed at improving macroeconomic stability, accelerating economic growth, and reducing poverty. The government adopted a market-oriented economic policy which brought about a significant change in the functioning of the financial sector. Unlike the Derg regime, the financial sector served the private sector and new financial institutions also emerged (Alemayehu, 2006). Although state control has been reduced and domestic and foreign (private) investment promoted, the state still plays a dominant role in the economy today. The financial sector is highly regulated by means of credit restriction, equity market control and foreign exchange control. Furthermore, the Ethiopian banking sector remained isolated from the impact of globalization.

Although Ethiopian policy makers understand the potential importance of financial liberalization[1], it is widely believed that liberalization may result in a loss of control over the economy and may not be economically beneficial (Wondaferahu, 2010).

1.2 Statement of the problem

Studies such as those of King and Levine (1993), Levine and Zervos (1998) and Beck and Loayza (2000) have been conducted to highlight the importance of financial development to economic growth and the correlation between the two. Some of the studies suggest that in the early stages of development, financial development leads to growth, while in later stages growth may determine the speed of financial development. When an economy starts to grow it creates immediate additional demand for financial services and helps grow a better financial system. At this stage the positive impact of financial system on economic growth could be modest. As development proceeds, a better and well functioning financial system is established.

[1] According to the financial liberalization index, which measures banking security and independence from government control, on a scale of 10-100(100 being most liberal), Ethiopia stands at the 20th place which is lowest in sub-Saharan Africa(Dailami, 2000).

On the other hand, a well developed financial system can contribute at a greater extent to income growth by reducing market frictions (including information and transaction costs), pooling risks and easing trade (Levine 1997). However, the causal relationship, that is weather financial development causes growth or economic growth causes financial development remains unclear.

In the case of Ethiopia , it is difficult to identify the relationship because of the unstable macroeconmic environment and the underdevelopment of the financial system. Despite the effort made to develope the country in the past, the financial system of Ethiopia is too weak to support the private sector. This underdevelopment imposes heavy costs on potential investors and traders. Moreover Ethiopia's financial sector is characterized by dominance of state ownership and low level of development with the Commercial Bank of Ethiopia accounting for 90 per cent of total deposit (Alemayehu, 2006). This bank controls 2/3 of the assets of the entire banking system (NBE, 2009/10). Ethiopia's financial sector is rudimentary and is dominated by the banking system. Ethiopia has no capital market and very limited informal investment in shares of private companies . Currently, the sector includes 17 banks, 14 insurance companies, around 30 microfinance institutions, over 700 savings and credit cooperatives and a Social Security Authority (NBE, 2009/10).

Ethiopia still remains a highly under-banked country in the world, that is, supply of the banking service is growing from year to year but it has not led to an increased outreach of the banking system at large. Unorganized active informal financial market such as "idir", "equb" and "mahber" are present. Many companies are established by issuing shares in the various sectors of the economy.

Money markets are not developed and there is only a thin primary market for treasury bills and weak inter-bank money market. Except government issued bonds, all types of capital markets including stock exchange and equity markets are missing.

The regulatory and institutional framework for this market is not developed yet (HaileKibret and Kassahun,2011). The number of population that uses financial institutions is only 5 million of the total 89 million and the number of bank branch located in urban areas is 60%, while 85% of the population is in rural area (World Bank). Acess to financial services to the wider public is limited.

Ethiopia's financial sector development, as measured by the financial indicators such as private credit to GDP, the ratio of narrow to broad money and the ratio of broad money to GDP, is well below that of other African countries, and is even more undeveloped when compared to the financial systems of the industrial countries (Abdi, 2000).

A developed and efficient financial system is important to mobilize savings and foreign resources and to allocate them to high return investment. In addition, if financial services are extended to rural and poor producers, a developed financial system is a strong tool to reduce poverty and promote growth (Abdi, 2000). The inefficiency of these financial sectors will raise the transaction cost and channel savings of households into physical assets which in turn reduces investment and hence, reduce growth. Due to the missing markets, the only financial assets available to investors other than bank deposits are treasury bills of short term maturity. There is also a huge gap between savings and investment which the Ethiopian financial sector is unable to bridge and hence led to foreign borrowing to finance investments.

In general the financial sector of Ethiopia needs deep understanding so as to find the clear impact it has on the economy. The works of HaileKibret and Kassahun (2011) is one evidence that shows the link between financial development and economic growth using data of Ethiopia from 1972-2010. Their study employed liquid liability as a financial indicator and found a positive link between the two. However, in a different perspective this paper uses credit issued to the private sector as an indicator of financial development to find the relationship between financial development and economic growth and try to fill the research gap identified form other studies.

1.3 Research Questions

The study critically investigates the following research questions regarding the link between financial developemnt and economic growth in Ethiopia.

1. Does financial development cause economic growth?

2. Does economic growth propel financial development?

3. Does the financial system contribute to the process of economic growth in the long-run?

4. To what extent does financial system affect economic growth?

1.4 Objectives

The general objective of this study is to examine the link between financial development and economic growth and clearly identify the short run and long run impact of financial development on economic growth in Ethiopia for the period 1980-2010.

Specific objectives:

- To find out whether financial development causes economic growth
- To identify if economic growth causes financial development
- To assess how the financial sector contributes to growth
- To forward policy prescription

1.5 Methodology of the Study

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

1.6 Significance of the Study

The study is believed to provide relevant information for policy makers and financial institutions in considering areas of intervention to develop the financial sector and promote economic growth. Knowing the direct relationship between financial development and growth is not sufficient by itself, however if proper policy is to be formulated, this information is going to play a vital role for designing proper policy and fill the knowledge gap.

1.7 Limitations of the Study

The VAR model usually include data of 50 year and above for estimation technique, however, this study only used data for 30 years due to the inavailability of full information. And also the study only used the ratio of Private Credit to GDP as an indicator of financial development.

1.8 Scope of the Study

The study is limited in scope with regard to the issue of examining the interactions between financial development and growth as well as impact assessment. The study covers the period between the years 1980-2010 G.C in Ethiopia due to the inavilability of data.

1.9 Organization of the Paper

This paper is organized into six chapters. Following the introduction part, chapter two presents the review of related theoretical and emperical literature regarding financial development and economic growth. Chapter three discuss some of the issues on the financial sector of Ethiopia. Chapter four gives insight on the model specification and methodology employed. Chapter five presents emperical results and its interpretation and finally chapter six provides conclusion and implications based on the findings.

Chapter Two : Literature Review

2.1 Theoretical Literature

A financial system is a network of financial institutions and markets dealing in a variety of financial instruments which are engaged in money transmission activities and the provision of loans and credit facilities. Financial institutions and markets occupy a key position in the economy as intermediaries in channelling savings and other funds to borrowers and investors. In doing this, one of their main roles is to settle the different requirements of savers and borrowers, thereby facilitating a higher level of saving and investment in the economy than would otherwise be the case (Levine, 2000). Liberalizing the financial system promotes the use of financial intermediaries there by creating an efficient flow of resources by transferring capital from less productive sector to more productive sectors and increase investment (FitzGerald, 2006).

According to Levine (2004), financial institutions provide 5 functions: (1) produce information about possible investments and allocate capital (2) monitor investments and exert corporate governance after providing finance (3) facilitate the trading, diversification and management of risk (4) mobilize savings (5) facilitate the exchange of goods and services.

The indicators of financial development may differ according to the financial services provided by financial system and the different kinds of agents and institutions involved. In general, financial development occurs when there is:

- Improvement in mobilization of savings
- Increase in the services provided by the financial sector
- Smooth exchange of goods and services
- Better allocation of capital to the private sector thereby promoting investment
- Diversification and management of risk
- Improvement in the regulation and stability of the financial sector

According to FitzGerald (2006), financial development occurs when institutions, instruments and markets that support the process of investment and growth are established. On the other hand Huang (2005) suggested that institutions, policy, geography and other variables such as economic growth, income level and population level are among the few that determine financial development.

2.1.1 Indicators of Financial Development

The development of the financial sector can be measured using different kinds of indicators. The most commonly used financial development indicators include:

1. Liquid Liabilities to GDP: major indicators to measure the size, relative to the economy, of financial intermediaries. It consists of currency plus demand and interest bearing liabilities of banks and other financial intermediaries divided by GDP. It is the broadest available indicator of financial intermediation (Beck & Demirguc-kunt, 2009).
2. Private Credit to GDP: credit issued to the private sector by banks and other financial intermediaries divided by GDP. It measures the activities of financial intermediaries by channelling savings to investors. Countries with higher levels of private credit to GDP have been shown to grow faster (Beck, Levine and Loayza, 2000, Beck, Demirguc-kunt and Levine 2007).
3. Commercial-Central bank: the ratio of commercial bank assets to the sum of commercial bank and central bank assets.
4. Stock Market Capitalization: the ratio of the value of listed domestic shares to GDP. It indicates the size of the stock market relative to the size of the economy.
5. Private bond market capitalization to GDP: is the total amount of outstanding domestic debt securities issued by private or public domestic entities divided by GDP

These measures however, are not by themselves enough to see the extent of financial development. The findings of Stigliz (1994) and Dimirquc-Kunt and Levine (2008) emphasize the role of state in shaping the operation of financial systems especially in developing countries.

Benhabib and Spiegel (2000) used the extent of the development of financial markets as a proxy for market imperfection and interact them with measures of wealth or income distribution to see if they influence either economic growth rates or investment rates and their result indicated that financial development positively influences both rates of investment and total factor productivity growth.

2.1.2 Theories of Financial Development

There are many theoretical literatures about the link between financial development and economic growth. The debate of whether the causal relationship runs from financial development to economic growth on the one hand and economic growth to financial development is far from settled. The traditional neo-classical literature on growth suggests that financing is not important. They emphasized that if the financial system is to play a role it can be through its effects on factor accumulation or on innovation. Bloch and Tang (2003) revealed that Schumpeter was among the first to point out that banks facilitate technological innovation in their role of financial intermediaries. The Schumpeterian view is that the development of financial intermediaries has a direct impact on the pace of technical change and productivity growth, which leads to overall output growth (Bloch and Tang, 2003). While Robinson (1952) and Lucas (1988) argued that financial development primarily follows economic growth.

Mackinnon (1973) and Shaw (1973) emphasized the role of capital accumulation in economic growth. They further implied that economic growth can be increased by removing institutional interest rate ceilings and reserve requirement tax and ensuring that the financial system operates competitively under conditions of free entry. In general, the Mckinnon-Shaw model shows that financial repression reduces both the quality and quantity of investment in the economy.

The structural economists such as Taylor (1983), Van Wijnbergen (1983) and Buffie (1984), in contrast to Mckinnon and Shaw's view argued that financial development decreases total real credit supply and thereby preventing economic growth.

Financial intermediary development increases capital accumulation and reduces the costs of external finance to firms, leading to overall economic growth (Bolch and Tang, 2003). Bencivenga and Smith (1991) also show that the development of banks increase economic growth by channelling savings to a productive activity which is consistent with the view of Schumpeter. In addition, they illustrated that even if aggregate saving is reduced, economic growth can occur because financial development has a significant impact on the efficiency of investments.

Roubini and Sala-i-Martin (1992) developed a model that shows financial repression reduces the productivity of capital and lowers savings, which hampers growth. They further built a model that examined the effects of policies of repression of the financial system in the form of taxes, restrictions and regulations of various sorts, on the rate of economic growth. They asked the question why an optimizing government represses the financial sector in spite of the fact that it reduces economic growth.

Their justification was that government stay in the way of private financial evolution because the financial sector is the potential source of "easy" resources for the public budget. One of the implications of the study was that countries that are financially repressed will have higher inflation rates, lower real interest rates, higher base money per capita and lower per capita growth than countries that are financially developed.

The model developed by Greenwood and Jovanovich (1990) shows that growth provided a means to develop the financial sector while the financial sector in turn allowed for higher growth through investment. Both the financial intermediation and the rate of growth are endogenously determined. In line with this argument, Blackburn and Hung (1998) also focused on the positive, tow-way causal relationship between growth and financial development. Some models emphasize the role of banks for the development of financial system while others stress on the potential benefits of security markets. Arestis et al. (2005) suggested three theories to examine the link between financial development and economic growth: the bank-based theory, the market-based theory and the financial services.

The bank-based theory argues that banks can promote economic growth by allocating resources in an efficient manner (Arestis *et al.,* 2005). The study of Gerschenkron (1962) cited by Levine (2004), indicated that bank-based financial systems are better than the market-based system because the latter reveals information publicly, thereby reducing incentives for investors to seek and acquire information. Banks however can form long-run relationship with firms by privatizing the information they acquire (Levine, 2004).

The market-based theory on the other hand stresses the advantage of better performing markets. These markets are believed to provide a richer set of risk management tools that permit greater customization of risk ameliorating instruments (Levine, 2004).

The third theory, financial services, argues that the issue is not the source of finance rather the creation of an environment where financial services are efficiently provided. It is neither banks nor markets that matter; it is both banks and markets Arestis *et al.* (2005). Levine (1997) also argued that the choice is not either banks or markets, rather, banks and markets provide complementary financial services to the economy.

On the other hand, to address the issue of causality between financial development and economic growth, Patrick (1966) developed the supply-leading and demand-following hypothesis. The supply-leading hypothesis argues a causal relationship from financial development to economic growth which means that the creation of financial institutions and markets increase the supply of financial services and thus leads to real economic growth. Among the researchers who agreed with this hypothesis are King and Levine (1993), Greenwood and Jovanovic (1990), Demirguc-Kunt and Levine (2008), Calderon and Liu (2003) and Christopoulos and Tsionas (2004).

The demand-following hypothesis however 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 grows (Patrick, 1966). Robinson (1952), and Lucas (1988) both beleived that economic growth is a causal factor for financial development.

2.2 Empirical Literature

Studies have shown that a strong financial system is important to mobilize domestic savings and foreign resources and allocate them to a high return investment. In addition financial intermediaries provide savers a channel to diversify the risk of holding financial assets and permit investors to access financial resources that would otherwise be unavailable. In this way, a developed financial sector facilitates economic competition, integrate commodity markets and enhance growth.

On the other hand, studies revealed that economic growth can stimulate the development of financial intermediation. Empirical literature on finance and growth includes cross-country growth regression, time-series analysis, panel studies, industry and firm level studies which are discussed as follows.

2.2.1 Cross- Country Evidence

Cross-country regressions have been used to examine a variety of macroeconomic relationships, including the one between financial development and long-run growth. This approach involves averaging out variables over long time periods (typically three decades) and using them in cross-section regressions aiming at explaining cross-country variations of growth rates (Arestis & Demetriades, 1997).

Goldsmith (1996) cited in Levine (2004) used data on 35 countries for the period 1860-1963 on the value of financial intermediary assets as a share of economic output and found out that the size of the financial intermediary sector is positively correlated with the quality of the services provided by the financial sector.

The major downside of his study noted by Levine (2004) is that financial development indicator may not accurately proxy for the functioning of the financial system. The study also fails to identify the direction of causality and furthermore the data set was limited to only 35 countries (Levine, 2004).

King and Levine (1993) studied 77 countries over the period 1960-1989. They examined the depth, which is the measure of the size of financial intermediaries, the variable bank, which measures the relative degree to which the central bank and commercial bank allocate credit and finally credit to the private sector. In addition they examined 3 growth indicators, (1) real per capita GDP growth (2) growth in capital stock per person and (3) total productivity growth.

They came to the conclusion that all 3 financial development indicators have a strong positive relationship with economic growth. But their finding is not without limitations. It doesn't deal with the issue of causality and only concentrates on a bank-based system. Using the data of King and Levine (1993), Arestis and Demetriades (1997) argue that the contemporaneous correlation between the main financial indicator and economic growth is much stronger than the correlation between lagged financial development and economic growth.

Levine and Zervos (1998) added stock market and used the data of 42 countries for the period 1976-1993 and built different measures of stock market development to find out the relationship between stock market development and growth.

They found out the initial levels of stock market liquidity and banking development are positively and significantly correlated with future rates of economic growth, capital accumulation and productivity growth. Like the works of King and Levine (1993), the works of Levine and Zervos (1998) does not deal with the issues of causality. They also exclude other components of financial sector like bond markets.

Khan and Senhadji (2000) studied the relationship between financial development and economic growth using 159 countries (Industrial and Developing) from the period 1960-1999. They estimated the growth equation using both cross-section sample and five-year-average panels. Cross-section is used in order to smooth out short-term fluctuation in the growth rate of real GDP and focus on the long-run growth rate of a country. But this method leaves out some important features of the growth path of the economy. That is why their study included five-year-average panels.

The result of their work confirms a strong positive and statistically significant relationship between financial depth and growth in the cross-section analysis. However, some financial depth indicators become statistically insignificant when the growth equations are estimated with panels.

Cross-country variations in results are difficult to interpret (Quah, 1993). It fails to distinguish between statistical association and causation and in addition it fails to address the country-specific effects of financial development on economic growth and vice-versa because it groups together countries that are at different economic stages. It can only refer to the 'average effect' of a variable across countries (Arestis and Demetriades 1997).

2.2.2 Time-Series Evidence

To examine the finance-growth relationship, time-series econometric applications which use the granger causality test and vector autoregressive (VAR) procedures are usually undertaken. HaileKibret & Kassahun (2011) used data of Ethiopia from 1971-2010 and studied the link between financial development and economic growth. They applied the Stock Watson Dynamic OLS method using liquid liabilities of commercial banks to GDP ratio as a financial development indicator. Their findings suggest that financial development and economic growth have a positive linkage and the granger causality test result shows a bi-directional causality between the two.

Rahman (2004) uses the data of Bangladesh from 1976-2005 based on long-run structural vector auto regressions (SVAR) model and investigates the finance-growth nexus. The study concluded that financial development has long-run impact on investment and income per capita. Furthermore, Arestis and Luintel (2005), utilized time-series data and methods along with dynamic heterogeneous panel approach on developing countries. They employed multivariate vector auto regression for the time-series data's and found that for the majority of sample countries, financial structure significantly explains economic growth. The results from heterogeneous panel also stress the importance of financial structure. Arestis and Luintel (2005) provided evidence that panel estimates do not appear to correspond to country specific estimates and may provide deceptive results.

Arestis and Demetriades (1997) used data for 12 countries and found out the casual link between finance and growth is determined by the nature and operation of the financial institutions and policies pursued in each country which is consistent with the works of Demetriades and Hussein (1996) who carried out a time-series analysis and concluded that causality patterns vary across countries. Empirical work on causality between financial development and economic growth is scarce because of insufficient long time series data especially for developing countries.

Jung (1986) investigated quantitative evidence on the causality between financial and real development using annual data for 56 developed and developing countries. But his results were inconclusive because they varied according to the financial development indicator and the development level of the countries under consideration.

Abu-Bader and Abu-Qarn (2005) examined the causal relation between finance and growth from a time series perspective for Egypt. They applied co-integration test and error correction models and revealed both direct causality from financial development to economic growth and indirect causality from financial development to real GDP per capita through investment.

They concluded that relaxing financial constraints and deepening the financial sector are essential to boost economic development through either increasing investment resource or enhancing investment efficiency. Guryay *et al.*(2007) on the other hand examined the relationship between financial development and economic growth in Northern Cyprus from 1976-2004 using ordinary least square (OLS) method and showed that there is negligible positive relationship between financial development and economic growth.

Rousseau and Sylla (2000) investigated the hypothesis that U.S economic growth and development were "finance–led". They used a set of multivariate time-series model that relate measures of banking and equity market activity to investment, imports and business incorporation over the 1790-1850 period. Examining an individual country, that is U.S, Rousseau and Sylla (2000) were able to design country specific measures of financial development and expand the time-series dimensions of the analysis. They concluded that improving the financial system will foster sustainable economic growth.

Bloch and Tang (2003), using time-series data for individual 75 countries over the period 1960-90 tested the relationship between financial development and economic growth. They calculated the correlation coefficients between private credit to GDP and GDP growth and found out that of 75 countries, 26 showed a positive correlation and the remaining 49 showed a negative correlation. They also emphasized the weak association over time between financial development and economic growth is not sensitive to a change in the indicator of financial development.

In addition their study made a distinction between cross-country and time-series approaches such that: (1) cross-country approach involves taking averages of the key variables over lengthy periods, which ignore the evolution of the key variables and how they interact overtime (2) cross-country approach makes the simplistic assumption that each economy has a stable growth path (3) cross-country approach gives all countries an equal weighting since they are assumed to be homogeneous (4) this approach might suffer from sample selection bias (5) and it represents only an average relationship (Bloch and Tang, 2003).

Time-series models are able to overcome such difficulties. Unlike the cross-country panel regressions discussed earlier, this concept therefore does not control for omitted variable bias by directly including other variables or by controlling with instrumental variables, rather, by including a rich lag structure, which is lacking in the cross-sectional approach, the time-series approach hopes to capture omitted variables (Beck, 2011).

2.2.3 Panel Evidence

It is quite possible to expect a combined influence of cross-sectional and time series changes together and their combined impact on economic growth. In other words, the explanation of financial development and economic growth nexus can be explained better with a combination of cross-section and time series analysis, than doing so individually. Such empirical analysis is referred as 'Panel Data Analysis' (Acharya *et al.*, 2009).

As variables under investigation are to be examined in both cross-sectional as well as time series dimensions, it takes care of all possible changes in the economy, resulting in controlling omitted variable bias (Acharya *et al.*, 2009). Acharya *et al.*, (2009) employed the panel data analysis based on a theoretical foundation that takes care-of the combined influence of cross-sectional and time-series specifications in empirical testing for 14 Indian states for the period 1981-2002. The study found out that financial development is considered to be a lead variable in economic growth in Indian states.

Beck *et al.*, (2000) used a panel GMM[2] (Generalized method of moments) estimator for 77 countries over the period 1960-1995. They stated that the use of panel estimation technique avoids biases associated with cross country regressions and it allows the use of instrumental variables for all regressors and thereby providing more precise estimates of the finance-growth relationship. Using private credit as a measure of financial development they found out a positive relationship between the exogenous component of financial development and economic growth, productivity growth and capital accumulation.

Rioja and Valev (2003) closely followed the works of Beck *et al.*, (2000) in estimating the effects of financial development on the sources of economic growth. They used data sets of 74 countries over the period 1961-1995 and applied the GMM dynamic panel technique. Their results are consistent with previous empirical work which finds that the effects of finance on economic growth may vary in different types of countries.

Their findings further shows that finance promotes growth through productivity growth in developed countries while for developing countries, finance encourages growth through capital accumulation. Rioja and Valev (2003) also found that the impact may be nonlinear.

[2] GMM is used in order to deal with the possible simultaneity of financial development and economic growth and to control for country specific effects

On the other hand, Jude (2010) emphasized that the nonlinear relationship can depend on economic policy variables, such as inflation rate and the government expenditure as ratio to GDP or structural variables like the degree of openness to trade and the financial development level. This study covered the period 1960-2004 and focused on a sample of 71 countries both developed and developing. The measurement was based on a panel smooth threshold regression specification and the study concluded that the non-linearity between finance and growth can be found by economic development variables as well as financial development indicators.

Christopoulos and Tsionas (2004) used panel co-integration analysis to examine whether a long run relationship between financial development and economic growth exist for 10 developing countries over the period 1970-2000. Using fully modified ordinary least square (OLS) estimation technique they had strong evidence in favour of the hypothesis that long run causality runs from financial development to economic growth, which is unidirectional causality from financial depth to growth. However their study was limited only to a few developing countries. Apergis *et al.*, (2007) expanded their data set and examined whether a long run relationship between financial development and economic growth exists employing panel integration and co-integration technique for dynamic heterogeneous panel of 15 OECD and 50 non-OECD countries over the period 1975-2000. Their result supported a positive and statistically significant equilibrium relation between financial development and economic growth for all different financial indicators used. Unlike the study of Christopoulos and Tsionas (2004), their result indicated a strong bi-directional causality between financial development and economic growth.

Furthermore, policies that foster macroeconomic stability, increased openness, investment in physical and human capital and productive government spending that improve economic growth also have an important effect on financial development in the long run. Using a different approach, Calderon and Lui (2003) employed the Geweke decomposition test on pooled data of 109 developing and industrial countries from 1960 to 1994 to examine the direction of causality between financial development and economic growth.

Their study used the ratio of broad money (M2) to GDP and the ratio of private sector credit to GDP as a measure of financial development. They decomposed the association between financial intermediation and growth into 3 different causal relationships: (1) causality from growth to financial development, (2) causality from financial development to growth and (3) instantaneous causality between financial development and economic growth. Their results are as follows:

1. Financial development leads to economic growth, that is , financial deepening in many countries resulted in a prosperous economy
2. The Granger causality from financial development to economic growth and the Granger causality from economic growth to financial development coexist
3. Financial deepening contributes more to the causal relationship in the developing countries than in the industrial countries, which means that developing countries have more room for financial and economic development
4. The effects of financial development on economic growth are more seen on a longer sampling interval, which means it takes time for financial deepening to affect the economy.

5. Financial development enhances growth through capital accumulation and technological change

The important policy implications put forward by Calderon and Lui (2003) is first, in order to have a sustainable economic growth, financial reforms must be undertaken and second liberalizing the financial sector, especially for developing countries is an advantage to promote economic growth.

2.2.4 Industry-Level analysis

Under this analysis the main issue is whether industries grow faster in economies with better developed financial system. Rajan and Zingales (1998) studied 36 industries in 42 countries for the period 1980-90 and tested whether industrial sectors that are relatively more in need of external finance develope disproportionately faster in countries with more developed financial markets. It is argued that financial markets and institutions help a firm overcome problems of moral hazard and adverse selection, thus reducing the firm's cost of raising money from outsiders.

Rajan and Zingales (1998) identified an industry's need for external finance from data on U.S and used the ratio of domestic credit and stock market capitalization to GDP as a measure of financial development. Their results concluded that industries that are naturally heavy users of external finance should benefit more from greater financial development than industries that are not.

Wurgler (2000) used industry level data for 65-countries, 28 manufacturing industry and 33 year panel of gross capital formation and value added for the period 1963-95. The result was that countries with high level of financial development, as measured by the size of the domestic stock and credit markets relative to GDP, increase investment in growing industries and decrease investment more in declining industries.

As cited by Levine (2004), scholars like Beck, Demirguc-Kunt, Laeven and Levine (2004) extended the works of Rajan and Zingales (1998) and examined whether industries that are naturally composed of small firms grow faster in financially developed economies. By comparing across countries and industries , they showed that industries that are composed of smaller firms do infact grow faster in countries with better developed financial system.

Fishman and Love (2003) analyzed the relationship between financial development and inter-industry resource allocation in the short and long run. They emphasized that in the short-run, financial development facilitates the reallocation of resources to industries with good growth opportunities. In the long-run, economies with high rates of financial development will devote relatively more resources to industries that rely on outside finance due to a comparative advantage in these industries.

In order to test this hypothesis, they developed a proxy for industry-country growth shocks based on the works of Rajan and Zingales (1998). They found different effects of these measure on industry growth and composition in countries with different levels of financial development.

2.2.5 Firm Level Analysis

Firm level studies were conducted by Guiso, Sapienza and Zingales (2002). Rather than studying the effect of financial development across countries, they studied the effect of local financial development within a single country, i.e, Italy. They criticised the use of financial developent measures such as stock market capitalization to GDP or stock market turnover to GDP at the local level. They constructed a new indicator of financial development by estimating a regional effect on the probability that, ceteris paribus, a house hold is shut off from the credit market. By using this indicator they found that financial development enhances the probability an individual starts his own business, favors entry, increases compitition and promotes growth of firms. All in all, their evidence suggest that local financial development plays a significant role even in a perfectly integrated markets.

Demirguc-Kunt and Maksimovic (1998) tested whether greater financial development removes impediments to the exploitation of profitable growth opporunities or not. Unlike Rajan and Zingales (1998), who focused on the need of external financing of an industry, Demirguc-Kunt and Maksimovic (1998) estimated the external financing needs of each individual firm of 26 countries for the period 1980-91.

They concluded that both banking system development and stock market liquidity are positively associated with the excess growth of firms and in addition noted that the size of the stock market is not relevant for a firm's growth.

Love (2003) also found that the sensitivity of investment to internal funds is greater in countries with poorly developed financial system. Financial developent is particularly effective at easing the constraints of small firms. Beck, Demirguc-Kunt and Maksimovic (2005) use a different data set and show that financial developement weakens the impact of various barriers to firm growth and that small firms benefit the most from financial development.

Benfratello *et al.,* (2006) on the otherhand investigated the effects of local banking development on firms' innovative activities using firm level data for a large number of Italian firms over the 1990's. Their results indicated that banking development affects the probability of process innovation for firms that depend on external finance. These development reduces the cash flow sensitivity of fixed investment spending for small firms and increase the probability they will engage in R&D. In general, firm level studies indicate that financial development removes barriers to firm expansion and exerts a particularly beneficial impact on small firms.

To summarize, emperical evidence on financial development and economic growth yield different result from one study to another. This is believed to be mainly due to the methodology employed, the development level of the countries under consideration or the financial development indicator used in the study.

Chapter Three: Overview of Ethiopian Economy with a Focus on the Financial Sector

3.1 Overview of Ethiopian Economic Growth

Ethiopia's economy is highly vulnerable to exogenous shocks due to its dependence on primary commodities and rain-fed agriculture. Agricultural productivity remains low eventhough agricultural production has increased considerably (Mwanakatwe and Barrow, 2010). In recent years, Ethiopia has experienced strong economic growth. This is mainly due to the increasing contribution of the service sector and industrial sector to GDP. Real GDP growth averaged 11.2 percent per annum during the 2003/04 and 2008/09 period, placing Ethiopia among the top performing economies in sub-Sahara Africa (Mwanakatwe and Barrow, 2010).

This GDP growth when compared to the growth rate during the Imperial regime and the Derg regime is quite substantial. During the period 1960 and 1970, for example, Ethiopia experienced an annual 4.4 percent average growth rate in per capita GDP. Between 1974/ 75 and 1989/90, growth decelerated to 2.3 percent (-0.4 percent in per capita terms) (Alemayehu, 2006). Instability induced by the new policy of the regime, war with Somali and the drought that occurred during 1983/84 can be mentioned as a cause of this poor performance. According to Mwanakatwe and Barrow, 2010, Ethiopia's recent growth can be explained by:

- Conducive government policies
- Increased domestic revenue mobilization and aid
- Heavy investment to address infrastructure bottlenecks
- Increased public expenditure to enhance pro-poor growth
- Expansion of exports and remittance

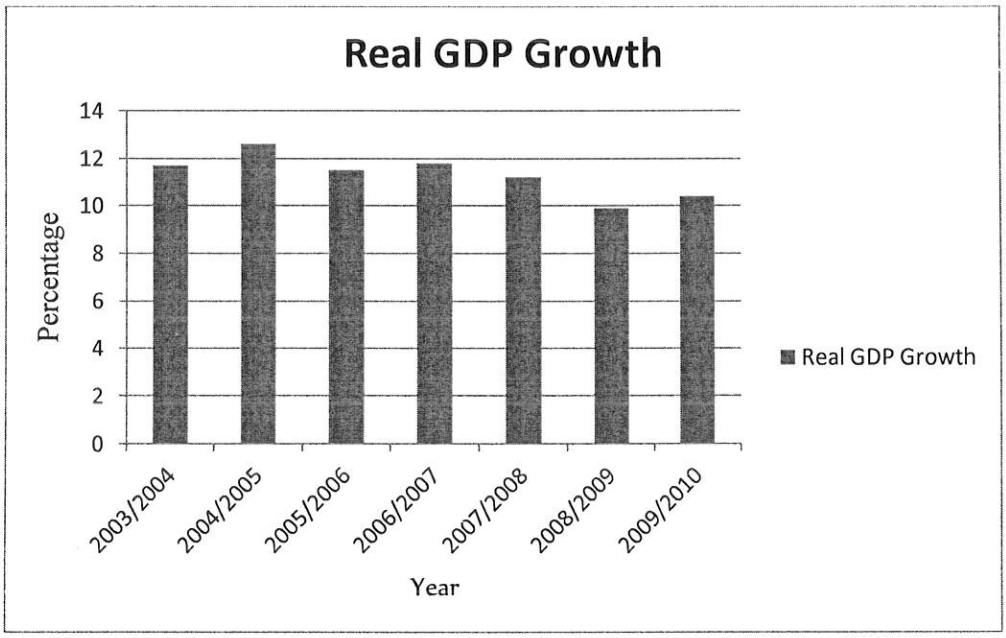


Figure 3.1 Real GDP Growth

Source: National Bank of Ethiopia Annual Report Various Years

3.2 The Development of the Financial System in Ethiopia

3.2.1 The Pre –Reform Period

The pre-reform (Derg) period is characterized by fast growing government expenditure with an unequal growth in revenue. All private financial institution including three commercial banks, thirteen insurance companies and two non-bank financial intermediaries were nationalized. The government restructured the financial system and formed one commercial bank (CBE), a national bank (NBE), two specialized banks (AIB & HSB) and one 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 construction 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. In addition the NBE was assigned to formulate the credit policy and determine the interest and exchange rate.

It also fixed both deposit and lending rates, adminstered the allocation of foreign exchange and directly financed the fisical deficit. Domestic credit extension was subject to central planning. The limit on direct advance allowed to the government from the NBE increased to 70 percent from 15 percent in 1963 (MEDaC, 1999). This lending strategy of the banks showed that the productive sector was not given priority.

In 1988, about 55% of all commercial bank credit financed imports and domestic trade and services, agriculture and industry received only 6% and 13% of the commercial credit respectively (Wondaferahu, 2010).

CBE was the dominant bank accounting for more than 90% of the total deposits mobilized in the country (Alemayehu, 2006). The government on the other hand controlled the financial sector using direct financial instruments such as lowering the interest rate and discriminating the allocation of foreign exchange and credit. The foreign exchange earnings were surrendered to the NBE and the credit policy also favored the expansion of the socialized sector.

Basically the financial sector during 1974-1990 served the state and the development of the socialized sector. According to Prof. Ali I. Abdi (2000), nationalizing the private sector, controlling the saving and lending interest rates and limitation on credit reflected the classical manifestation of a repressed financial system. Financial intermediation and the development of the financial sector were affected due to poor resource utilization of the public sector on the one hand and the performance of this sector at the expense of the private sector.

3.2.2 The Post-Reform Period

In 1991, the Transitional Government of Ethiopia (TGE) took over and restructured the system to a market-based economy. The government's strategy for financial development is characterized by gradualism (Alemayehu, 2006).

It reformed the financial sector by granting power to the NBE and strengthening its capacity, granting commercial banks with adequate autonomy to operate within the general financial policy framework provided by the NBE and introduce a competitive bank and non-bank financial sector by allowing private sector participation in the sector. In 1994 the private sector was allowed to engage in the banking and insurance business. The number of banks which were active before the 1974 revolution were only 9 with 113 branches all together (Alemayehu, 2006). However during the fisical year 2009/10 the number of banks operating in the country reached 15 with 681 branches (NBE, 2009/10). These banks play a major role in the development of the financial sector. The efficiency of these banks in turn defines the strength of the economy.

Bank branch to population ratio improved from126,258 in 2008/09 to 117,474 taking total population as 80 million in 2009/2010. At the end of 2009/2010 the share of private banks grew from 57% to 60% as a result of a significant capital injection by the private banks (NBE, 2009/10).

The introduction of private banks in the country gradually led to improved banking services, including features as longer banking hours, ATMs, electronic banking and improved facilities.

These private banks in turn focused on fast growing sectors in order to promote economic growth. But the Ethiopian banking industry is still small despite the increase in the capital base when compared to other African countries (NBE, 2009/10). Although bank branches are expanding at a fast pace, banks are not still accessible to most of the rural area. This can be justified by the high minimum balance required to open a bank account and the low geographic as well as demographic penetration.

The number of Insurance companies in 2009/10 were 12, and their total capital grew by 47.5% to birr 962.4 million with private insurance companies accounting for 65.3%. The number of MFIs by the end of 2009/10 reached 30 and their capital increased by 36.7% to birr 2.4 million (NBE, 2009/10).

Table 3. 1 No. of Bank branch, Total capital in million and Percentage share are in ( )

	2003/04		2006/07		2009/10	
	No. of Bank Branch	Total Capital in Million	No. of Bank Branch	Total Capital in Million	No. of Bank Branch	Total Capital in Million
1. Public Banks						
CBE	172 (48)	1495.4 (47.4)	196 (40.2)	4220.0 (45.6)	209 (30.7)	5532 (42.8)
CBB	21 (5.9)	87.9 (2.8)	27 (5.5)	257 (2.8)	32 (4.7)	229 (1.8)
DBE	32 (8.9)	524.4 (16.6)	32 (6.6)	1865 (20.1)	32 (4.7)	1969 (15.2)
2. Private Banks						
Awash International Bank	31 (8.7)	177.5 (5.6)	43 (8.8)	434 (4.7)	62 (9.1)	721 (5.6)
Dashen Bank	31 (8.7)	229.9 (7.3)	42 (8.6)	612 (6.6)	59 (8.7)	967 (7.5)
Abyssinia Bank	19 (5.3)	208.6 (6.6)	28 (5.7)	419 (4.5)	47 (6.9)	482 (3.7)
Wegagen Bank	25 (7.0)	145.6 (4.6)	39 (8.0)	401 (4.3)	50 (7.3)	828 (6.4)
United Bank	14 (3.9)	96.1 (3.0)	27 (5.5)	359 (3.9)	42 (6.2)	506 (3.9)
Nib Bank	13(3.6)	189.5 (6.0)	25 (5.1)	426 (4.6)	48 (7.0)	723 (5.6)
Cooperative Bank of Oromia	-	-	16 (3.3)	131 (1.4)	37 (5.4)	169 (1.3)
Lion International Bank	-	-	12 (2.5)	134 (1.4)	22 (3.2)	201 (1.6)
Oromia International Bank	-	-	-	-	27 (4.0)	208 (1.6)
Zemen Bank	-	-	-	-	3 (0.4)	121 (0.9)
Buna International Bank	-	-	-	-	3 (0.4)	169 (1.3)
Berhan International Bank	-		-	-	8 (1.2)	108 (0.8

Source: Annual Reports of National Bank of Ethiopia (NBE), various years

In 1992, the exchange rate reform took place and the government devalued the currency from 2.07 birr to the dollar to 5 birr to the dollar. The auction-based exchange rate system which worked side by side with the official exchange rate was introduced in 1993. However, the foreign exchange supply by NBE through the auction system was not sufficient to satisfy the demand of banks.

Consequently, the NBE issued directives and established interbank foreign exchange and monetary market in 1998. Since its establishment only 23 transactions worth Birr 259.2 million were transacted with interest rate ranging between 7-11% per year (NBE, 2009/10). The existence of excess liquidity in the banking system and lack of collateral in the case of private banks has contributed to the poor performance of the interbank money market in Ethiopia. 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.

Unlike the Socialist Government, which was basically engaged in active participation in the production and distribution activities, the current government shifted its role to creating an enabling environment for the private sector and providing regulatory services. Besides privatization, the government has paved the way for foreign investors. But despite the efforts undertaken by the current government to create a conducive business environment, the flow of private investment, the growth of the private sector, and its participation in the economy have so far been quite low. This is partly due to the repression of the private sector under the Derg regime (World Bank, 2004).

In general the Ethiopian financial system is bank dominated with underdeveloped money and securities market which characterizes the inefficiency of financial intermediation. Financial markets are underdeveloped and currently there is no capital market in Ethiopia. The monetary and financial policy is not firm enough to let the financial institutions mobilize deposits with attractive interest rates and to extend credit to support the growth of the economy. With the growing number of banks entering the financial system, the financial sector supervision remains low. Currently there is no foriegn bank in the country and the system remains isolated from the effects of globalization while policy makers fear that liberalization will lead to loss of control over the economy (Wondaferahu, 2010).

Whereas studies show that liberalization has a long-run economic effect on the financial sector by making the domestic banking sector effecient. One of the advantages of financial liberalization is that it will increase the domestic banks' competetiveness. The efficiency of the banking sector can be enhanced by the privatization of state-owned banks as part of the liberalization process, thereby promoting economic growth.

When we come to the case of Ethiopia, a least developed country, financial liberalization may cause financial fragility rather than financial stability due to the underdevelopement of the exisiting financial system. Thus , before persuing financial liberalization, Ethiopia needs to develope policies that promote sucessful financial development and financial liberalization. This is because a strong financial system is important to mobilize savings and foreign resources to allocate them to efficient investments. The underdevelopment of the financial sector will raise the transaction cost and channel savings of households into physical assets which inturn reduces investment and hence, reduce growth.

If financial services are extended to rural and poor producers, a developed financial system is a strong tool to reduce poverty and promote growth in Ethiopia (Abdi, 2000).

3.3 Indicators of Financial Development in Ethiopia

To assess the development of the financial sector a number of indicators are employed to find the relationship between financial development and economic growth. In this section the performance of the ratio of broad money to GDP (M2/GDP) and the share of domestic credit to the private sector as percent of GDP in Ethiopia are discussed.

3.3.1 Broad Money Supply

Broad money consists of both narrow money and quasi-money, where narrow money contains currency outside the bank and net demand deposits and quasi-money includes both saving and time deposits. It is the broadest measure of financial development and it measures the depth of the financial system. It also indicates the degree of monetization with respect to the real economy.

Basically, broad money can be determined by net foreign assets and domestic credit. A higher M2/GDP ratio suggests that a larger financial sector and therefore greater financial intermediary development. During the Derg period, foreign reserve accounted for less than 10% of the monetary base (except for the three years ending in 1990/91), and growth in M2 was largely determined by domestic credit mainly to the government (MEDaC, 1999).

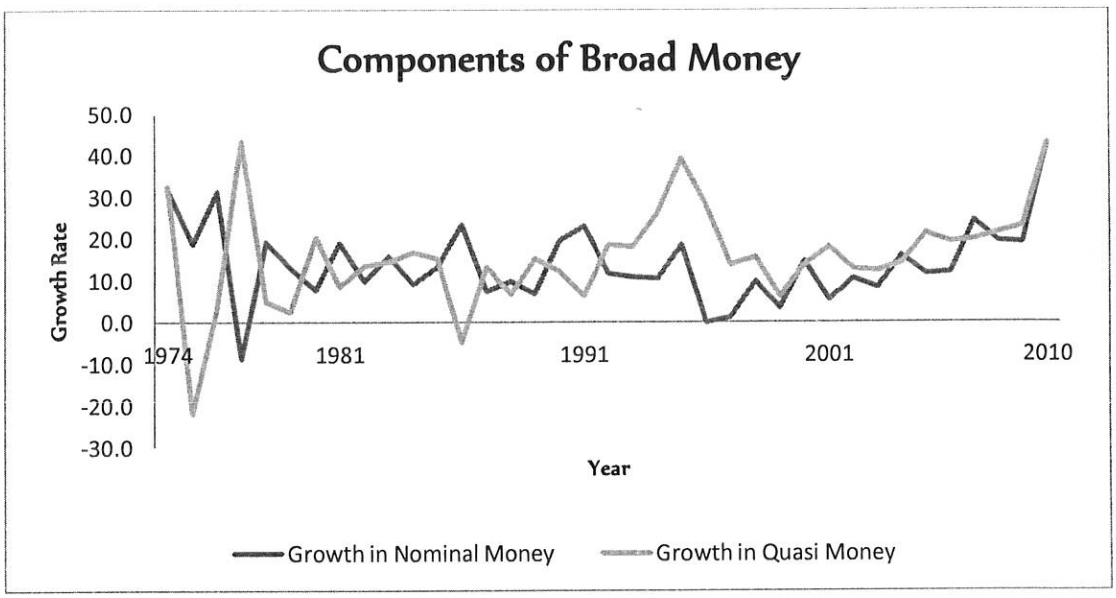


Figure 3.2 Components of Broad Money

Source: National Bank of Ethiopia Annual Report Various Years

This financial development indicator remained low for most of the Derg period. Between 1981/82 and 1985/86, the ratio of M2/GDP increased from 15% to 20% and further to 22% by 1989/90. During the last two years of the Derg, M2 further expanded due to the growth in the net claims of banks on the central government. After the economic reform, efforts have been made to make growth of broad money supply in line with nominal GDP growth.

A relatively faster growth in broad money has been witnessed in 1994/95 since the beginning of the reform averaging 23%. This has been partly justified by the windfall gain from coffee export and the substantial increase in credit expansion to the private sector during the period (MEDaC, 1999).

Broad money to GDP ratio dropped from 26% in 2006/07 to 22% in 2007/08 and further to 20% in 2008/09 but resurged to 22% in 2009/10. This surge in M2 during 2009/10 was due to an increase in net foreign asset and domestic credit which are components of M2 (NBE, 2009/10).

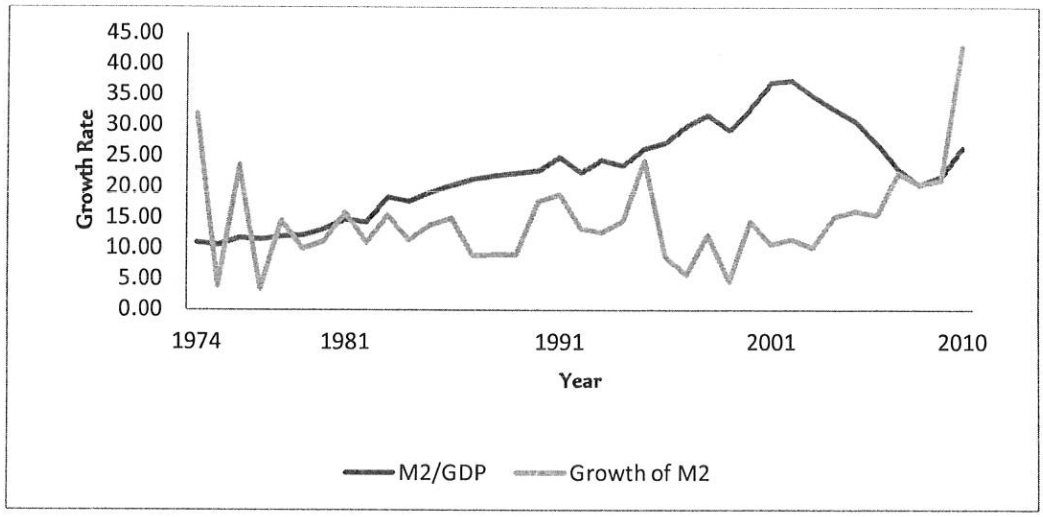


Figure 3.3 Growth of M2 and M2 as percent of GDP

Source: National Bank of Ethiopia Annual Report Various Years

3.3.2 Domestic credit to the private sector

Domestic credit issued to the private sector refers to the financial resources provided to the private sector, such as through loans, purchase of non-equity securities and trade credit and other account receivables, that establish a claim for repayment. For some countries these claims include credit to public enterprises. During the Derg regime, total domestic credit grew by almost 12% on average, faster than the growth in M2. Much of this growth was accounted for by the credit given to the central government.

Credit to the central government grew by 15.7% on average during the period 1980/81-1990/91 (MEDaC, 1999). On the other hand, bank credit to the private sector grew slowly because of the restriction imposed on the economic activities of the private sector. After the economic reform however, bank claims on government grew on average by 3.2% while non-government borrowers increased by 20% per annum due to the increasing participation of the private sector. Credit disbursed to non-government borrowers accounted for 51% of the total domestic credit up from 30% in 1991/92. Unlike the Derg period, bank credit to the private sector became a major determinant for the expansion of the monetary base. For example the ratio of private credit as percent of GDP in 2004 was 19.1 the second highest in East Africa (Kiyota *et al.*, 2007). However, this does not necessarily mean that intermediation is stronger because Ethiopia's GDP is relatively low.

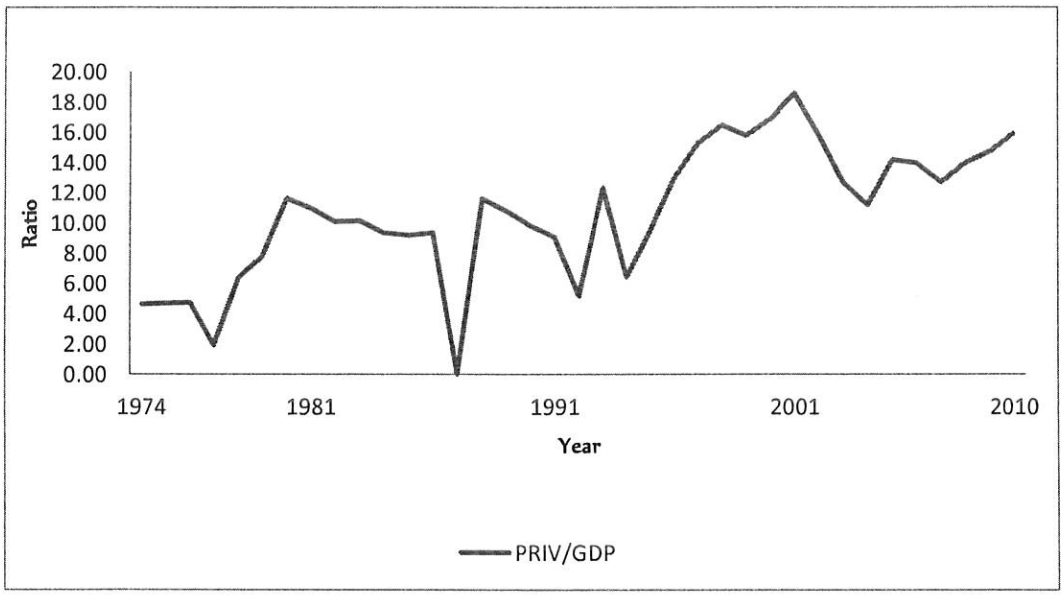


Figure 3.4 Private Credit as percent of GDP

Source: National Bank of Ethiopia Annual Report Various Years

Chapter Four: Model Specification and Methodology

4.1 Model Specification

To investigate the relationship between financial development and economic growth, this paper utilizes the Neo-Classical Growth Model which was developed by Solow (1956) and Swan (1956). According to Aghion and Howitt (n.d), the building block of this model is an aggregate production function exhibiting constant returns in labor and reproducible capital which is given by:

$$Y_t = f(L_t, K_t) \quad \text{.....(4.1)}$$

Where y is real output, L is total labor force and K is gross capital formation.

In equation (4.1), K is substituted with I (Investment) due to the fact that capital stock data are usually unavailable for a least developed country such as Ethiopia. For this reason I is used as a proxy for K and is given as:

$$y_t = f(L_t, I_t) \quad \text{.....(4.2)}$$

The Neo-Classical growth model which states that $S_t = I_t$ (where S is savings), is modified when we come to the case of Ethiopia. This is because of the existence of an enormous gap between domestic savings and investment in Ethiopia. Hence, investment comprises of both saved fund (S) and borrowed fund (BF) that comes from credit given to the private sector (PRIV) and external resource such as foreign borrowing or as an alternative foreign aid (FA).

$$y_t = f(L_t, S_t, BF).....(4.3)$$

King and Levine (1993), used the ratio of private credit to GDP as one indicator of financial development to find out the correlation between financial development and economic growth. This financial development indicator measures general financial intermediary activities provided to the private sector by excluding the public sector as the private sector is an engine to growth. The supply of credit to private sector is important for the quality and quantity of investment (Demitriades and Hussien, 1996). Accordingly, the paper employes private credit as percent of GDP as an indicator of financial development.

$$y_t = f(L_t, S_t, PRIV, FA).....(4.4)$$

Finally, the above eqautions are specified as follows:

$$LRGDP = \beta_o + \beta_1 LLAB + \beta_2 LSAV + \beta_3 PRIV + \beta_4 LFA + \beta_5 D_1 + \mu_t.....(4.5)$$

Where L = Natural Logarithim

RGDP = Real Gross Domestic Product

LAB = Labor Force

SAV= Domestic Saving

PRIV= Ratio of private credit to GDP

FA= Foriegn Aid

D1= Dummy variable for regime change

μ_t = Error term

4.2 Vector Auto Regressive and Vector Error Correction Models

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

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

$$\Delta yt = \alpha o + A1\Delta yt - 1 + A2\Delta yt - 2 + ... + Akyt - k + \varepsilon t \quad ..... (4.6)$$

where Yt is an nx1 vector that contains n variables in the system. α_o is an nx1 vector of constants and A_1 upto A_n are nxn vector of white noise process, with mean zero and covariance $\sum$.

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

Classifying variables as endogeneous and exogeneous as well as imposing some arbitrary restrictions on the parameters to insure identification are not required when we use VAR models, like a reduced form, a VAR is always identified (Gujarati, 2004). He further emphasized that VARs provide a more systematic approach to imposing restrictions and could lead one to capture emperical regularities which remain hidden to standard procedures. Before estimating the VAR, we have to decide the maximum lag lengths, K to generate the white noise of error terms. This can be done based on the Akaike information criteria (AIC) or Schwarz (SIC).

Since time-series variables have been widely noted to be non-stationary, the results that are obtained from the level VAR are spurious[3] and misleading (Mukhopadhyay and Pradhan, 2010). Moreover, utilizing properly differenced variables in the VAR may lead to model mis-specification if the level variables share the long run relationship or are cointegrated. In this case the VAR should be written in a VECM (Vector Error Correction Model) form as indicated below.

[3] When two variables are trending over time, a regression of one on the other could have a high R^2 even if the two are totally unrelated.

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

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

$$\Delta yt = \alpha o + \Pi yt - 1 + \Gamma 1 \Delta yt - 1 + \Gamma 2 \Delta yt - 2 + ... + \Gamma k - 1 \Delta yt - k + 1 + \varepsilon t \quad (4.7)$$

Where $\Gamma = -(A_{j+1} + \ldots + A_k)$, j= 1,.....k-1 and $\pi = -I+A_1+A_2+A_3+\ldots+A_k$

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

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

4.3 Econometric Procedure

4.3.1 Unit Root Test

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

1. The Random Walk model with drift

$$Y_t = \mu + Y_{t-1} + \mu_t \qquad (4.8)$$

2. The Deterministic trend process

$$y_t = \alpha + \beta t + \mu_t \qquad (4.9)$$

The first case is known as stochastic non-stationarity. If $\Delta y_t = y_t - y_{t-1}$ and $Ly_t = y_{t-1}$ so $(1-L)\,y_t = y_t - Ly_t = y_t - y_{t-1}$

If we subtract y_{t-1} from equation (1) we get $\Delta yt = \mu + \mu t$

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

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

$\Delta y_t = \psi y_{t-1} + \mu_t$ so that a test of $\phi = 1$ is equivalent to a test of $\psi=0$ since $\phi-1=\psi$

On the other hand the Augmented Dickey Fuller Test (ADF) can be written as

$$\Delta y_t=\psi y_{t-1}+\sum_{i=1}^{p} \alpha_i \Delta y_{t-i}+\mu_t \qquad (4.10)$$

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

The ADF test can be biased towards accepting the null hypothesis of unit root in the series if the series exhibits significant structural breaks (Harris, 1995). Therefore, the data should be first tested for the existence of structural breaks.

Differencing may lead to a considerable loss of long run properties of the data. So it is appropriate to develope a statistical tool which is suited for capturing long-run relations between non-stationary variables in a right manner. Engle and Granger (1987) developed the theory of cointegration relation so as to provide a solution for this problem.

4.3.2 Co-integration Analysis

The idea of cointegration is to take care of the non-stationarity of the variables and confirm whether there exists a long-run equilibrium relationship. The m x 1 series Yt is cointegrated if Yt is I(1) yet there exists β, m x r, of rank r, such that $z_t=\beta'\gamma_t$ is I(0). The r vectors in β are called the cointegration vectors.

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

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

A. The Engel-Granger Approach

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

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

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

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

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

B. The Johansen Approach

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

$$y_t = \lambda 1 y_t - 1 + \lambda 2 y_t - 2 + ... + \lambda p y_t - p + \psi Z_t + \varepsilon_t \qquad (4.11)$$

Where y_t is a vector of (nX1) non stationary I(1) variables, Z_t a vector of (mX1) , λ_i (i=1,.....,p) and ε_t is a vector of white noise error term.

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

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

Johansen represented Ho: $\pi = \alpha\beta'$and α and β are (mxr) matrices where the rows of β' are the r cointegrating vectors while the matrix α represents the coefficient of speed of adjustment. This approach enables us to determine the number of cointegrating vectors and estimate the cointegrating vectors. According to Enders (1995), the number of cointegrating vector can be identified based on:

$$\lambda_{trace}(ro) = -T \sum_{i=ro+1}^{m} \ln(1-\hat{\lambda}_i) \qquad (4.12)$$

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

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

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

$$\lambda_{\max(ro)} = -T \ln(1 - \hat{\lambda}_{ro+1}) \qquad (4.13)$$

Ho: $r \leq r_o$ and Ha: $r = r_o + 1$

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

4.3.3 Granger Causality Test

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

4.3.4 Impulse Response and Variance Decomposition

Impulse Response Function (IRF) and the Variance Decomposition are the two ways in which we forecast the dynamic behaviour of the VAR model. The impulse response function traces the effect of a one standard deviation shock to one of the innovations on the current and future values of the endogenous variables. The variance decomposition provides a different method of depicting the system dynamics. It decomposes variation in an endogenous variable into the component shocks to the endogenous variables in the VAR. The variance decomposition provides information about the relative importance of each random innovation to the variables in the VAR.

4.4 Nature and Source of Data

Inorder to capture the relationship between financial development and economic growth the study used the ratio of Private Credit to GDP as an indicator of financial development since the other indicators such as broad money consists of currency in circulation and bank deposit which is mostly a monetary phenomenon dealing with central bank issues. Following the works of Roubini & Sala-i-Martin (1992), King and Levine (1993), the study use Gross Domestic Product as a proxy for economic growth.

This study conducts the emperical analysis by employing data sets for the period 1980-2010 for all the variables specified in the model. This period is chosen based on the availability of full figures. Data of real GDP, Domestic Savings and Credit to the Private Sector are all obtained from the National Bank of Ethiopia.

The Data for Foriegn Aid is obtained from World Bank Database, whereas Labor Force data (which is described as an economically active population between the age of 15 and 65) is obtained from the database of The United Nations Conference on Trade and Development (UNCTAD).

Chapter Five: Emperical Results and Discussion

This chapter analyses the relationship between financial development and economic growth using annual data from 1980-2010 in Ethiopia. Before we go to the direct estimation of the model, we need to first employ the unit root test to check whether the time-series is stationary or not. After identifying the optimal lag length, the presence of the co-integrating vectors is tested using the Johansen procedure. Further the granger causality test is employed to find the direction of causality between financial development and economic growth. The long-run and short-run relationship is also identified followed by the volatility test.

5.1 Unit Root Test Result

This test can be done using the Augmented Dickey-Fuller (ADF) unit root tests. The ADF test is an extension of the Dickey-Fuller test because the regression has been augmented with the lagged changes. When the ADF test statistics is larger than the critial value in absolute terms, the null hypothesis of unit root is rejected, and if the ADF test statistics is less than the critical value in absolute terms, we fail to reject the null hypothesis. Table (5.1) shows the results of ADF test for unit root. All variables except PRIV are in logarithmic forms since PRIV represents a ratio of private credit as per cent of GDP.

Table 5. 1 ADF Unit Root Test in Level

Level	ADF	Critical Value at 5% Level of Significance
LRGDP	0.475875	-3.568379
LLAB	-1.162137	-3.568379
LSAV	-3.473884	-3.568379
LFA	-3.110666	-3.568379
PRIV	-1.229427	-3.568379

Table 5. 2 ADF Unit Root Test at First Difference

1st Differnce	ADF	Critical Value at 5% Level of Significance
LRGDP	-4.514096	-3.574244
LLAB	-4.75647	-3.574244
LSAV	-7.815174	-3.574244
LFA	-6.079594	-3.580623
PRIV	-4.537476	-3.632896

LRGDP, LLAB, LSAV, and LFA are the natural logarithms of real GDP, labor, domestic saving and foriegn aid while PRIV is ratio of private credit to GDP.

The absolute values of the calculated test statistics for all variables are less than its critical value at 5 per cent level of significance. The result indicates that all variables are non-stationary at level, i.e, the series appeares to have unit root. So the null hypothesis that each variable has unit root can not be rejected by the ADF test. However, after applying the first difference, we reject the null hypothesis since the data appeares to be stationary at first difference. Therefore all variables are integrated of order one I(1).

5.2 Co-Integration Test Result

In order to evaluate the CVAR model the next step is to test for the existence of long-run relationship among the variables. Lack of co-integartion between variables suggests the existsance of no long-run relationship between them. Hence, the Johansen co-integartion method is applied. However, before applying this test, it is necessary to determine the appropriate lag length and check the stability of the VAR. The lag length is selected according to Final Prediction Error (FPE), Akaike Information Criterion (AIC), Hannan-Quinn Information Criterion (HQIC) and Schwarz Information Criterion (SIC). The more lags we include, the more initial values we lose. If we include too few lags, the size of the test will be incorrect (Wooldridge, 2000). Var lag exclusion test is also applied so as to check the suitability of the lag included for estimation techniques. It is showen in Appendix (B) that the VAR is stable.

Table 5.3 VAR Lag Order Selection Criteria

Lag	Log L	LR	FPE	AIC	SC	HQ
0	-82.80260	NA	0.000364	6.271614	6.509508	6.344341
1	49.86060	208.4707*	1.72e-07*	-1.418614	0.008748*	-0.982255*
2	73.30397	28.46695	2.33e-07	-1.307426	1.309404	-0.507435
3	101.6252	24.27538	3.21e-07	-1.544660*	2.261638	-0.381037

* indicates lag order selected by the criterion

FPE, SIC and HQ all chose one lag length to be the optimum lag length. The smaller the value of the information criteria, the better the model. The lag exlusion[4] test confirms the first lag to be the appropriate lag. Hence this study emlopyes the optimal lag length of one for estimation techniques. The result of testing the number of co-integrating vectors is shown in table (5.4). If the test statistics is greater than the critical values, the null hypothesis that there exists r cointegrating vectors aginst the alternative hypothesis that there are r+1 (for λtrace) or more than r (for λmax) is rejected. It can be concluded that there is a long-run relationship among the variables.

[4] See Appendix A (VAR lag exclusion wald test)

Table 5.4 (a) Unrestricted Co-integration Rank Test (Trace)

Hypothesized No of CE(s)	Eigen value	Trace Statistics	0.05 Critical Value	Probability
None*	0.680038	87.11322	69.81889	0.0011
At most 1*	0.605782	54.06622	47.85613	0.0117
At most 2*	0.510835	27.07152	29.79707	0.0999
At most 3	0.190036	6.334921	15.49471	0.6559
At most 4	0.007650	0.222709	3.841466	0.6370

Trace test indicates 2 co integrating eqn(s) at the 0.05 level.

*Denotes rejection of the hypothesis at the 0.05 level

**Mackinnon-Haug-Michelis (1999) PP-Value

Table 5.4 (b) Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

Hypothesized No of CE(s)	Eigen value	Maximum Eigen value Statistics	0.05 Critical Value	Probability
None	0.680038	33.04700	33.87687	0.0626
At most 1	0.605782	26.99470	27.58434	0.0594
At most 2	0.510835	20.73660	21.13162	0.0567
At most 3	0.190036	6.112211	14.26460	0.5988
At most 4	0.007650	0.222709	3.841466	0.6370

Maximum eigenvalue indicates no co integrating eqn(s) at the 0.05 level.

*Denotes rejection of the hypothesis at the 0.05 level

**Mackinnon-Haug-Michelis (1999) PP-Value

It can be seen from the table 5.4 (a) that the unrestricted cointegration rank test (Trace) shows two cointegrating vectors at the 5% critical value in the system while table 5.4 (b), the unrestricted cointegration rank test (Maximum Eigenvalue) shows no co-integrating vectors in the system. Occasionally, the trace and the maximum eigen value test statistics yield conflicting results. In such a case the trace statistics is more robust than the maximum eigen value statistics in testing for co-integration (Luintel & Khan, 1999). Thus based on trace statistics result we can conclude that there exists meaningful long run relationship between the variables under consideration.

5.3 Granger Causality Test Result

In this section, we employ the Pair-wise granger causality between GDP and financial development indicator PRIV (Private credit as per cent of GDP). The estimated F-statistics of the causality test is reported in table (5.5)[5]. As can be seen from the table below, we fail to accept the null hypothesis that LRGDP does not cause PRIV, but we fail to reject the null hypothesis that PRIV does not granger cause LRGDP. Therefore it is shown that granger causality runs one way from GDP to PRIV and not the otherway: Hence, causality is uni-directional from economic growth to financial development.

[5] The estimated F-Statistics of causality test for the other variables is included in Appendix F

Table 5.5 Pair-Wise Granger Causality

Sample: 1980-2010

Lag: 1

Null Hypothesis	Observations	F-Statistics	Probability
LRGDP does not Granger Cause PRIV	30	17.5677	0.0003
PRIV does not Granger Cause LRGDP	30	2.06774	0.1619

As can be seen from the result economic growth is essential for the development of the financial sector in Ethiopia. This is a major sign that Ethiopia is still a developing country. This senario is different for developed countries: the more the country is developed, the more the financial development is useful to forecast GDP growth (Hurlin & Venet, 2008). In addition, the growth-led financial development causal relationship reveals the instability of Ethiopia's fnancial system.

The findings are in line with Patrick's (1966) Demand-following hypothesis wich 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 grows. But the result contradicts with the works of King and Levine (1993) that conducted a study on the causal relationship between financial development and economic growth using data on 80 countries over the period 1960-1989. Using different financial development indicators, they found that financial development promotes economic growth.

The result is also inconsistent with the findings of Haile Kibret and Kassahun (2011) who employed data of Ethiopia from 1972-2010 to find the link between financial development and economic growth. They indicated the bi-directional causality between financial development and economic growth in Ethiopia using liquid liability as an indicator of financial development. Our findings are believed to contradict with these studies due to the methodological difference and the financial development indicators utilized. In our study, the uni-directional causality from economic growth to financial development may be justified by the fact that:

- The financial reform of Ethiopia has a delayed effect on economic development.
- The presence of financial constarints that are imposed on the financial sector
- As Hurrlin & Venet 2008 implied, the existence of incomplete financial markets and the lack of financial skills of bankers due to lack of training and or corruption may lead to the dependence of the financial system on the real side of the economy making the contribution of the financial sector to economic growth lesser.

5.4 Diagnostic Tests

Diagnostics test are usually undertaken to detect model misspecifiaction and as a guide for model improvement. This tests include serial correlation, heteroscedasticity and normality tests. The serial correlation test can be done using the Durbin-watson test or the lagrange multiplier (LM) test. It helps to identify the relationship that may exist between the current value of the regression residuals and lagged values.

The study used the LM test to investigate serial correlation. The null-hypothesis of the LM test that the residuals are not serially correlated is accepted at 5% level of significance (see appendix C).

The Jarque-Bera normality test is used to see whether the regression errors are normally distributed. The null-hypotheis that the residuals are normal is rejected in this particular study. However, econometric theory states that the existence of non-normality does not affect and distort the estimator's BLUE and consistency property (Enders 1995). The non-normality of vector in our model dosen't affect the coefficients and t-values (see appendix D).

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

5.5 Long-run and Short-run Models

The Johansen trace statistics suggested two cointegrating vectors, however the objectives of this study is to examine the impact of financial development proxied by the financial development indicator PRIV on economic growth. Hence, we estimated the unrestricted co-integrating vector with ad-hoc normalization on LRGDP. The result in table (5.6) below are based on the estimation of the cointegrated VAR with one lag selected by the optimum lag length selection criteria.

Table 5.6 Estimates of β coefficients normalized to LRGDP

Variables	β	T-value
LRGDP	1	
LSAV	0.050190	1.46566
LLAB	-0.887210	-5.30124
LFA	-0.111736	-4.80306
PRIV	-0.012881	-3.33606
Constant	-0.704681	

The normalized cointegration equation can be written as :-

LRGDP= -0.0502LSAV + 0.8872LLAB + 0.1117LFA + 0.0129PRIV + 0.7

(0.034) (0.167) (0.023) (0.004)

The numbers in parenthesis under the estimated coefficients are the asymptotic standard errors. For the coefficients that are normalized to 1, standard errors will not be shown. From the above equation it can be observed that a 1% change in LSAV, LLAB and LFA, will result in -0.0502%, 0.8872%, 0.1117% increase in LRGDP respectively. A one unit change in PRIV will result in a 1.23% change in LRGDP. Private credit to GDP has a positive and significant relationship with real GDP in the long run. However, domestic saving has a negative and insignificant effect on real GDP in the long run. The other variables, labor force and foriegn aid have a positive and statistically significant relationship with real GDP in the long-run.

Vector Error Correction Models

After identifiying the existence of long-run relationship among the relevant variables, the vector error correction model is estimated. The VEC has cointegration relations built into the specification so that it restricts the lon-grun behavior of the endogenous variables to converge to their cointegrating relationships while allowing for short-run adjustment dynamics (Harris, 1995). The cointegration term is known as the error correction term since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments. The error correction terms lagged one period is shown in table (5.7).

Table 5.7 Error Correction Model with LRGDP as dependent variable

Variables	Coefficients	Standard Error	T-Statistics
DLRGDP(-1)	0.136518	0.36083	0.37834
DLSAV(-1)	0.039289	0.04008	0.98025
DLLAB(-1)	1.922980	1.58054	1.21666
DLFA(-1)	0.031308	0.02698	1.16035
DPRIV(-1)	0.000269	0.00691	0.03892
Constant	0.000285	0.05035	0.00566
DUM	-0.054204	0.03664	-1.47938
ECT(-1)	-0.089288	0.03776	-2.36439

In the short-run, all coefficients lagged one period including the dummy for regime change are statistically insignificant. Both the long and short-run models suggested that domestic saving has statitically insignificant effect on real GDP. This could be due to lack of continous saving behavior in Ethiopia over time. According to Abu, (2004), the insignificant level of domestic saving in the economy has necessitated increasing reliance on foriegn aid to finance investment requirements of the country. Despite the insignificant effect of saving in economic growth of Ethiopia (both in the short run and long run), financial development has a strong positive impact on economic growth in the long-run in Ethiopia. Accoding to Bencivenga and Smith (1991), economic growth can occur even if savings is reduced because financial development has a significant effect on the efficiency of investment.

The insignificant coefficient of PRIV in the short-run might be due to the time lag of the contribution of the private sector to economic growth showing the underdevelopment of the financial sector in the short-run. But from the long-run point of view, PRIV is highly significant indicating the importance of financial development for long-run economic growth. This finding is in line with the theory of Schumpeter which emphasized the role of financial development on the economic growth of a country. Foreign aid and labor force have a positive but statistically insignificant effect on RGDP in the short-run but in the long-run its impact is significant.

The error correction term is -0.089 which measures the adjustment of real GDP towards the long-run steady state path. When a shock occurs in the system each year, about 8.9% of it will be adjusted towards its long-run equilibrium. For full adjustment to take place it needs almost 11 years which shows a slow process.

5.6 Impulse Response

Impulse response function is used to trace the effect of a one standard deviation shock to one of the innovations on current and future values of the endogenous variables. We can identify the positive or negative impact of the variables and determine how long it would take for that effect to work. It is a method of assessing the interaction among the variables in the VAR. This study used the generalized impulse response function because it does not require orthogonalization of innovations and is invariant of the ordering of the variables in VAR.

Table 5.8 Impulse Response of LRGDP

Period	LRGDP	LSAV	LLAB	LFA	PRIV
1	0.073508	0.053642	-0.032431	0.011303	0.006659
2	0.136705	0.104342	-0.053537	0.034987	0.025470
3	0.183002	0.144989	-0.066370	0.051981	0.060824
4	0.230540	0.195959	-0.079078	0.047882	0.102377
5	0.287468	0.257999	-0.088077	0.030089	0.153270
6	0.352609	0.328368	-0.096482	0.007797	0.208014
7	0.419230	0.401478	-0.102159	-0.016308	0.268005
8	0.485317	0.476162	-0.105937	-0.043889	0.332492
9	0.552049	0.553600	-0.108251	-0.076473	0.400854
10	0.620733	0.634226	-0.109440	-0.113303	0.472423

Table (5.8) presents the results of the IRF. In response to one standard deviation shock of LRGDP, LRGDP itself increases by 0.074 in the first year and continues to grow in the long-run reaching 0.62 in 10th period. A one standard deviation distubance originating from PRIV produces a 0.0067 increase in GDP in the first year. Its effect continues to grow as the forecast horizon is extended and reaches 0.47 at the 10th year. PRIV (private credit as % of GDP) has a permanent impact on GDP. However its effect does not die out, rather it continues to grow and reaches 0.47 at the 10th year. In other words, financial development has a long- run impact on economic growth which is consistent with the above findings. The impact of saving is permanent while those of labor and foreign aid vanish in the long-run.

Table 5.9 Impulse Response of PRIV

Period	LRGDP	LSAV	LLAB	LFA	PRIV
1	0.182783	0.396686	0.723363	-0.243768	2.017775
2	2.061355	2.246354	0.007976	-1.276066	3.301188
3	4.551326	4.832755	-0.380211	-2.593305	4.948988
4	7.080950	7.301771	-0.609774	-3.671851	6.939021
5	9.479266	9.853344	-0.838254	-4.895906	8.995791
6	11.80650	12.44519	-0.893106	-6.410514	11.37526
7	14.28567	15.25841	-0.960911	-8.191099	13.84556
8	16.88991	18.22418	-0.963760	-10.11227	16.45690
9	19.55627	21.27243	-0.932191	-12.09854	19.16370
10	22.23422	24.37360	-0.860295	-14.15957	21.96195

Table (5.9) presents the accumulated response of PRIV. In response to one standard deviation shock of PRIV, PRIV itself increases by 2.02 in the first year and continues to grow in the long-run reaching 21.96 in 10th period. A one standard deviation disturbance originating from LRGDP produces a 0.18 increase in PRIV in the first year. However its effect continues to grow and reaches 22.23 at the 10th year. Hence, LRGDP has a significant impact on PRIV implying that economic growth has a long-run impact on financial development.

5.7 Variance Decomposition

While impulse response functions trace the effect of a shock to one endogenous variable on the other variables in the VAR, variance decomposition separetes the variation in an endogenous variable into the component shocks to the VAR. The relative importance of each random innovation in affecting the variables in the VAR can be seen by the variance decomposition results. It highlights the proportion of the movements in the dependent variables that are results of their own shocks, against shocks from the other variables.

Table 5.10 Variance Decomposition of LRGDP

Period	S.E.	LRGDP	LSAV	LLAB	LFA	PRIV
1	0.073508	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.099937	94.09100	0.449997	0.100799	3.897275	1.460934
3	0.115682	86.23782	1.088380	0.277882	4.616075	7.779839
4	0.131745	79.51116	4.105718	0.300167	3.635111	12.44785
5	0.153054	72.74724	6.878750	0.265973	3.730571	16.37747
6	0.176358	68.43469	8.766538	0.398449	3.994960	18.40536
7	0.199076	64.90618	10.11827	0.564281	4.103295	20.30798
8	0.220956	61.63362	11.28073	0.677464	4.321405	22.08679
9	0.242763	58.61456	12.34341	0.781038	4.728245	23.53274
10	0.264693	56.03743	13.22384	0.896450	5.222108	24.62017

We focus on the relative importance of endogenous variables in explaining the variation in GDP and PRIV, hence, we only decompose the forecast error variance on GDP and PRIV. In table (5.10) above, the variance estimates indicate that a greater proportion of the variation in GDP is due to its own innovations. The variation due to the other variables is smaller. The other four variables together explain approximately 25.78% of the future variation in GDP growth in Ethiopia. The remaining 74.22% are due to changes in GDP growth itself within the period under consideration.

Private credit as percent of GDP has the highest effect on GDP growth followed by savings, foriegn aid and labor having the lowest contribution. 14.6% of future changes in GDP are due to changes in PRIV, showing the importance of financial development to economic growth.

Table 5.11 Variance Decomposition of PRIV

Period	S.E.	LRGDP	LSAV	LLAB	LFA	PRIV
1	2.017775	0.820588	3.642489	0.000000	0.000000	95.53692
2	3.281292	33.08706	5.932072	0.789699	14.73578	45.45539
3	4.649606	45.15690	8.811420	1.231650	15.10253	29.69750
4	5.726715	49.27966	8.340602	1.292378	13.47250	27.61486
5	6.640259	49.69790	9.319530	1.244623	13.00093	26.73702
6	7.557570	47.84813	10.18486	1.223174	13.35324	27.39060
7	8.503113	46.29914	11.02846	1.258161	14.18423	27.23001
8	9.451610	45.06477	11.64381	1.377026	14.81559	27.09880
9	10.36448	44.09433	12.10352	1.491632	15.23936	27.07115
10	11.24083	43.16251	12.51698	1.587883	15.57815	27.15447

Table (5.11) on the other hand shows the variance decomposition result for PRIV. The variance estimate result shows that high variation in PRIV is due to GDP changes. Hence, economic growth is significantly important as it explains 40.45% of future changes in PRIV. The variation due to the other variables, when compared to GDP is smaller.

Chapter Six: Conclusion and Policy Implication

6.1 Conclusion

The financial sector of Ethiopia is characterized by the dominance of state ownership and slow development process. The financial sector is basically dominated by the banking system. Financial development indicators such as the ratio of private credit to GDP and broad money to GDP further indicate the underdevelopment of the financial sector. Moreover, a substantial gap between saving and investment, which the Ethiopian financial sector is unable to bridge, has led to foriegn borrowing to finance investments.

Accordingly, this paper examines the link between financial development and economic growth in Ethiopia over the 1980-2010 period. We used the VAR and VECM approach to determine the long-run and short-run relationship between financial development and economic growth. Furthermore, the granger causality test is employed to find the direction of causality. Using the financial development indicator PRIV, the empirical result shows a uni-directional causality from economic growth to financial development. This implies that past values of economic growth of Ethiopia are useful when we forecast the development of the financial system. This finding is consistent with Patrick's (1966) Demand-following hypothesis which postulates a causal relationship from economic growth to financial development. That is, as the economy grows, the demand for financial services might lead to the expansion of the financial sector.

Besides the granger causality test the paper also identified the long and short-run relationship between financial development and economic growth. As per the emperical analysis, the financial development indicator PRIV has a positive and significant relationship with economic growth in the long-run. However, in the short-run the link is weak. The increase in financial development in the long-run has a considerable effect causing an increase in economic growth. This can be explained by the significant growth in the financial sector of Ethiopia over the past year. The Impulse response and the variance decomposition results are also in line with the above findings that financial development has a long-run impact on economic growth.

6.2 Policy Implication

Based on the emperical analysis, it is observed that the financial sector has a long-run impact on the economic growth of Ethiopia. Since Ethiopia is dominated by the banking system, the financial sector has to deepen by strengthening the banking sector so as to maintain a sustainable economic growth. Banking development can be strengthed by having a strong regulatory system that stregthen the private sector as it is the engine of economic gorowth.

Credit to the private sector has to be given high emphasis inorder to boost investment therby reducing foreign borrowing. Financial constaraints that are imposed on the private sector should be relaxed and more focus sholud be on ways to promote private sector development.

Since financial development has an insignificant effect on economic growth of Ethiopia in the short-run, policy makers should focus on long-run policies such as improving the financial markets and introducing capital markets. In the long-run, this policies will have a significant effect on economic growth. In addition, strategies that enable a strong economic growth should be implemented as the growth of an economy would have repercussions on the development of the financial system.

Moreover, the use of the financial development indicator, that is, ratio of private credit to GDP, may not fully capture the concept of financial development. Hence, the study can be extended through the use of more diversified financial development indicators and expanding the data set.

References

Abu Girma (2004). On the Determinants of Domestic Saving in Ethiopia. Prepared for the 2nd International Conference on the Ethiopian Economy. Ethiopian Economics Association.

Abu-Bader,S. And Abu-Qarn, S. (2005). Financial Development and Economic Growth: Time-Series Evidence from Egypt. Discussion Paper No.05/14.

Acharya, D., Amanulla, S., and Joy,S. (2009). Financial Development and Economic Growth in Indian States: An Examination. *International Research Journal of Finance and Economics.*

Aghion, P. And Howitt, P. (n.d). Endogenous Growth Theory. The MIT Press. Cambridge, Massachsets London, England.

Alemayehu Geda, (2006). The Structure and Performance of Ethiopia's Financial Sector in the Pre- and Post-reform Period with a Special Focus on Banking. Resaerch paper No-2006/112.

Alemayehu Geda, Daniel Zerfu and Ndung'u. N, (2011). Applied Time-Series Econometrics: A Practical Guied for Macroecomomic Researchers with a Focus on Africa. Central Bank of Kenya, African Economic Research Consortium and Addis Ababa University.

Ali I.Abdi(prof). (2000). Towards a developed and an efficient financial sector in Ethiopia. Presentation paper at Ethiopian Economics Association seminar on financial sector reform in Ethiopia.

Apergis, N., Filippidis, I. and Economidou, C. (2007). Financial Deepening and Economic Growth Linkages : A Panel Data Analysis. *Review of World Economics*, Vol. 143, pp 179-198.

Arestis, P. and P. Demetriades (1997). Financial Development and Economic Growth: Assessing the Evidence. *Economic Journal*, 107: 783-799.

Arestis, P., A.D. Luintel and K.B. Luintel (2005). Financial Structure and Economic Growth. CEPP Working Paper No 06/05.

Beck.T, (2011). The Role of Finance in Economic Development: Benefits, Risks and Politics. European Banking Center Discussion Paper No. 2011-038.

Beck, T. and R. Levine (2002). Industry Growth and Capital Allocation: Does Having a Market- or Bank-Based System Matter? *Journal of Financial Economics*, 64: 147-180.

Beck, T., A. Demirgüç-Kunt, and V. Maksimovic (2005). Financial and Legal Constraints to Firm Growth: Does Size Matter? *Journal of Finance.*

Beck, T., R. Levine and N. Loayza (2000). Finance and the Sources of Growth. *Journal of Financial Economics*, 58: 261–300.

Beck,T. And A.Demirguc-Kunt, (2009). Financial Institutions and Markets Across Countries and Over Time-Data Analysis.

Beck,T., A.Demirguc-Kunt, and Levine,R. (2007). Finance, Inequality and the Poor. *World Bank Economic Review* 14: 597-605.

Bencivenga,V.R and Smith, B.D. (1991). Financial Intermediation and Endogenous Growth. *Review of Economic Studies,* 58: 195-209.

Benfratello, L., Schiantarelli, F., and Sembenelli, A. (2006). Banks and Innovation, Macroeconomic Evidence on Italian Firms. Discussion Paper No.2032.

Benhabib, J. and M. M. Spiegel (2000). The Role of Financial Development in Growth and Investment. *Journal of Economic Growth*, 5: 341-360.

Blackburn, K and V.T. Hung (1998). A Theory of Growth, Financial Development and Trade. *Economica*, 65: 107-124.

Bloch, H. and Tang.H.K., (2003). The Role of Financial Development in Economic Growth. Progress in Development Studies 3, pp. 243-251.

Buffie, E.F. (1984). Financial Repression, The New Structuralist and Stabilization Policy in Semi-Industrialized Economies. *Journal of Development Economics* 14: 305-322.

Calderon, C.and Liu, L. (2003). The Direction of Causality between Financial Development and Economic Growth. *Journal of Development Economics* 72: 321-334.

Christopoulos, D. K. and Tsionas E.G., (2004). Financial Development and Economic Growth: Evidence from Panel Unit Root and Co-integration Test. *Journal of Development Economics*, 73: 55-74.

Dailami,M (2000). Financial Openness, Democracy and Redistribution Policy. Policy Research working paper, 2372, World Bank.

Davidson, R., and Mackinnon, J.G. (1999). Foundations of Econometrics, Oxford University Press.

Demetriades, P. and K. Hussein (1996). Does Financial Development Cause Economic Growth? Time Series Evidence from 16 Countries. *Journal of Development Economics*, 51: 387-411.

Demirguc-Kunt, A. And Levine, R. (2008). Finance, Financial Sector Policies, and Long-run Growth. The World Bank Commission on Growth and Development, Working Paper 11.

Demirgüç-Kunt, A. and R. Levine (1996). Stock Market Development and Financial Intermediaries: Stylized Facts. *World Bank Economic Review*, 10: 291-322.

Demirgüç-Kunt, A. and V. Maksimovic (1998). Law, Finance, and Firm Growth. *Journal of Finance*, 53: 2107-2137.

Enders, W. (1995). *Applied Econometric Time Series*. Iowa State University, John Wiley and Sons, Inc.

Engle, R.F. and Granger C. W. J., (1987). Co-Integration and Error Correction: Representation, Estimation, and Testing. *Econometrica*, 55 (2): 251-276.

Fisman, R.J. and I. Love (2003). Financial Development and Growth in the Short and Long-run. National Bureau of Economic Research Paper No.9582.

FitzGerald, V. (2006). Financial Development and Economic Growth: A Critical View. Oxford University.

Greenwood, J and B. Jovanovic (1990). Financial Development, Growth and the Distribution of Income. *Journal of Political Economy*, 98: 1076-1107.

Guiso, L., P. Sapienza and L. Zingales (2002). Does Local Financial Development Matter? National Bureau of Economic Research Working Paper No. 8922.

Gujarati, D. (2004). *Basic Econometrics*. Fourth Edition. McGraw-Hill Companies.

Guryay, E., Safakli,V. And Tuzel, B. (2007). Financial Development and Economic Growth: Evidence from Northern Cyprus. *International Research Journal of Finance and* Economics. ISSN 1450-2887.

Haile Kibret Fantaye and Kassahun Aberra (2011). Linkage between Financial market Development and Economic Growth in Ethiopia. Paper Presented at the 9th International Conference of EEA/EEPRI.

Harris R. (1995). *Using Co-integration Analysis in Econometric Modeling*. London.

Huang, V. (2005). What Determines Financial Development. Discussion Paper No. 05/580. Department of Economics, University of Bristol.

Hurlin, C. and Venet, B. (2008). Financial Development and Growth: A Re-examination on using a Panel Granger Causality Test.

Jude, C. (2010). Financial Development and Growth: A Panel Smooth Regression Approach. *Journal of Economic Development*, Vol 35.

Jung, W. S. (1986). Financial Development and Economic Growth: International Evidence. *Economic Development and Cultural Change*, 34: 333-346.

Khan, S. and Senhadji, S. (2000). Financial Development and Economic Growth: An Overview. IMF Working Paper, No. 00/209.

King, R. and Levine, R. (1993). Finance, Entrepreneurship, and Growth: Theory & Evidence. *Journal of Monetary Economics*, 32: 513-542.

King, R. and Levine, R. (1993). Finance and Growth: Schumpeter Might Be Right. *Quarterly Journal of Economics*, 108: 717-738.

Kiyota, K., Peitsch, B., Stern, R., (2007). Research Seminar in International Economics: The Case of Financial Sector Liberalization in Ethiopia. University of Michigan, Ann Arbor, Michigan. Discussion Paper No. 565.

Levine, R. (1997). Financial Development and Economic Growth: Views and Agenda. *Journal of Economic Literature*, 35: 688-726.

Levine, R. and S. Zervos (1998). Stock Markets, Banks, and Economic Growth. *American Economic Review,* 88: 537-558.

Levine, R., (2000). Legal Theories of Financial Development. University of Minnesota.

Levine, R. (2004). Finance and Growth: Theory and Evidence. Handbook of Economic Growth.

Love, I. (2003). Financial Development and Financing Constraint: International Evidence from the Structural Investment Model. *Review of Financial Studies*, 16: 765-791.

Lucas, R.E. (1988). On the Mechanics of Economic Development. *Journal of Monetary Economics*, 22: 3-42.

Luintel, K.B. and Khan M., (1999). A quantitative reassessment of the finance growth nexus: evidence from a multivariate VAR. *Journal of Development Economics*, 60 (2): 381-405.

Mckinnon, R. I. (1973). *Money and Capital in Economic Development*. Washington DC: Brookings Institution.

Ministry of Economic Development and Cooperation (MEDaC), (1999). Survey of the Ethiopian Economy: Review of Post-reform Developments (1992/93-1997/98). Addis Ababa, Ethiopia.

Mukhopadhyay, B and Pradhan,R. (2010). An Investigation of the Finance-Growth Nexus: Study of Asian Developing Countries Using Multivariate VAR Model. *International Research Journal of Finance and Economics*, Issue 58

Mwanakatwe, P.and Barrow,L. (2010). Ethiopia's Economic Growth Performance: Current Situations and Challenges. *Economic Brief*, Vol 1, No 5.

National Bank of Ethiopia (1980-2010). Annual and Quarterly reports, various issues

Patrick, H. (1966). Financial Development and Economic Growth in Underdeveloped Countries. Economic Development Cultural Change, 14: 174-189.

Quah, D., (1993). Empirical cross section dynamics in economic growth. *European Economic Review* 37, 426–34.

Rahman, H. (2004). Financial Development-Economic Growth Nexus: A Case Study of Bangladesh. The Bangladesh Development Studies, Vol.30, No.3/4, pp 113-128.

Rajan, R. G. and L. Zingales (1998). Financial Dependence and Growth. *American Economic Review*, 88: 559-586.

Rioja, F. and N.Valev (2004). Finance and the Sources of Growth at Various Stages of Economic Development. *Economic Inquiry*, 42: 27-40.

Robinson, J. (1952). The Generalization of the General Theory. In: The Rate of Interest and other Essays. London, Macmillan.

Roubini, N. And X. Sala-i-Martin (1991). Financial Development, The Trade Regiem and Economic Growth. NBER Working Paper Series , No, 3876.

Roubini, N. And X. Sala-i-Martin (1992). Financial Repression and Economic Growth. *Journal of Development Economics*, 39: 5-30.

Rousseau, P. L. and R. Sylla (2000). Emerging Financial Markets and Early U.S Growth. National Bureau of Economic Research Working Paper No.7448.

Shaw, E. S. (1973). *Financial Deepening in Economic Development*. New York, Oxford University Press.

Stiglitz, J. E. (1994). The Role of the State in Financial Markets. Proceedings of the World Bank Annual Bank Conference on Development Economics 1993. Edited by Michael Bruno and Boris Pleskovic. Washington D.C: WB, 19-52.

Taylor, L. (1983). *Structural Macroeconomics*: Applicable Models for the Third World. New York, Basic Books.

Van Wijinbergen, S. (1983). Credit Policy, Inflation and Growth in a Financially Repressed Economy. *Journal of Development Economics* 13: 45-65.

Wondaferahu Mulugeta, (2010). The Structure and Development of Ethiopia's Financial Sector. Andhra University.

Wooldridge M.J.(2000). *Introductory Econometrics*: A Modern Approach", 2nd edition.

World Bank's Investment Climate Assessment Report, Determinants of Private Sector Growth in Ethiopia's Urban Industry: The Role of Investment Climate. The World Bank, Washington, D.C. January 2004.

Wurgler, J. (2000), "Financial Markets and the Allocation of Capital", Journal of *Financial Economics*, 58: 187-214.

List of Appendices

A. VAR Lag Exclusion Wald Tests

VAR Lag Exclusion Wald Tests

Date: 01/01/02 Time: 00:12

Sample: 1980 2010

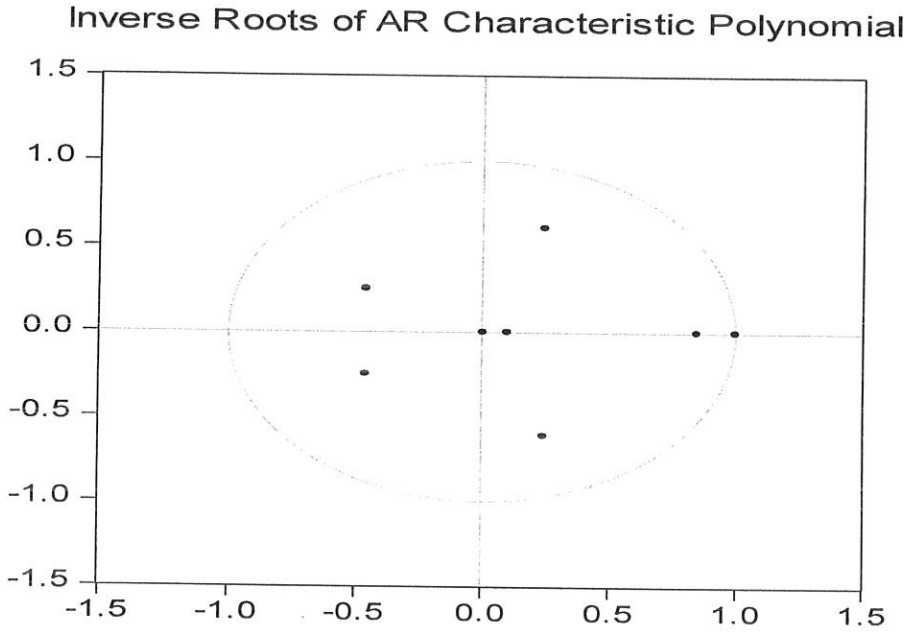
Included observations: 30

Chi-squared test statistics for lag exclusion:

Numbers in [ ] are p-values

	LRGDP	LSAV	LLAB	LFA	PRIV	Joint
Lag 1	592.1866	55.44034	6806.476	50.57971	367.1581	10318.94
	[0.000000]	[1.06e-10]	[0.000000]	[1.05e-09]	[0.000000]	[0.000000]
df	5	5	5	5	5	25

Appendix B: VAR Stability Test



Appendix C: VEC Residual Serial Correlation LM Tests

Null Hypothesis: No Serial Correlation at lag order h

Date: 04/20/12 Time: 13:12

Sample: 1980 2010

Included observations: 29

Lags	LM-Stat	Prob
1	29.64725	0.2378

Probs from chi-square with 25 df.

Appendix D: VEC Residual Normality Tests

Orthogonalization: Cholesky (Lutkepohl)
Null Hypothesis: residuals are multivariate normal
Date: 04/20/12 Time: 13:13
Sample: 1980 2010
Included observations: 29

Component	Skewness	Chi-sq	df	Prob.
1	-0.353597	0.604317	1	0.4369
2	0.359321	0.624040	1	0.4296
3	-2.303955	25.65633	1	0.0000
4	0.487685	1.149544	1	0.2836
5	0.880582	3.747886	1	0.0529
Joint		31.78212	5	0.0000

Component	Kurtosis	Chi-sq	df	Prob.
1	2.895397	0.013221	1	0.9085
2	2.097416	0.984377	1	0.3211
3	11.10376	79.35240	1	0.0000
4	3.452077	0.246951	1	0.6192
5	3.670395	0.543060	1	0.4612
Joint		81.14001	5	0.0000

Component	Jarque-Bera	df	Prob.
1	0.617539	2	0.7344
2	1.608417	2	0.4474
3	105.0087	2	0.0000
4	1.396496	2	0.4975
5	4.290946	2	0.1170
Joint	112.9221	10	0.0000

Appendix E: VEC Residual Heteroskedasticity Tests

Date: 04/20/12 Time: 13:14

Sample: 1980 2010

Included observations: 29

Joint test:

Chi-sq	df	Prob.
229.0359	225	0.4127

Appendix F: Pair-wise Granger Causality Tests

Date: 04/20/12 Time: 13:23

Sample: 1980 2010

Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
LSAV does not Granger Cause PRIV	30	8.61054	0.0067
PRIV does not Granger Cause LSAV		6.55109	0.0164
LRGDP does not Granger Cause PRIV	30	17.5677	0.0003
PRIV does not Granger Cause LRGDP		2.06774	0.1619
LLAB does not Granger Cause PRIV	30	4.13460	0.0520
PRIV does not Granger Cause LLAB		0.11286	0.7395
LFA does not Granger Cause PRIV	30	0.27838	0.6021
PRIV does not Granger Cause LFA		12.1023	0.0017

LRGDP does not Granger Cause LSAV	30	8.22686	0.0079
LSAV does not Granger Cause LRGDP		0.07522	0.7860
LLAB does not Granger Cause LSAV	30	14.0593	0.0009
LSAV does not Granger Cause LLAB		2.54420	0.1223
LFA does not Granger Cause LSAV	30	2.61195	0.1177
LSAV does not Granger Cause LFA		5.60047	0.0254
LLAB does not Granger Cause LRGDP	30	0.79242	0.3812
LRGDP does not Granger Cause LLAB		1.55766	0.2227
LFA does not Granger Cause LRGDP	30	0.39969	0.5326
LRGDP does not Granger Cause LFA		10.7550	0.0029
LFA does not Granger Cause LLAB	30	5.25528	0.0299
LLAB does not Granger Cause LFA		3.54291	0.0706

Declaration

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in any other university, and that all source of materials used for the thesis have been duly acknowledged.

The examiners' comments have been duly incorporated.

Declared by:

Name: Roman Tesfaye

Signature: _____

Date: 15/06/2012

Confirmed by Advisor:

Name: Girma Estiphanos (Dr.)

Signature: _____

Date: June 15/2012

Place and date of submission: Addis Ababa 02/07/2012