FINANCIAL DEVELOPMENT SECTOR AND ECONOMIC GROWTH IN ETHIOPIA

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(Submission sheet-1) Annex-1

This is to certify that the thesis entitled "Financial Development Sector and Economic Growth in Ethiopia" submitted in partial fulfillment of the requirements for the degree of Master's with specialization in Developmental Economics, Department of Economics, College of Business and Economics/School of Graduate Studies, and has been carried out by Abdo Hassen; ID. No BEGE/015/12, under my supervision. Therefore, I recommend that the student has fulfilled the requirements and hence hereby can submit the thesis to the department.

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DECLARATION

I hereby declare that this MSc thesis is the result of my own work and has not been presented for a degree in any other university, and all sources of materials used for this thesis have been properly acknowledged.

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Date of submission_____

This MSc Specialty has been submitted for examination with my approval as Thesis advisor.

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Wolkite University, Ethiopia

July, 2021

DEDICATION

This thesis is dedicated to my younger brother Tebark Nuredin, my lovely sons' Amar Abdo, Ayub Abdo and Hanisa Abdo and leaders who live for their peoples.

BIOGRAPHICAL SKETCH

The author was born in Guraghe Zone of Cheha Woreda Administration in 1986. He attended his Junior Cheha Jato Primary School and High School education at Wolkite Gorro/Aberus Senior Secondary High School. He then joined Jimma University, Faculty of Business and Economics, Department of Economics in October 2006 and graduated with BA in Economics in 2008. After his graduation, he worked in different sectors as Expert and leader in different positions from Cheha Woreda up to Guraghe Zone from 2009 up to 2020. Then, he joined to Wolkite University on October 2020 to learn MSc program in Developmental Economics as regular programme.

LIST OF ACRONYMS AND ABBREVIATIONS

ADF	:	Augmented Dickey –Fuller
AIC	:	Akaike Information Criteria
AR	:	Auto Regression
CIA	:	Cash-in-Advance
DF	:	Dickey-Fuller
ECM	:	Error Correction Mechanism
EEA	:	Ethiopia Economic Association
FDS	:	Financial Development Sector
FRDE	:	Federal Democratic Republic of Ethiopia
GCF	:	Gross Capital Formation
GDP	:	Gross Domestic Product
MOFED	:	Ministry of Finance and Economics Development
NBE	:	National Bank of Ethiopia
NGOs	:	Non-Governmental Organizations
OLS	:	Ordinal List Square
TLF	:	Total Labor Force
UN	:	United Nations
VAR	:	Vector Auto Regression
VECM	:	Vector Error Correction Model
WDI	:	World Development Indicator

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ABSTRACT

The finance growth nexus, though it is well-entrenched in the academic discourse and no consensus is reached, still begs for updating through revisiting the issue using recent data. With this motivation, this study has attempted to achieve the objective: examining the financial sector development and economic growth in Ethiopia and their causality based on the time series data set covering the period of 1974/75 to 2019/20 in Ethiopia, using Eview9 software. From a methodological perspective, unit root tests, Johansson's co integration test, vector error-correction model, impulse response analysis, variance decomposition analysis and granger causality tests were utilized. The finding of this study shows that financial development sector, gross capital formation /investment/, saving and government expenditure have a positive and statistically significant relationship with GDP in the long run. In the short run, the study confirms that one year lagged value of financial development and savings are positive and statistically significant affecting current growth of RGDP. The study also found that there is no causality running from either financial development sector to economic growth or from economic growth to financial development both in the long run and short run. The short run speed of adjustment coefficient of -0.247 indicates that 24.7 % of the short run adjustment made within a year. Finally, the study recommends the policy towards the path of a sustainable growth and the effects of financial sector on economic growth must be taken into consideration.

Key words: Economic Growth, Financial Development, Johanson Cointergration, VECM

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The time of Adam Smith, economists have been preoccupied with the notion of economic growth. Smith (1776) added financial systems lower transactions costs, facilitates trade and specialization fundamental inputs to technological innovation. The controversy between apologists of the neo-classical approach and endogenous growth models has certainly contributed to the revitalization of economic growth theory. Though critics may question the wisdom of prioritizing economic development as a policy objective or as the end question of economic analysis, there is a general consensus that economic development is able to serve as an effective means to achieve the prosperity of a nation, in order to raise living standards and the well-being of the people. (Yohannes Getachew, 2016).

During the past few decades, the world has provided a natural experiment with surprisingly variegating results: On one hand, countries which experienced spectacular economic growth, like Japan and Germany in the post-war period and the Asia Pacific countries during the past three decades have generally have exhibited the rise of the prosperity of nations and the improvement in living standards of their citizens. On the other hand, countries like SSA countries, like Ethiopia where economic growth was stagnant, have seen widespread poverty and insufficient economic and human development and paraded instability and civil wars which resulted in further deterioration of the living standards of their people. Why is such difference: Africa's growth tragedy on the bottom and the Asian miraculous growth on the top? What should be done to narrow such a big gap? How can one explain this fact? And the like questions provoked interest for economists and policy makers on the notion of economic growth, (Greenwood and Jovanovic, 1990).

Nowadays, for economists stepping in the middle where history, data and findings, and situations allow that have been observe but not to explain the growth phenomena of the tragedy and the miracle, the firsthand tools to solve the problem might be economic researches. The economic researches being a sub field of social researches are believed to help understand the complex nature of functioning of a system. Conducting such research beyond making a good contribution to the body of knowledge and evidence for decision

making and policy formulation, offers the researcher the pleasure of solving problems. The finance-growth interaction is one among many where the financial sector development has a significant impact on economic growth is the strongest elements of the modern economists' principle. Financial systems collect funds and pass them along to partners; the wealthy and the politically connected; which slow economic growth and blocks potential entrepreneurs from make an effort to realize their economic growth (World Bank, 2013).

The financial sector is crucial; it difficulties everyone: Financial markets and institutions not only affect your everyday life but also involve huge flows of funds—billions of dollars throughout our economy, which in turn affect business profits, the production of goods and services, and even the economic well-being of countries. Even the great concern to politicians today is highly attached to what happens to financial markets and institutions because it can have a major impact on elections. Financial development has a significant influence on economic development, poverty alleviation, and economic stability (Feyen, 2012).

Financial development markets in which funds are transferred from people who have an excess of available funds to people who have a shortage. Financial markets, such as bond and stock markets, are crucial to promoting greater economic efficiency by channeling funds from people who do not have a productive use for them to those who do. Indeed, well-functioning financial markets are a key factor in producing high economic growth, and poorly performing financial markets are one reason that many countries in the world remain desperately poor. Activities in financial markets also have direct effects on personal wealth, the behavior of businesses and consumers, and the cyclical performance of the economy (Mishkin, 1978).

Consequently research in the area of the growth-finance nexus has intensified and with the subsequent development of the finance-growth nexus decades, such as the historical studies by (Gerschenkron, 1962) and (Cameron, 1967), the first detailed empirical studies by (Goldsmith, 1969), the McKinnon-Shaw school of the financial liberalization thesis, the development of the theory of intermediation using micro-approach during the 1970s and 1980s, and new growth theory and the accompanying second generation financial models of the 1990s, economists are having a general belief over the positive and significant influence of finance on economic growth. But there are still controversies over

the relation between finance and economic growth which essentially originates from the contestation between the neo-classical approach and endogenous growth models.

The neo-classical point of view, economic growth is entirely driven by the accumulation of input factors and technical progress (but these sources are exogenous), with the potential role of finance restricted to assistance in the accumulation of capital. Endogenous growth approaches derived the sources of growth internally and stress the role of entrepreneurship and innovation, which allows some flexibility for finance to direct incentives to research, development and innovation. In supporting the above argument for the general belief, no economist joined to one or the other campsite would reservation that a developed financial system is beneficial to the economic growth. (Micheal, 2001)

First and last, a large and by now well established literature has shown the critical importance of the development of the financial system for economic growth. If from both the theoretical and historical point of view, the positive relationship between financial development and economic growth is beyond any doubt, some points however remain object of a debate; some still need to be analyzed in more depth. Drawing from these, one can raise an interesting topic in discovering the mechanism of governing the relationship between financial development and economic growth in Ethiopia. Is economic growth influenced by financial development? What are the main variables to explain financial development? These are the questions that this thesis attempts to answer. Two sub teams can be derived while answering these questions: one is the general relation between financial development and economic growth and the other is what other explanatory variables have significant effect on economic growth in these poor economies of Ethiopia.

Therefore, this study is believed to contribute in showing: a well-focused and deep analysis of the effect of financial development on economic growth and those variables do really have a significant relation with economic growth.

1.2 Statement of the problem

The general relationship between financial development and economic growth on one hand and the causality relation between finance and growth on the other hand is one of the most debatable topics in macroeconomics and development discourse which is also characterized by variegating findings. There are controversies over the relation between

finance and economic growth which essentially originates from the contestation between the neo-classical approach and endogenous growth models.

The neo-classical point of view, economic growth is entirely driven by the accumulation of input factors and technical progress (but these sources are exogenous), with the potential role of finance restricted to assistance in the accumulation of capital. Much of the post-1945 analysis of development has concentrated on real process and mainstream economic thought tend to refer financial development into secondary importance prior to 1960s. The historical studies by Gerschenkron (1962) and Cameron (1967), the first detailed empirical studies by Goldsmith (1969), the McKinnon-Shaw school of financial liberalization thesis and the breakthrough of the theory of intermediation using micro-approach during the 1970s and 1980s, and the development of new growth theory in the early 1990s, has provided economist with formal theoretical foundation on finance-growth nexus. The new growth theories-Endogenous growth approaches derived the sources of growth internally and stress the role of entrepreneurship and innovation, which allows some flexibility for finance to direct incentives to research and development and innovation (Heijdra,Frederick van der Ploeg, 2009).

The issues of the finance-growth nexus are popular as there, exists quite a large modern literature with highly variegating results on the general and causal relation between finance and growth. Still far from being conclusive, there exists quite a lion's share of literature to affirm a positive relation among these variables which makes this issue more popular. There is agreement on that no economist joined to one or the other camp would doubt that a developed financial system is beneficial to the economic growth (Micheal, 2001).

However, more often the discrepancy in findings arises how significant this interaction in Ethiopia. Most of the empirical studies conclude that the development of the financial sector accelerates the economic growth of a nation for considering that financial systems play a crucial role in improving market frictions and hence influencing savings rates, investment decisions, technological innovation and therefore long-run growth rates. (Levine R., 1997) (Levine R, 2005),(Wachtel, 2001).

Other authors also stand for this argument considering finance as an important element of growth (Schumpeter J.A, 1934) (Shaw, 1973) (Mckinnon, 1973) (Goldsmith, 1969), whilst

for others finance is only minor growth factor and the operation of the financial sector merely responds to economic development, adjusting to changing demands from the real sector and is therefore overemphasized (Lucas, 1988) (Robinson, 1952). Something that seems unique is the effect of finance on growth is a disappearing phenomenon (Peter. L. Rousseau and Paul Wachtel, 2011).

Above all, these studies, for the most part, focused on high-income and middle-income countries and there is a relative absence of SSA countries, specially, in Ethiopia, (without denying there exists few contributions), making it difficult to generalize their results across all developing countries. One empirical finding financial development on economic growth and brings out such long run relationship, the direction of the relationship differs across countries (Anthony Enisan Akinlo and Tajudeen Egbetundae, 2010).

Drawing from these findings and other factors in the last decades, many developing economies have adopted development strategies that prioritize the modernization of their financial systems. The countries of sub-Saharan Africa like Ethiopia were no exception. Since the end of the 1991s, our country has been interested in promotion financial development, for example, by reducing governmental intervention in national financial sectors or by privatizing banks. However, the recommendation of such policies requires strong analysis of the general and causal relationship between financial and real sectors of the economy. The organization of the empirical evidence advertises an important weakness in the finance and growth literature: there is frequently an insufficiently precise link between theory and measurement (Levine R., 2005). Therefore, organizing oneself around econometric approaches of examining the relationship between finance and growth the following gaps were identified.

Using secondary data set for the period 1974/75-2019/20 and by applying a system of Johansen Co integration estimator on VECM growth models, Mulualem (2007) obtained a negligible support to the view that finance leads to economic growth. He also found out that though financial development has positive influence on economic growth in Ethiopia, it has insignificant impact on total factor productivity (Mulualem, 2007). Though, the study's attempt to see the effect of financial development on economic growth in Ethiopia makes it substantial; it has its own limitations. First, the methodology adopted (secondary data analysis) fails to address country homogeneity that is in time series models it is

common to assume, which implies that financial development generates equivalent economic growth and productivity increase across countries, but in reality it may vary. Therefore, the analysis in this study didn't deeply show the effect of financial development on the economic growth. Another study attempted to analyze and verify empirically the controversy on the relationship between the financial scope and the real scope.

Appreciating the attempts of the researchers although the above identified gaps exist, it is possible to document to examine those variables significantly affect economic growth by investigating the relation between financial development and economic growth using VECM. First and last, a large and by now well established literature has shown the critical importance of the financial system for economic growth. Therefore, studying how financial development affects the economic growth and what have been the variables (those presumed to significantly affect economic growth) determine the development of the financial sector particular in Ethiopia. Most of the earlier studies measure the financial development using a variable that measures depth of the financial sector. However, depth does not necessarily represent the effectiveness of the financial development. Since it correlated with economic growth due to output increases the demand for financial service increases too, which in turn has a positive effect on financial development (Chris, and Tsionas,2001;Koivu,2002).

As a result, the long run relationship and the measurement become ambiguous and mixed results. Hence, this study is important because recent empirical studies that examine financial development and economic growth in Ethiopia remain scanty. Moreover, the measurement of financial development sector by domestic credit to private sector has not been used previous as a proxy for financial development sector depth in Ethiopia.

1.3 Research Questions

1. What are the patterns and trends of financial development sector in Ethiopia?
2. Does the financial development sector have a long run relationship on economic growth in Ethiopia?
3. Does the financial development sector have a short run relationship on economic growth in Ethiopia?
4. What is the direction of causality between financial development sector and economic growth in Ethiopia?

1.4 Objectives of the study

1.4.1 General objective of the study

The main objective of this study is to investigate the effects of financial sector development on economic growth and their causality in Ethiopia.

1.4.2 Specific objective of the study

1. To realize patterns and trends of financial sector development in Ethiopia.
2. To analyze the long run relationship between financial development sector and economic growth in Ethiopia.
3. To evaluate the short run relationship between financial development sector and economic growth in Ethiopia.
4. To identify the direction of causality between financial development sector and economic growth in Ethiopia.

1.5 Significance of the study

This research attempts to assess whether economic development has been actually influenced financial expanding or not in Ethiopia and makes some implications on whether a policy focus on financial sector development is appropriate or not. Beyond the above, role this study is believed to add to the stock of existing literature by using energetic data and econometric methods to assess the relation between financial development and economic growth and other variables like saving, gross capital formation, total labor force and government expenditure on economic growth.

1.6 The Scope and Limitation of the study

The scope of this study is confined in Ethiopia based on data availability and the period covers from 1974/75 – 2019/20. Among the basic issues a researcher should deal with while undertaking such big research (covering wide and a bit longer time) is availability of data. There were many limitations faced in achieving to this study, shortage of finance and studies done on the same area in Ethiopia. The problem related to the reliability of data on Ethiopian economy was unrelieved. Different institutions provide significantly different data report on the same variable. The major difference between data provide by government and non-government organizations. The reasons may be the use of different methods and assumptions in the preparations of macro variables. This research has been used only government source of data such as the Ministry of Finance, Plan and

Development Commission, Central statics Agency and National Bank of Ethiopia to minimize the variations as the row data mainly derive from these offices.

1.7 Organization of the study

The study is organized in the following manner. The first chapter presented background of the study, statement of the problem and research questions with objectives. Chapter two presents a brief review of the historical, theoretical and empirical literature on the relationship between financial development and economic growth. Under chapter three, discusses the detailed methodology including the data type and source as well as the variables with their corresponding working definitions. In chapter four, descriptive and econometric analysis on both financial development and economic growth of in Ethiopia have been given and then wind up with discussions the findings from econometric analysis. Chapter five offers concluding remarks together with policy suggestions and recommendations.

CHAPTER TWO

LITERATURE REVIEW

This section attempts to present the review of the majority of academic research works both theoretical and empirical works in short and precise way based on the focus of this study. The researcher believes that presenting the historical, theoretical and empirical reviews separately and sequentially makes the idea flow in better way so that strong arguments are built on and the reader better gets a very good insight of the issue. Therefore, the first part of the literature review has been kept to presenting the path of history that the finance-growth nexus have come through. The second part have been a role of making known what the theory says; stating the notions of financial development and economic growth together with the available means of measurement; explaining the interaction between these variables; determinants of financial development and the like relevant topics. The third part is held to reviewing empirical evidences over the point of discussion in this study. The empirical literature review part initially focuses on recapitulating the building masses from early pioneers in the area and finally concentrates on the recent works.

2.1 Historical Review of Literature

It could be said that it's best to start from history. No one would step here without passing through history, everyone walks through, attempts to work, to solve problems, attract to live better life, still one generation makes mistake and the latter learn from the former, therefore, here as a matter of history. In the following subsequent paragraphs a summary of reviewing the literature related to financial development and economic growth from a sequential point of view is presented.

The early intellectual development of the finance-growth nexus can be traced back to the 17th and 18th century, where earlier writers, such as John Locke, Adam Smith and Jeremy Bentham, had advocated the liberal attitude to finance that sound money and unrestricted financial intermediation are beneficial to society. In the late 19^{th} century important contributions to the literature which has stressed the importance of the banking system, and highlighted scenarios where banks could foster innovations and future growth by identifying and financing productive investment (Bagehot, 1873).

In the early 20th century the essential and integral part of financial development on the process of economic development was explicitly emphasized as financial institutions are key agents in this process, as they evaluate and finance entrepreneurs in their initiation of innovation activity and the bringing of new products to market, which is the central process of economic growth (Fry, 1995) (King &Levine, 1993a) (Schumpeter, 1911).

The standard view before the 1960's was highly dominated by Keynesian arguments that put emphasis on real processes and favored the policy of 'state intervention' and 'financial repression' for economic development. Financial repression can be justified as a second-best strategy to finance government expenditure given the government low tax raising-power as well as the idea that the financial sector can be easily controlled and taxed. Besides, a suggestion by both Keynes liquidity trap theory, the Tobin portfolio model stating that credit shortage as a result of relative high equilibrium interest rate will lead to a loss of growth potential. This argument was also supported by the structuralisms in view of that higher interest rate will increase short-run inflation through a cost-push effect, and dampen economic growth because of reduced supply of real credit volume (Chow, 2008).

Implicitly, financial development only remains of secondary importance and the essential element in economic development. A new strand of economists emerged from this background arguing that financial development was a neglected but it is integral and essential element in economic development (Goldsmith, 1969) (Shaw, 1973) (Mckinnon, 1973).

In the 1960's some detailed case studies of the interactions of finance and economic growth in successful industrialized nations as well as less developed countries, several works were published to provide empirical evidence for the importance role of finance sector in the process of economic development which were Based on the earlier economic thought developed by Schumpeter and others. The period-1960s- where there was a breakthrough in the finance-growth nexus as the period saw a surge of interest and growing academic debate in the area (Eschenbach, 2004). Among the prominent works the analysis of economic backwardness by Gerschenkron in 1962 can be mentioned.

The theory of intermediation pioneered by Gurley and Shaw to Tobin stressed the significance of the financial system and the importance of financial intermediation in the credit supply process. The first contribution in analyzing alternative transmission

mechanisms of the financial system i.e. the idea of how bank crises can affect the real economy is by Mishkin in 1978. The severity of the Great Depression and the contraction of aggregate demand were due to the weakness of borrower's balance-sheet (Mishkin, 1978). During 1980 it was stressed that the failure of a financial institution has a great knock-on effect and macroeconomic consequences (Chow, 2008). Friedman and Schwartz put down bank failure as a major cause of the great depression.

In summary the 1980s was characterized by a series of work synthesizing the literature in explaining the role of the financial sector in output fluctuations. Yet macroeconomics researched in 1970s and 1980s focuses on the understanding of the causes of short-term aggregate fluctuations. With the development of endogenous growth literature in the mid-1980s economists shift their focus to the long run relationship between financial development and economic growth (Chow, 2008).

The central focus of the financial development in the endogenous growth literature of the 1990s was that finance generates an external effect on aggregate investment efficiency that counteracts the effect of the diminishing marginal product of capital accumulation. The first major work contributed to the body of literature over the finance growth nexus in the aurora of 1990s is from Greenwood and Jovanovic (1990) by analyzing the long-run relationship between financial development and economic growth. The two individuals attempted to formalize the bi-directional relationship between finance and growth drawing from the Goldsmith-McKinnon-Shaw view on economic development and Kuznet's (1955) hypothesis on the depicted by inverted U-shaped curve for the relationship between economic growth and income distribution. In the advanced stage of development, an economy has a fully developed financial structure, attains a stable distribution of income across people, and has a higher growth rate than the state of the financial autarky in the early stage (Greenwood, Jovanovic, 1990); (Kuznet, 1955).

King and Levine (1993) introduced the notion of imperfect credit market and agency cost in the finance literature into the Schumpeterian model originated by Aghion and Howitt (1992) and Grossman and Helpman (1991) in the endogenous growth literature to explore the relationship between growth and finance. By the considering the simplest AK models from the endogenous growth literature Pagano (1993) introduced the presence of financial intermediation cost (costly financial development).

The overall growth of literature in the 'finance-growth nexus in the long run' and the renewed interest to examine the issue of financial repression or government interventions in the presence of market failure in financial sector in the context of the new framework, to look at its impact on long term economic growth is imputable to development of endogenous growth theory. This has enabled the economists to introduce finance to the growth theories through the channel of money balances to study the long run relationship between financial development and economic growth. Another area of study during that period is stock market development; incorporation of the stock market development into the endogenous growth framework and the prominent works among many (Levine 1991), (Atje and Joyanovic 1993).

Recently the literature in the finance-growth nexus has been engrossed with multiple growth path, bi-directional causal relationship and legal view of finance. The economists further formalize theoretical models to understand this intertwining process.

2.2 Theoretical Literature Review

This part seeks to attraction together a diverse and active theoretical literature into a coherent view of the interaction between financial development, economic growth and other variables. The first part focuses on enhancing up the concepts of financial development, economic growth and financial possibility frontier, together with measurement of financial development; the second part go over theories about how financial development promote growth; the third part focuses on: what the literature says on the determinants of financial development; finally some concluding observations are forwarded.

2.2.1 Economic thought on: Financial development and Economic growth

The study of the interaction between financial sector and economic growth will reward both researchers and readers with an understanding of many exciting issue. I believe the attempt to present the economic thought on two broad concepts- financial development and Economic growth- have been serve a comprehensive horizon to understand the issue; initially, if some definitions are given for explanation; then some clarification are made on measurements issues and finally explicating the functions that financial sector provide which potentially can better market frictions and foster economic growth.

According to the department of international development (2004) financial sector is defined as "the wholesale, retail, formal and informal institutions in an economy offering financial services to consumers, businesses and other financial institutions; it includes everything from banks, stock exchanges, and insurers, to credit unions, microfinance institutions and money lenders". Once, it can have the definition for financial sector more broadly put, can now refer to what financial sector development from several scholars. Different researchers have explained the concept of financial development:

According to Shaw (1973), financial development is the accumulation of financial assets at a more rapid rate than the accumulation of non-financial assets. For Levine (2005), financial development occurs when financial instruments financiers, markets and financial intermediaries reduce, without necessarily eliminating them, the costs of obtaining information, the costs of executing contracts and the costs of transaction, and as a consequence, do a better job by offering financial functions. Somehow generically, financial development may well be defined as the improvement in quantity, quality and efficiency of financial intermediary services.

According to Khan and Senhadji (2000), the fundamental frictions that give rise to financial intermediaries are either of technological or an incentive nature. Economic growth is the evolution of Gross Domestic Product (GDP) in the short, medium and long term. It is the result of an increase in value-added produced by all the firms operating within a country. GDP is an aggregated value which takes account of all the value-added of all the firms operating on the national territory in a given time. The increase in the value-added during a given period means that the global wealth of a nation is rising.

Economic growth and development are dynamic processes, focusing on how and why output, capital, consumption and population change over time. This manifests itself in the growth of per capita income and in a higher level of wellbeing. Put differently, economic growth is able to serve as an effective means to achieve the prosperity of a nation, in order to raise living standards and the well-being of the people.(Getachew Yohannes, 2016)

2.2.2 Proxy measures of financial development and economic growth

One may find an important weakness, common to most of the literatures in finance-growth nexus: there is frequently an insufficiently precise link between theory and measurement. Various authors have come up with several proxy measures of financial development with

their respective argument claiming as a best tool. As most of the data at macro-level are costly and difficult to manage and consequently are prepared by big international organizations like the World Bank and International Monetary Fund, most of the literatures cite these data sources. Financial development is defined as a combination of depth (size and liquidity of markets), access (ability of individuals and companies to access financial services), and efficiency (ability of institutions to provide financial services at low cost and with sustainable revenues, and the level of activity of capital markets).(Yohannes Getachew, 2016).

Ndikumana (2001) roughly classified the indicators of financial development used in empirical studies in to three broad categories as: monetary aggregates, stock market indicators, and structural and institutional indicators. Initially the indicators were based on monetary aggregates, such as M1 or M3 mainly because these aggregates are widely available. Researchers also shifted to broader definitions (M3), which is referred to as liquid liabilities of the banking system.

In addition the availability of foreign funds in the financial system also renders this an inadequate measure of financial development as pointed out by king and Mckinnon (2005). An alternative and commonly used measure of financial development is bank credit to private sector which is often argued to be a more superior measure of financial development. Since the private sector is able to utilize funds in a more efficient and productive manner as compared to the public sector, the exclusion of credit to public sector better reflects the extent of efficient option allocation.

Developed by King and Levine (1993a), another variable used as a measure is the ratio of commercial bank assets divided by commercial bank plus central bank assets which measures the relative importance of a specific type of financial institution that is the commercial banks in financial system. The basic idea underlying this measure is that commercial banks are more likely to identify profitable investment opportunities and therefore make more efficient use of funds than central bank.

Structure and institutional indicators provide information that enables to directly or indirectly assess the efficiency and sophistication of the financial systems. These indicators include: Indicators of financial structure (bank-based or market-based financial systems), indicators of banking regulation, banking ownership structure, and banking concentration,

which provide information on the degree of concentration in the banking sector (Demirguc-Kunt and Levine, 1999).

In addition to discussing measurement of financial development others have analyzed the fundamental determinants of cross-country differences in financial development. For instance the findings of Huang (2005) suggest that the level of financial development in a country is determined by its institutional quality, macroeconomic policies, geographic characteristics, the level of income and culture characteristics whereas Stiglitz (1994) and Demirguc-Kunt and Levine (2008) emphasize the role of state in shaping the operation of financial systems specially in developing countries.

2.2.3 Financial Sector Development and Economic Growth

As the literature in the area suggests Finance and growth may interact in three different alternatives yes-view, having in mind that still there exists small body of literature contending there is no interaction no-view (Lucas, 1988). Adhering our discussion with the "yes-view", the three alternatives of interaction are: finance affects growth ("supply-lead"), growth affects finance ("demand-following") views as to Patrick (1996) and the two way or bidirectional interaction.

A. Finance Promotes Growth

The first view, where finance promotes growth, supported by different authors like McKinnonShaw (1973), Shaw (1973) from the McKinnon-Shaw school of thought, Bencivenga and Smith (1991), Greenwood and Jovanovich (1990), King and Levine (1993a, 1993b) and Pagano (1993) from the endogenous growth model proponents. The argument from the former group is that banks act as an engine of economic growth. They argue in their financial repression model where, economic growth can be increased by eliminating institutional interest rate upper limit, by abandoning selective credit programs, by eliminating the reserve requirement tax, and by ensuring that the financial system operates competitively under conditions of free entry. According to Demirguc-Kunt and Levine (2008), the overall function of a financial system is to reduce information and transactions costs delaying economic activity.

B. Financial Development brings Economic Growth

The second view, where growth causes financial development, passed around by authors like (Demetriades and Hussein, 1996) (Robinson, 1952), Kuznets (1955) and Stem (1989)

few among many. The possible directions of causality between financial development and growth are labeled by Patrick (1966) as the supply- leading and demand-following hypothesis. The explanation initiated by Robinson (1952) argues that finance does not exert a casual impact on growth. Instead, financial development follows economic growth as a result of higher demand for financial services- demand-following hypothesis.

According to different authors, the interaction theory on how growth can affect finance argues, as the real-side of the economy expands, there will intensified demand for more financial services, leading to the growth of financial services and thus, further led to economic growth. In the opinion of Robinson (1952), it seems to be the case that where enterprises lead finance follows. Kuznets (1955) equally states that financial markets begin to grow as the economy approaches the intermediate stage of growth process and develop once the economy becomes matured. The argument is that high economic growth generates demand for some categories of financial instruments and arrangement and that financial market effectively respond to these demands and change.

C. Two-Way Causality

The third view comprising the combination of demand leading and supply hypothesis, which postulates the two variables, is mutually causal- where the bidirectional-two way relationship dominates, diffused by authors like (Greenwood and Smith, 1997). This bi-directional relationship between financial development and economic growth implies that financial markets develop as a consequence of economic growth that in turn feedback as a stimulant to real growth.

Generally, once follow to the view proposing for a significant relationship to exist and the substantial body of literature supports the positive effect of financial development on economic growth, it is quite meriting to study what affects the financial development and work in that direction to bring about economic growth.

2.2.4 Determinants of Financial Development

Much research regards institutions as the fundamental factor in long-run growth, and some even argue that the only effect of geography on development is via institutions (Acemoglu et. al.). Before proceeding to accept the literatures' conclusion on the main determinants of overall financial development, shall start by reviewing some tests of the hypothesis of whether any of three determinants (institutions, policy and geography), considered as a

whole, dominates the other two. Huang (2010) has demonstrated that geography, institutions and policy as a group are all important in the process of financial development, although their effects may be picked up by varied predictors when conditioning on other factors is in place. These results clearly suggest that it would be more appropriate to include all of them in the analysis.

Therefore the usual claim that policy and geography works through institutions doesn't hold (Huang, 2010). Coming back to the fundamental determinants of financial development, the body of existing literature suggests that institutional factors, macroeconomic factors, geographic factors and others are potentially capable of determining the level of financial development.

A. Institutions:

Research on the role of institutions in financial development has been considerable, especially research on the effects of the legal and regulatory environment on the functioning of financial markets. A legal and regulatory system involving protection of property rights, contract enforcement and good accounting practices has been identified as essential for financial development. Most prominently, (La Porta et.al., 1997, 1998), (Beck et.al, 2003), are few among many. Some authors argue that the origins of the legal code substantially influence the treatment of creditors and shareholders, and the efficiency of contract enforcement, consequently the development of the financial sector (La Porta et.al., 1998).

While some other authors argue that colonizers, often named as extractive colonizers, in an inhospitable environment aimed to establish institutions which privileged small elite groups rather than private investors, while colonizers, often named as settler colonizers, in more favorable environments were more likely to create institutions which supported private property rights and balanced the power of the state, therefore favoring financial development (Beck et.al, 2003). Both the legal origin theory and application are related to colonization, but the former is more concerned with how colonization determines the national approaches to property rights and financial development, whereas the latter is more about the channel via which colonization influences financial development. Generally speaking, institutions might have a profound impact on the supply side of

financial development. The level of institutional development in a country to some extent determines the sophistication of the financial system.

B. Policies:

This view highlights the importance of some macroeconomic policies and financial liberalization in promoting financial development. The significant effect of policy on financial development could be working through either its demand side or its supply side. Some major national macroeconomic policies such as maintaining lower inflation and higher investment have been documented as being conducive to financial development. The prominent works of (Mckinnon, 1973), (Shaw, 1973) have shown that while financial repression reduces the quantity and quality of aggregate investment, financial liberalization can foster economic growth by increasing investment and its productivity.

Both theoretical and empirical investigations on the effects of inflation on financial development conclude that economies with higher inflation rates are likely to have smaller, less active and less efficient banks and equity markets. Some recent work has supported the view that policies which encourage financial development tend to boost economic development. Overall, the effect of policy on economic development is quite certain but the direction is dependent on the policy centering (Huang, 2010).

2.2.5 Overview of Financial System in Ethiopia

Notwithstanding the positive improvements in financial developments, Ethiopia growth had not yet proven to be sustainable and fully inclusive, even before the crisis. Similar to the rest of the world, Ethiopia financial systems have been undergoing adjustments and stabilizing from the negative shocks of the global crisis over the last three years. In this subsection, it can be presented the overview of Ethiopia financial system, focusing on the banking system, insurance companies, micro-finance institutions, stock markets and other financial markets (bond markets). This part also gives some highlights on informal finance system through presenting the size of the formal financial system in Ethiopia.

A. The Banking System:

The banking system in Africa, just the same for sub Saharan Africa, consists of the Central Banks, commercial banks-deposit taking institutions. The Central Banks are technically independent of government control, but in practice they work closely with the Ministries of Finance of their States or the office of treasury and help formulate and implement

macroeconomic policies of the various governments. The commercial banks or deposit taking institutions are made up of local banks and branches or subsidiaries of foreign banks. Facts from data, foreign banks have played an important role in banking development in Africa; their share of total African banking has increased significantly. The increase can be attributed to the financial sector reforms that these countries have embarked upon, which in turn have led to the opening up of the markets in Africa and the attendant entry of foreign banks. However, there are still countries which are fully closed for foreign banks, Ethiopia-big country both in population and size is a good example here. The banking sector in most of the countries is either dominated by state-owned banks or by a few large, sometimes foreign, banks; Ethiopia is still one with highly dominated by state-owned bank-the commercial bank of Ethiopia. (Alemayehu Geda, 2011).

The low level financial development in terms of private credit provision that observed earlier is attributable to this phenomenon. Credit to the private sector provided by the banking sector as a percentage of GDP has been declining over the years. This phenomenon does not promise well for the African countries. This dysfunctionality in financial intermediation is being increasingly recognized in African policy circles, and various efforts are under way to provide an environment for banks to serve as informed agents and build information capital that is vital for the efficient allocation of resources. (Yohannes Getachew, 2016).

B. Insurance companies:

The insurance industry in Africa as a whole and in sub Saharan region in particular is still in its beginning and is relatively underdeveloped compared to other emerging economies and developed countries. The insurance companies in this region offer property, auto, health, life, casualty, and other types of insurance; however in most countries the auto insurance sector holds the largest portion of the market share. The insurance market in some countries is dominated by nonlife insurance which represents about 85% of the industry premium. Life insurance is not a significant portion of the market, although the sector has been the fastest growing sector in the insurance industry. The insurance sector in Ethiopia varies from a monopoly to a very competitive market. Nigeria has a large insurance market with 48 insurance companies operating in the country as of 2008. Although the insurance companies in this area are mostly privatized, the governments in

some of these countries still hold significant stakes in the firms. (Yohannes Getachew, 2016).

C. Stock markets:

A particularly important outgrowth of the extensive financial sector reforms in Africa, including policy measures for the development of capital markets, has been a flow of interest in the establishment of stock exchanges, particularly in Sub-Sahara Africa. Stock exchanges have multiplied over the last two decades. There has also been a market capitalization boom in Africa, with the exception of the two oldest markets in South Africa and Egypt which came into existence in 1880s. What is also interesting is that SSA witnessed an establishment of a regional stock exchange domiciled in Abidjan, which currently serves the Francophone countries of West Africa. There are, in fact, similar initiatives underway in Southern and Eastern Africa to consolidate the thinly capitalized markets into regional markets. To mention, Ethiopia is almost ready to launch secondary stock markets, though not yet started functioning.

D. Microfinance institutions:

Microfinance has a long history in Africa, initially organized in an informal setting. Informal microfinance systems predated the formal microfinance sector. The industry has experienced high growth in recent years and is becoming an important driver in the development of the economies in Africa and continues to play a key role as a grassroots financial tool. Access to credit by small business is a big problem in Africa, and for this reason the governments have facilitated the establishment of microfinance institutions (MFIs). The providers of these services range from government enterprises to large commercial banks to non-government organizations. These microfinance institutions can help build the foundation of the economy and help increase the GDP of the countries in this region. In Ethiopia, these institutions have been successful in providing financial services to the people who may normally not qualify for loans from the banks and other financial institutions. This is why the MFIs have been popular in our country as many people do have valuable assets to back their loans, and do not require large loans or have saving accounts which the banks go after.

2.3 Empirical Literature Review

The empirical body of literature over the finance-growth nexus is accredited for its well-entrenched in the academic world of business and economics. Most of these findings aimed at clarifying the theoretical contestations in the discourse have attempted to achieve their goal using different techniques, though they couldn't to do so. One thing abnormal here is that, the results vary extremely those advocating no or negligible interaction to those saying finance and growth are highly synergistic. An even more interesting point is the variegation bears on among the synergistic advocators over the direction of causality. In essence, such variegations are common in academic research; particularly in economics where one is exposed to several econometric and other analytical techniques to achieve its point of interest and let on the findings. Thus, these sections have been organized around econometric approaches to examine the relationship between finance, growth and other variables together with their findings.

2.3.1 Evidences on financial sector development and economic growth

In a comprehensive review of the empirical literature, Demirguç-Kunt and Levine (2008) point out that the literature contains four different types of studies: (i) pure cross-country growth regressions, (ii) time-series dimensions of the data, (iii) panel techniques that make use of both the cross-country and time-series dimensions of the data, and (iv) microeconomic studies that explore the various channels through which finance may affect economic growth. Thus, in the next section empirical evidences under the second econometric methodologies and the other not from this list will be discussed.

2.3.1.1 Time-series evidences

To improve a number of statistical problems with pure cross-country investigations, a number of pure time-series econometric applications which frequently use Granger-type causality testes, Johansson co-integration and vector error correction model (VECM) procedures to examine the nature of the finance growth relationship have been undertaken.

There are numerous empirical studies on the relationship between financial development and economic growth (Patrick1974, Greenwood and Jovanovic 1990, Levine 1997, Thiel 2001, Christopoulos and Tsionas, 2003), among others. Khan and Senhadji (2000) and Hailay Tsigab (2013) in their work covers the period between 1960-1999 for 159 countries comprising industrial and developing countries measured financial development by

domestic credit to the private sector as a share of GDP. The study confirms strong statistically significant positive relationship between financial depth and economic growth in the time series-section analysis.

Christopoulos and Tsionas (2003) used panel data to examine the relationship between financial development and growth in ten developing countries. The time series evidence showed that there exists a unique co integrating vector between economic growth and financial development. Rahman (2004) also investigates the finance-growth nexus in Bangladesh during 1976-2005 based on a long-run structural vector auto regressions (SVARs) mode. The result indicates that financial development has a long-run positive impact both on investment-GDP ratio and income per capita. Khan *et al* (2005), examine the relationship between financial development and economic growth in Pakistan for the period 1971 -2004, using Autoregressive Distributed Lag (ARDL) approach. The result acknowledged that financial depth accelerated economic growth through the channel of increased investment but the coefficient on investment is insignificant. To sum up, the empirical evidence indicates a strong and statistically significant relationship between financial development and economic growth. (Hailay Tsigab 2013).

As explained in Mulualem (2007) these method, as the sample size used is small, has helped researchers to examine individual countries in depth, employ a more powerful econometric technique and test a variety of financial development measures. Whereas the problem of generalizing time-series evidences to other countries were found to be the major limitation of this method. In general the evidences from series analysis were mixed owing to shorter time span of the data, measures of financial development used and difference in model specification. Jung (1986) was among the first to test for causality by applying a Granger-causality procedure. He used annual data for 56 developed and developing countries. However, his results were inconclusive because they varied according to the financial development indicator used. Jung's test was conducted in a levels vector auto regression (VAR) framework without testing for stationary of the data. However, as data are very likely to be non-stationary, Jung's findings are debatable (Granger and Newbold, 1974).

In a frequently-cited paper, Demetriades and Hussein (1996) have presented a time-series evidence for 16 countries excluding highly developed countries based on a criteria and

used two measures of financial development (the ratio of money to GDP and the ratio of bank claims on the private sector to GDP). Their result provides little support to the view that finance is a leading sector in the process of economic development. However, they find a considerable evidence of bi-directionality and some evidence of reverse causation where their findings also clearly demonstrate that causality patterns vary across countries.

Arestis et al. (2001) enhanced time-series studies of finance and growth by incorporating measures of both stock market and bank development using quarterly data to five developed economies. They find support for the view that finance stimulates growth but raise some cautions on the size of the relationship and they show that while both banking sector and stock market development explain subsequent growth, the effect of banking sector development is substantially larger than that of stock market development.

The ARDL model was also applied in the study of Muyambari (2017), who examined the association between financial sector development and investment in Botswana, South Africa and Mauritius from 1976 to 2014. The study grouped financial sector development into bank-based and market-based financial sector development. Country-specific results indicated that Botswana's bank-based financial sector development's impact on investment was positive in the short and long run. However, there was no impact of market-based financial sector development on investment. The investment impact of bank-based financial sector development in South Africa in the short term was identified to be negative but observed to have no impact in the long term. Mauritius' market-based financial sector development was the only type of financial sector development established to have a substantial beneficial effect on investment, and this was apparent for just the short term.

Adopting the same ARDL model in addition to a trivariate Granger-causality technique on causal link between both bank-based and market-based financial sector development and investment from 1976 to 2014 revealed that in both models bank based and market-based financial sector development Granger cause investment in the short and long run (Muyambiri & Odhiambo, 2018). In order to provide further evidence on the causality issue, there has also been a movement away from applying time-series methods to a variety of countries towards examining individual countries, which allows research to design country-specific measures of financial development and expand the time-series dimension of the analyses in many cases.

For instance, Kar and Pentecost (2001) examined the causal relationship between financial development and economic growth in Turkey for the period from 1963 to 1995. After developing five alternative proxies for financial development, they showed that the direction of causality is sensitive to the choice of proxy used for financial development. On balance, however, for Turkey, growth seems to lead financial sector development.

The empirical evidence from a study by Asare (2013) utilizing a three-stage least squares estimation technique for analyzing the impact of financial liberalization on private investment in Ghana from 1980 to 2007 suggested that the response of private investment to financial liberalization is only marginal. In another similar study in Ghana, the autoregressive and distributed lag (ARDL) model was employed to examine the impact of financial sector development on private investment during 1970–2014. The findings showed that financial sector development has not been an important driver of private investment in the long run. However, in the short run, the effect of financial sector development on private investment is a function of the measure of financial sector development (Boachie & Immurana, 2016).

Choong et al. (2004) carried out a time series study in the context of Malaysia, for the period from 1978 to 2000 and suggested that stock market development has a significant positive long-run impact on economic growth. In contrast to Choong et al. (2004), Ang and Mckibbib (2005) using time series data from 1960 to 2001 for Malaysia and conducting a co-integration and various causality testes concluded that output growth causes financial depth in the long run. Shan and Jianhong (2006) examined the impact of financial development on economic growth in china and supported the view that financial development and economic growth exhibit a two-way causality. Whereas, Guryaya et al. (2007) examined the relationship for Northern Cyprus for the period from 1986 to 2004 using OLS method and two proxies for financial development and presented evidence of causality from economic growth to the development of financial intermediaries.

Wood (1993) examined the causal relationship between financial development and economic growth in Barbados during the 1946 -1990 period. Using Hsiao's (1979) test procedure, the study found a bidirectional causal relationship between financial development and economic growth. The results of the study showed that when bank deposits are used as a proxy for bank development, a demand-following response

predominates. Despite the overwhelming arguments in favour of supply-leading and demand-following hypotheses, a number of studies have found that the third view holds – that financial development and economic growth can Granger-cause one another (Wood, 1993; Akinboade, 1998; Calderon and Liu, 2003; Chuah and Thai, 2004; Odhiambo, 2005; Shan and Jianhong, 2006; Ang, 2008; Acaravci *et al.*, 2009; Odhiambo, 2011).

Calderon and Liu (2003), while using the Geweke decomposition test on pooled data for 109 countries from 1960 to 1994, found evidence of bidirectional Granger-causality when the sample was split into developing and industrial counties. Likewise, Chuah and Thai (2004), while investigating the causal relationship between financial development and economic growth in six Gulf Cooperation Councils using error-correction model (ECM) and vector autoregressive (VAR) model, found that there is evidence of bidirectional causality in five of the six study countries. Odhiambo (2005) found a bidirectional causal relationship in Tanzania between economic growth and financial development, proxied by the ratio of currency to narrow definition of money and the ratio of bank claims on the private sector to GDP.

The study employed the Johansen-Juselius co-integration method and VECM. Shan and Jianhong (2006) and Sheilla Nyasha, Yvonne Gwenhure and Nicholas M. Odhiambo (2016) examined the causal relationship between financial development, proxied by total credit, and economic growth in China using a VAR approach. The study supported the view in the literature that financial development and economic growth exhibit a two-way causality. Ang (2008) estimated a six-equation model of financial development and economic growth for Malaysia to shed light on the mechanisms linking these two variables. The results indicated that financial development and economic growth in Malaysia show a bidirectional causality pattern (Sheilla Nyasha, Yvonne Gwenhure and Nicholas M. Odhiambo, 2016).

Levine (2005) concluded well-functioning financial systems play an independent role in promoting long run economic growth. Further, Beck *et al.* (2000) find that financial development has a positive impact on total factor productivity. A well-functioning financial sector helps to fill the gap between the rich and the poor and the degree to which that gap persists across generations (Demirguc-Kunt and Levine, 2009).

Asongu (2014) employed the vector autoregressive technique, the vector error correction model for the long-run and short-run effects and the Granger causality test to investigate

the relationship between finance and investment (domestic, foreign, portfolio and total). To achieve this, the study introduced efficiency, activity and size, which were omitted in earlier studies, and maintained financial depth as had been used in other studies. The empirical result showed that finance-led investment elasticity's are positive whereas, investment elasticity's are negative. Moreover, there was no sign of finance stimulating portfolio investment in Guinea-Bissau, Mozambique and Togo, in contrast to the evidence in the previous literature. One of the policy implications of the result points to short comings in blanket policies that are, not reliant on country –specific trends in the finance-investment nexus.

A structural model based on the Euler equation for investment was adopted by Love (2003) to evaluate how financial sector development and financing constraints impact growth through the efficiency of firm investment. They applied firm-level data from 40 nations. The outcome showed a strong negative link between the degree of financial market development and the responsiveness of investment to the availability of internal funds (a proxy for financing constraints). Other variables, such as size effect, business cycles and legal environment were considered and found to be plausible alternative explanations. Wurgler (2000) and Chimere O. Iheonu(2020) supported this and stated that financial sector development improves resource distribution and increases the efficiency with which investment funds are redistributed across businesses as demand differs.(Yohannes Getachew, 2016).

Koiuv (2002) and Hailay Tsigab (2013) measured the relation between banking sector development and economic growth in transition economies using fixed effect panel model for 25 transition countries during 1993 to 2000. The result of the model described interest rate margin and the amount of non-performing loans are negatively and significantly correlated with economic growth but bank credit to private sector has negative sign which is contrary to the theoretical literatures.

This study adds to the literature by employing a more recent dataset for understanding how the financial sector affects economic growth in Ethiopia. The study also accounts for the likelihood of cross-sectional dependence to avoid estimation bias. The reviewed previous time series data studies did not account for this issue. (Chimere O. Iheonu, 2020).

2.4 Summary of the Literature gaps

There were studies undertaken on national levels like Ethiopia; the researchers consider country-specific characteristics in their identification of dimensions and indicators of financial development and economic growth. According to this study the indicator of financial development is domestic credit to private sector and the dimensions are government expenditure, gross capital formation/investment/, domestic savings and labor force.

This big section of the study has reviewed the historical, theoretical and empirical works on the relationship between financial development and economic growth. The historical part was mainly confined to briefing how the literature on the issue comes through history highlighting which works were pioneer and how the development and innovations in the academic research world contributed to the evolution of investigations in finance – growth nexus. The theoretical part illuminates many of the channels through which economic growth affect the emergence and development of financial system (instruments, markets and institutions) and also how the latter affects the former. The empirical part also to show the result of financial development and economic growth previously done by cross sectional, time series and panel; then in this study to use best one is time series in Ethiopia. To conclude, by now this study all have a good understood from the existing body of literature about the notions of financial development, economic growth; even how to measure them in a better way. This study have been also seen the theoretical explanation of the interaction between finance and growth and the determinants of financial development on economic growth.

2.5 Conceptual framework

As discussed above about economic growth and financial development in Ethiopia, the following conceptual framework was shown here below figure (2.1), the study was use dependent variable economic growth, the independent variables Financial Development, Government Expenditure, Savings, Investment (GCF) and Total labor force. The aim of the researcher is to conduct the long run and short run relationship between economic growth and financial development sector and their causalities. The arrow indicated in each variable below figure (2.1) is to see the causal relationship between economic growth and

financial development. The causal relationships among the variables are to support hypotheses at the end of final analysis.

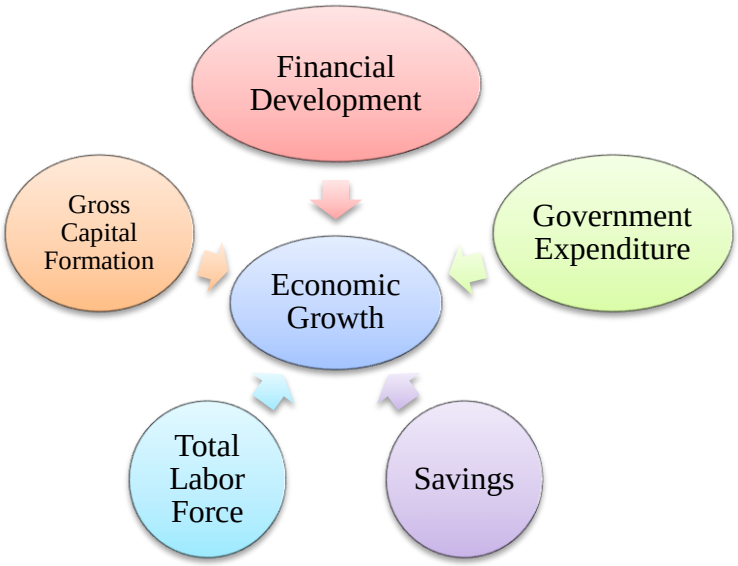


Figure 2. 1 Own Design (2021)

Based on the above theoretical and empirical review of literature, this study framed conceptual frame work. And the next chapter explained the methodology of the study. The methodology of the study has been constructed based on the above review of literature, specially, from the conceptual frame work.

CHAPTER THREE

METHODOLOGY OF THE STUDY

In the literature parts different theories and studies were described and different studies countries conclude about the nature of relationship between financial development and economic growth in different aspects. Meanwhile, the main objective of investigating the relationship, direction of causality and the effect of financial development and economic growth in the long run and short run for Ethiopia, this study instruct the recommendations forwarded by previous studies for developing countries in order to fill the existing knowledge gap for the period under investigation and the following methods are designed to reach on more meaningful results.

3.1 Sources and types of Data

This study investigates the empirical relationship between financial development and economic growth in Ethiopia and their directional causalities. Yearly time series data is collected for the period 1974/75 to 2019/20 providing 46 observations. The data were sourced from the National Bank of Ethiopia (NBE), Ministry of Finance (MoF), Central Statistics Agency (CSA), Ethiopian economic association (EEA), Ethiopian Plan and Development Commission and Ethiopian Developmental Research Institute. The data collected for this study was limited to the figures officially available with relevant government agencies for the period. Therefore, the study acknowledges that minor error of measurement might have been committed by the primary data collecting agencies.

Drawing from the works of Beck et al. (2000, 2008) segment the variables of financial development indicators as measure of depth (including size, level of activity and liquidity of markets), access (ability of individuals and companies to access financial services), and efficiency (ability of institutions to provide financial services at low cost and with sustainable revenues, and the level of activity of capital markets) of the financial sector. But this studies branch to the financial depth (size, level of activities and liquidity of market) components only. Primarily, there is not adequate data for measuring others (access and efficiency). The second reason, it still makes sense to think the indicators in the employed this component serves as proxy for this component implicitly.

According, to Yohannes Getachew, (2016), To measure the financial development sector, the suggested best way of using proxy variables is the ratio of credit to the private sector to

GDP, which is the value of loans, made by banks to private enterprises and households divided by GDP. It is used as a measure of financial depth and banking development. In fact it is possible to use the overall all credit made available to the economy, but for most developing economies, this might be misleading as the central banks and government have substantial share from the credits and borrowings respectively. In most of the literatures in the finance-growth nexus the growth rate of GDP is widely used to measure economic growth. Therefore, the study have been chosen this indicator as it keeps apart credit issued by banks, as opposed to credit issued by the central bank, and credit to enterprises, as opposed to credit issued to governments (Levine R., 2005).

3.2 Model Specification

To achieve the objectives of this study, this study have been prepared data time series and 46 years data were used. Estimation using such data offers a number of advantages for researchers (as discussed in the empirical review part). These advantages include to be able to address a broader range of issues and tackle more complex problems, enables to examine how variables, or the relationships between them, change dynamically (over time), helps to remove the effect of certain forms of omitted variables bias in regression results for the country.

The general representation of the model to estimate the effect of economic growth and other variables on financial development is given in equation below. The selection of explanatory variables in general was made based on reviewing empirical literature (is driven by previous results in the literature) (see Levine, Loayza and Beck (2000)).

The empirical link between financial development and economic growth be estimated in this study is adapted from a simple model developed by De Gregorio and Guidotti (1995) and Abduroluman (2003). In this model the economic development variable is included in an endogenous growth model. The model shows how indicators of financial development through economic relations turn to have an impact on economic growth. The equation below shows the functional and econometric relationship between the variables of the study.

The study was used macroeconomic development indicators (GDP, FDS, GOVEXP, GCF, SAV and TLF). However, this study by its very nature is interested to investigate the effects of financial development on economic growth and causality; it improves the past

model by including the two regimes of the period covering 46 years. Therefore, the relationship between financial development and economic growth in Ethiopia from macroeconomic perspective, this model states economic growth depends on domestic credit to private sector, gross capital formation (investment), gross domestic saving, government expenditure and total labor force. In this model the economic development variable is an endogenous growth model that examine determine of the rate of technical progress creation of knowledge. Therefore, functional form between economic growth and financial development is given as:

Economic growth = f (financial development sector)

$RGDP_t = (FDS_t,$

$GOVEXP_t, GCF_t, SAV_t, TLF_t)$……..……..(1)

Where,

RGDP is Economic growth, FDS is Domestic credit to private sector, GOVEXP is Government expenditure, SAV is Gross Domestic Saving, GCF is Gross Capital Formation (Investment) and TLF is Total labor force, and subscript t denotes the time period.

$RGDP_t=\beta_0+\beta_1 FDS_t, +\beta_2 GOVEXP_t+\beta_3 GCF_t+\beta_4 SAV_t+\beta_5 TLF_t +$

U_t…… (1a)

Where, β_0 = Intercept Term

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$=Parameter known as partial regression coefficient

U_t = Error termor unexplained variable , t = Denotes variable at time t

RGDP=Economic Growth

FDS= Financial Development Sector

GOVEXP=Government Expenditure

GCF=Gross Capital Formation (Investment)

SAV=Gross Domestic Saving

TLF= Total Labor Force

VECM:

$$\Delta lnY_t = \boldsymbol{\lambda_0} + \boldsymbol{\lambda_{it}}\left(lnY_{t-1} - \Phi_1\, lnX_{1,t-1} - \Phi_2\, lnX_{2,t-1} - \Phi_3\, lnX_{3,t-1}\right) + \sum_{l=0}^{q} \alpha_l\, \Delta lnX_{1,t-l} + \sum_{m=0}^{r} \gamma_m\, \Delta lnX_{2,t-m} + \sum_{n=0}^{s} \delta_n\, \Delta lnX_{3,t-n} + \vartheta_{i,t} \qquad (1b)$$

where, λ_{it} are parameters of the error correction term which estimate the speed of adjustment or error-correction towards the long- run equilibrium.

The goal of most empirical studies in econometrics is to determine whether a change in one variable causes a change in or helps to predict another variable. Therefore, based on the objectives of the study the model is estimated using Johansen co integration test, VECM and grange causality test. Variables are transformed into their natural logarithm so that their first differences approximately. On the other hand, to eliminate the impact of hetreroscedasticity for economic variable time series data, change in natural logarithm. The empirical model was designed to model all variables after logarithmic transformation for the linear model, is easy to verify, so the transformed model:

$lnRGDP_t = F(lnFDS_t, lnGOVEXP_t, lnGCF_t, lnSAV_t, ln\ TLFt)$……..(2)

When two or more entirely unrelated variables are trending over time, they were appearing to be correlated simply due to shared directionality. Correlation does not essentially involve causation in any meaningful sense of that word. The econometric cemetery is full of magnificent correlations, which are simply meaningless. Thus, traditional linear regression or correlation methods cannot be used to establish casual relations among a group of variables. Two methods for testing for causality among time-series variables are Granger causality tests (Granger, C.W.J. 1969) and co-integration analysis (Engle, R.E. & C.W.J. Granger.1987)

The standard Granger (1969) test employed to reveal the causal relationship between two variables. This test states that, if past values of a variable Y significantly contribute to forecast the value of another variable X_{t+1} then Y is said to Granger cause X and vice versa. The test is based on the following regressions.

- $RGDP_t = \beta_0 + \sum_{q=1}^{N} \beta_1 RGDP_{t-q} + \sum_{q=1}^{N} \beta_2 GOVEXP_{t-q} + \sum_{q=1}^{N} \beta_3 GCF_{t-q} + \sum_{q=1}^{N} \beta_4 SAV_{t-q} + \sum_{q=1}^{N} \beta_5 FDS_{t-q} + \sum_{q=1}^{N} \beta_6 TLF_{t-q} + u_{1t}$……..(3)
- $GOVEXP_t = \mu_0 + \sum_{q=1}^{O} \mu_1 RGDP_{t-q} + \sum_{q=1}^{O} \mu_2 GOVEXP_{t-q} + \sum_{q=1}^{O} \mu_3 GCF_{t-q} + \sum_{q=1}^{O} \mu_4 SAV_{t-q} + \sum_{q=1}^{O} \mu_5 FDS_{t-q} + \sum_{q=1}^{O} \mu_6 TLF_{t-q} + u_{2t}$……..(4)

- $GCF_{t=}\varphi_0+\sum_{q=1}^{P}\varphi_1 GRDP_{t-q}+\sum_{q=1}^{P}\varphi_2\, GOVEXP_{t-q}+$
  $\sum_{q=1}^{P}\varphi_3\, GCF_{t-q}+\sum_{q=1}^{P}\varphi_4\, SAV_{t-q}+\sum_{q=1}^{P}\varphi_5\, FDS_{t-q}+\sum_{q=1}^{P}\varphi_6 TLF_{t-q}+u_{3t}$……(5)
- $SAV_t=\rho_0+\sum_{q=1}^{Q}\rho_1 RGDP_{t-q}+\sum_{q=1}^{Q}\rho_2\, GOVEXP_{t-q}\sum_{q=1}^{Q}\rho_3\, GCF_{t-q}+\sum_{q=1}^{Q}\rho_4\, SAV_{t-q}+$
  $\sum_{q=1}^{Q}\rho_5\, FDS_{t-q}+\sum_{q=1}^{Q}\rho_6 TLF_{t-q}+u_{4t}$……(6)
- $FDS_t=\delta_0+\sum_{q=1}^{R}\delta_1 RGDP_{t-q}+\sum_{q=1}^{R}\delta_2\, GOVEXP_{t-q}\sum_{q=1}^{R}\delta_3\, GCF_{t-q}+\sum_{q=1}^{R}\delta_4\, SAV_{t-q}+$
  $\sum_{q=1}^{R}\delta_5\, FDS_{t-q}+\sum_{q=1}^{R}\delta_6 TLF_{t-q}+u_{5t}$……(7)
- $TLF_{t=}\tau_0+\sum_{q=1}^{S}\tau_1\, RGDP_{t-q}+$
  $+\sum_{q=1}^{S}\tau_2\, GOVEXP_{t-q}\sum_{q=1}^{S}\tau_3\, GCF_{t-q}+\sum_{q=1}^{S}\tau_4\, SAV_{t-q}+\sum_{q=1}^{S}\tau_5\, FDS_{t-q}+$
  $\sum_{q=1}^{S}\tau_6 TLF_{t-q}+u_{6t}$……(8)

  $GDP_{t,}\ GOVEXP_t, GCF_t, SAV_{t,}FDS_{t\,,}TLF_t$ are the variables to be tested and $u_{1t,}u_{2t}, u_{3t}, u_{4t,}u_{5t}\,, u_{6t}$ are mutually uncorrelated white noise errors, and t denotes the time period and "q" is number of lags. The all variables were measured by their natural logarithm so that their first difference approximates their rates

  Hypothesis uses standard Granger:

  The null hypothesis is β_i=μ_i=φ_i=δ_i=$\rho_i = \tau_i$=0 for all i's versus the alternatives hypothesis that

  $\beta_i \neq \varphi_i \neq \delta_i \neq \rho_i \neq \mu_i \neq \tau_i \neq 0$ For at least some i's. For instance, if the coefficient of β_1 statically significant but φ_i is not. But if both $\beta_1$and φ_i are significant then causality runs both ways. Current developments in the time series analysis have suggested some improvements in the standard granger test. The first step is to check for the stationary of the original variables and then test co-integration between them. According to Granger (1986), the test is valid if the variables are not Co-integrated.

  Second, the results of granger causality are very responsive to the selection of lag length. If the selected lag length is less than the true lag length, the omission of important lags can cause bias. If the chosen lag length is more, the dissimilar lags in the equation cause the estimates to be inefficient. Finally, both the co integration technique a Granger causality tests, will be employed to determine the causal relationship between economic growth and financial development and relation between economic growth and various components government expenditure, gross capital formation (GCF), total labor force (TLF) and gross domestic saving.

3.2.1 Research Hypothesis

To discuss the relationship between financial development sector and economic growth, the following hypothesis is outlined. The study done on the relationship between financial development and economic growth shows that financial development sector have negative, positive and neutral. To investigate and give strong conclusion and recommendation the following hypothesis are made:

First, regarding the relationship;

H_0: Financial development sector growth has no contribution to economic growth of Ethiopia.

H_1: Financial sector development growth has contribution to economic growth of Ethiopia.

Second, regarding the time serious nature of Data;

H_0: $\delta = 0$, i.e., there is a unit root, and the series is non-stationary; against

H_1: $\delta < 0$, i.e., there is no unit root and the series is stationary.

Third, regarding the long run relationship between variables;

H_0: There is no co integration between series

H_1: There is co integration between series

The hypotheses are mounted for proof the analysis which are influence the financial variables to economic growth and the hypotheses are analyzed and tried to proof with the econometrics model which are framed for the study are Johnson co-integration test with unit root causality test and VEC model.

3.2.2 Analytical and Theoretical frame work

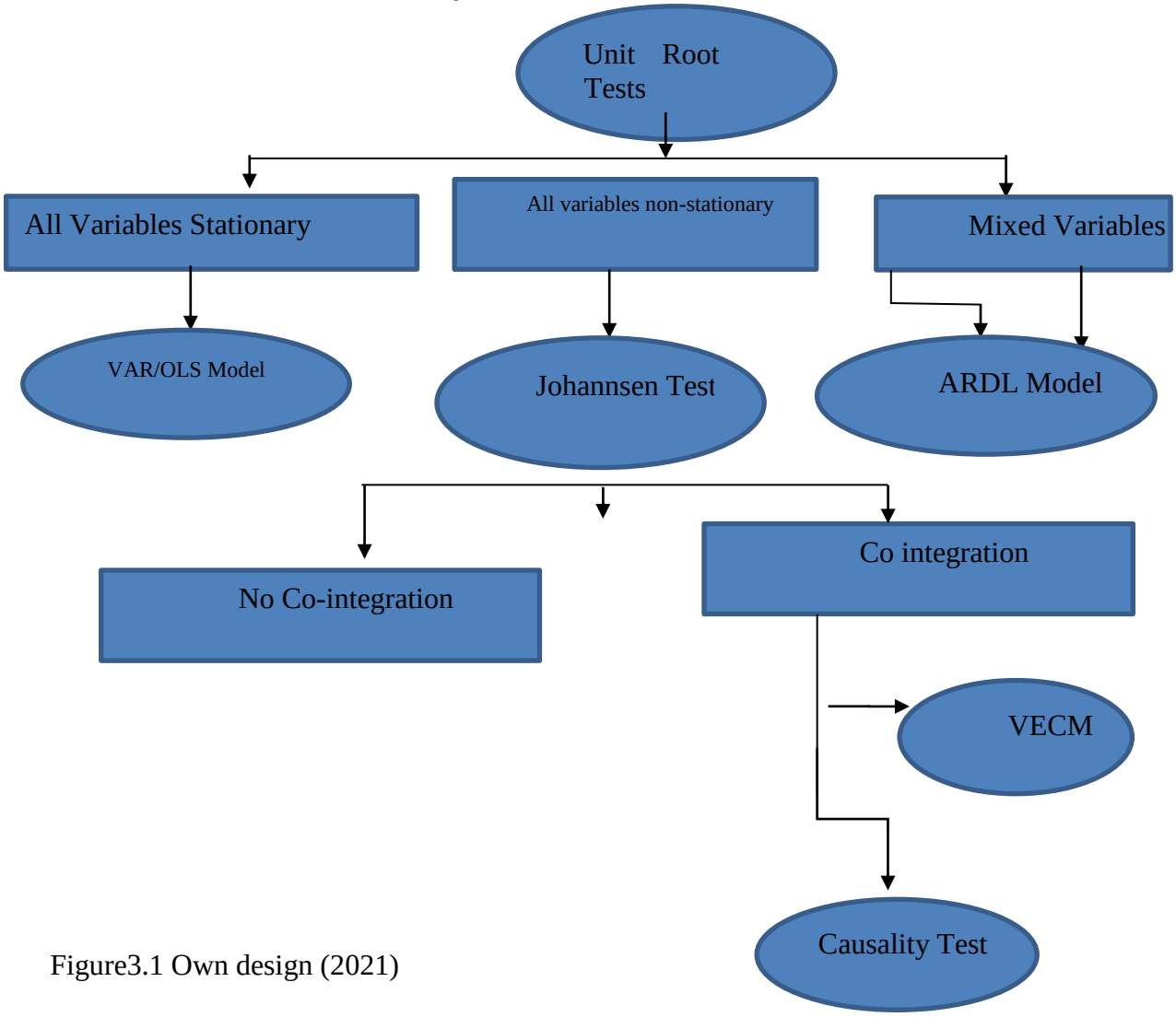


Figure3.1 Own design (2021)

3.2.3 Unit Root Test

Time series regression model is based on the assumption that the data generating process are stationary, i.e. the moments of the variable under consideration are time invariant. However, as the economy grows evolves over time, most of macroeconomic variables are likely to grow over time rendering them non-stationary. Regression using non-stationary variables will only reveal a relationship that is not actuals, and accordingly such regression is termed as “spurious regression”.

In case of spurious regression, as the sample size increase, the coefficient of variance does not tend to be constant and the consistency property of OLS estimation is not hold. The

sampling distribution of the estimators will be non-standard and the usual statics(t and F) based on normal become invalid (Maddala,1992).Nelson and Plosser (1982) distinguish between two types of stationary series: trend stationary process (TSP) and difference stationary processes (DSP).These two distinctions derive from the two widely used techniques of converting non-stationary series into stationary series.

The first one is trends stationary, in this case the mean trends is deterministic. The movement is estimated and avoid from the data, the residual series is stationary stochastic process. Trending mean is common violation of stationary. There are two accepted models for non-stationary series with a trending mean. The second is difference stationary; in this case the mean trend is stochastic. Differencing the series times yields a stationary stochastic process. Both techniques may lead to stationary series, caution is needed is choosing between the two as trending a DSP series or differencing a TSP series may lead to a spurious autocorrelation.

Nelson and Plosser (1982) indicate that in most economic time series DSP is more suitable and the –TSP should be applied only if assume that the residuals exhibit strong autocorrelation. Time series that can be made stationary by differencing are called integrated process. Specifically, When *d* differences are required to make a series stationary, that series is said to be integrated of order *d*, denoted I(*d*). Processes with $d \geq$ 1are mostly said to have a unit root. The precondition of co-integration test is the stationary of each individual time series over the sample period. There are several tests of stationary. These tests are Dickey-Fuller unit root tests, Augmented Dickey-fuller (ADF) unit root test and Phillips Perron (PP) unit root tests

This study used attest which become popular over the past years. Thus, unit root tests for stationary was examined on the level and first differences for all variables using the most common unit root test, which is the Augmented Dickey-Fuller (ADF).

Augmented Dickey-fuller (ADF) unit root test was used in this study. The technique of co-integration involves three steps. The first step requires a determination of the order of combination of the variables of interest. It can have for this purpose has been used to popular tests, Namely, Dickey Fuller (DF) and Augmented Dickey fuller (ADF) test based on H_O, X_t is not I(0).The regression model of the Augmented Dickey Fuller (ADF) unit root test is given by the following equations.

- $\Delta Y_t=\beta_0+\beta_{1t}+\sigma Y_{t-1}+u_t$……...(9)

  Where Yt denotes the variable Economic Growth. All variables are in logarithm form. Δ Is the difference operator; β_0 and β_1 are parameters to be estimated; u_t is white noise. The following regression models of the Augmented Dickey Fuller (ADF) unit root test below;

- $\Delta Y_{t=}\beta_0+\beta_{1t}+\sigma Y_{t-1}+\sum_{i-1}^{q}\zeta_i\,\Delta Y_{t-1}+u_t$……..(10)

  The hypotheses of the above equation form are:

  H_0:σ =0; there is a unit root, i.e the time series is non stationary

  H_1:σ =1; there is no unit root, i.e the time series is stationary (level stationary)

  The Null hypothesis (Ho): Yt is not I(0), if the calculated ADF statistics are less than their critical values from Fuller's table, then the null hypothesis (Ho) will be accepted and the series are non-stationary or order one i.e, I(1). If the coefficient of the lag of Y_{t-1},σ is significantly different from zero, then the null hypothesis is rejected. To allow for the different possibilities the Augmented Dickey Fuller (ADF) test is estimated in three different forms;

  1st possibility: Y_t is a random walk without drift: $\Delta Y_t=\sigma Y_{t-1}+\sum_{i-1}^{q}\zeta_i\,\Delta Y_{t-1}+u_t$

  2nd possibility: $Y_t$is a random walk with drift: $\Delta Y_t=\beta_0+\sigma Y_{t-1}+\sum_{i-1}^{q}\zeta_i\,\Delta Y_{t-1}+u_t$

  3rd possibility; Y_t is a random walke with drift around a stochastic trend

- $\Delta Y_t=\beta_0+\beta_{1t}+\sigma Y_{t-1}+\sum_{i-1}^{q}\zeta_i\,\Delta Y_{t-1}+u_t$

  β_0 is intercept, t is linear time trend, q is the number of lagged first differences, and (i=1,2,3,…q) is q is the number of lagged terms chosen by Akaike Information Criterion (AIC) to ensure that $u_t$is white noise.

3.2.4 Optimal Lag Length Selection

The determination of autoregressive lag length for a time series is especially important in economic studies. Various lag length selection criteria such as the Aikaike's Information Criterion (AIC), Schwarz Information Criterion (SIC), Hannan-Quinn Criterion (HQC), Final prediction error (FPE) and Bayesian information criterion (BIC) have been employed. As the outcomes of these criterion may influence the ultimate findings of the study, a throughout understanding on the empirical performance of these criteria is necessary.

Akaike Information Criterion (AIC) developed by HirotuguAkaike in 1971; Greene (2003), has been found to be nearly unbiased estimator of selecting lag order and also and it's a large sample size measure of less than thirty observations.

First, the criteria to pick up the correct lag length at least half of the time in small sample. 2nd, the performance increase substantially as sample size grows. 3rd, with relatively large sample (more than 120 observations) HQC is found to do the rest in correctly identifying the true lag length. In contrast, AIC and FPE should be better choice for smaller sample. Fourth, AIC and FPE are found to produce the least probability of under estimation among all criteria under study. Finally the problem over estimation however is negligible in all cases.

As many econometric testing procedures such as unit root test, casualty test, co integration tests and linearity tests involved the determination of autoregressive lag length, the finding in this simulation study may be taken as useful guidelines for future economic researches. It is the most used and recommended methodology was to use to determine the lag length. Accordingly, that provides the minimum value is chosen as the optimal lag length in other words among the IC that provides greater part lag is chosen as optimal lag length. On the basis of one more of these criteria this study was used a model that he lowest value of AIC or SIC or BIC.

3.2.5 Co-integration test

Granger causality tests are sensitive to the stationary of the series. This is why first study the stationary properties of the variables. The different types of unit root tests, in order to proceed with co integration and VEC analyses one need to be confident as to the order of integration of the serious used. In the second step to estimate co-integration regression using variables having the same order of integration. Co-integration among the variables means that two or more variables are said to be co-integration if they share common trends that is they have long run equilibrium relationships.

More, co-integration is necessary criteria for stationary among non-stationary variables. The serious are associated by some long-run equilibrium relationship from which they can diverge in the short run but they must return to in the long run that is they exhibit the same stochastic trend.

This initial formulation by Granger used levels of variables as shown in equation. But following the development of unit root testing and co integrating, for non-stationary variables, integrated of order one or I(1) the following will be made.

- $\Delta RGDP_t = \beta_{0+} \sum_{q=1}^{N} \beta_1 \Delta RGDP_{t-q} + \sum_{q=1}^{N} \beta_2 \Delta FDS_{t-q} + \sum_{q=1}^{N} \beta_3 \Delta GOVEXP_{t-q} + \sum_{q=1}^{N} \beta_4 \Delta GCF_{t-q} + \sum_{q=1}^{N} \beta_5 \Delta SAV_{t-q} + \sum_{q=1}^{N} \Delta\beta_9 TLF_{t-q} + u_{1t}$ .....(11)
- $\Delta FDS_t = \mu_0 + \sum_{q=1}^{O} \mu_1 \Delta RGDP_{t-q} + \sum_{q=1}^{O} \mu_2 \Delta GOVEXP_{t-q} + \sum_{q=1}^{O} \mu_3 \Delta GCF_{t-q} + \sum_{q=1}^{O} \mu_4 \Delta SAV_{t-q} + \sum_{q=1}^{M} \mu_5 \Delta FDS_{t-q} + \sum_{q=1}^{O} \mu_6 \Delta TLF_{t-q} + u_{2t}$ .....(12)
- $\Delta GOVEXP_t = \varphi_0 + \sum_{q=1}^{P} \varphi_1 \Delta RGDP_{t-q} + \sum_{q=1}^{P} \varphi_2 \Delta GOVEXP_{t-q} + \sum_{q=1}^{P} \varphi_3 \Delta GCF_{t-q} + \sum_{q=1}^{P} \varphi_4 \Delta SAV_{t-q} + \sum_{q=1}^{P} \varphi_5 \Delta FDS_{t-q} + \sum_{q=1}^{P} \varphi_6 \Delta TLF_{t-q} + u_{3t}$ .....(13)
- $\Delta GCF_t = \rho_0 + \sum_{q=1}^{Q} \rho_1 \Delta RGDP_{t-q} + \sum_{q=1}^{Q} \rho_2 \Delta GOVEXP_{t-q} + \sum_{q=1}^{Q} \rho_3 \Delta GCF_{t-q} + \sum_{q=1}^{Q} \rho_4 \Delta SAV_{t-q} + \sum_{q=1}^{Q} \rho_5 \Delta FDS_{t-q} + \sum_{q=1}^{Q} \rho_6 \Delta TLF_{t-q} + u_{4t}$ ...(14)
- $\Delta GCF_t = \delta_0 + \sum_{q=1}^{R} \delta_1 \Delta RGDP_{t-q} + \sum_{q=1}^{R} \delta_2 \Delta GOVEXP_{t-q} \sum_{q=1}^{R} \delta_3 \Delta GCF_{t-q} + \sum_{q=1}^{R} \delta_4 \Delta SAV_{t-q} + \sum_{q=1}^{R} \delta_5 \Delta FDS_{t-q} + \sum_{q=1}^{R} \delta_6 \Delta TLF_{t-q} u_{5t}$ .....(15)
- $\Delta TLF_t = \tau_0 + \sum_{q=1}^{S} \tau_1 \Delta RGDP_{t-q} + \sum_{q=1}^{S} \tau_2 \Delta GOVEXP_{t-q} \sum_{q=1}^{S} \tau_3 \Delta GCF_{t-q} + \sum_{q=1}^{S} \tau_4 \Delta GCF_{t-q} + \sum_{q=1}^{S} \tau_5 \Delta FDS_{t-q} + \sum_{q=1}^{S} \tau_6 \Delta TLF_{t-q} + u_{6t}$ .....(16)

Where

Δ Is the first difference operator, so that the terms are introduced in differences to ensure that they are stationary or I(0). Here the concept of causality is formulated in terms of changes to the variables and the presence of Granger –causality depends on the significance of the Δ Yt-q terms and Δ Et-q terms in equations.

3.2.6 Vector Error Correction Model

According to Engle-Granger (1987), if two times series are co-integrated then the VECM will represent them most efficiently. If co-integration has been detected between series known that there exists a long –term equilibrium relationship between series them, thus, apply VCEM in order to evaluate the short-run properties of the co-integration serious.

In the case of no-integration VCEM is no longer required and directly preceded to Granger causality tests to establish causal links between variables. An ECM is defined as a dynamic model in which the movement of variable in any period is interconnected to the previous period's gap from the long run equilibrium. Although it may be possible to estimate the long –run or co-integration relationship, $Y_t=\beta X_t+u_t$ economic systems are rarely in equilibrium, as they are affected by institutional and/or structural changes that might be temporary or permanent.

Simple dynamic model of a short run adjustment is given by;

- $Y_t=\varphi_0 +$

$\varpi_0 X_t+\varpi_1 X_{t-1}+\varphi_1 Y_{t-1+}u_t$…….....(17)

Where,

Yt is dependent variable, and Y_{t-1} are lagged values; X_t is independent variable, and X_{t-1} are lagged values; $\varphi_0, \varpi_0, \varphi_1$ and ϖ_1, are parameters; u_t is the error term assumed to be

$u_t \sim$IID(o,σ^2)

The problems related to the use of the short-run model are multicollinearity and spurious correlation.

The problems are solved by estimating the first difference of equation (17) to get

- $\Delta Y_t=\varphi_0 +$

$\varpi_0 \Delta X_t+\varpi_1 \Delta X_{t-1}+\varphi_1 \Delta Y_{t-1+}u_t$……..…(17i)

This, however, introduces problems of loss of information about the long-run equilibrium and the economic theory is different away. Thus, the possible solution is adopt, the error-correction mechanism formulation of the dynamic structure .the set up as follows.

$\Delta Y_t=\varpi_0 \Delta X_t - (1-\varphi_1)(Y_{t-1} - \beta_0 - \beta_1 X_{t-1}) +$

u_t…….……..……..……..…….…

(17ii)

The above equation (17ii) shows the ECM model.

Error correction mechanism (ECM) satisfies the assumptions of classical normal linear regression model. Through others the assumption includes a linear regression model residuals are normally distributed, there is no serial correlation with residuals and there is perfect Multi-co linearity.

Where, $-(1-\varphi_1)$ is the speed of adjustment; $u_{t-1} = Y_{t-1} - \beta_0 - \beta_1 X_{t-1}$ as error-correction mechanism which measures the distance of the system away from equilibrium? Therefore, the coefficient of u_{t-1}should be negative in sign in order for the system to converge to equilibrium. The size of the coefficient $-(1-\varphi_1)$ is an indication of the speed of adjustment towards equilibrium in that; Small values of $-(1-\varphi_1)$ tending to -1, indicate that economic agents remove a large percentage of disequilibrium in each period, large value tending to 0, indicate that adjustment is low; extremely small value less than -2 indicate an overshooting of economic equilibrium; positive values would imply that the system diverges from the long run equilibrium path. Given from the above fact that the variable was subjected to Johansen co-integration test and it is found that the variables are co-integrated. Followed by using the Granger causality theorem, will conceive the following testing relationships that form a vector error correction (VEC) model for output growth.

- $RGDP_t = \beta_0 + \sum_k^r \emptyset_1 u_{t_k} + \sum_{q=1}^N \beta_1 RGDP_{t-q} + \sum_{q=1}^N \beta_2 GOVEXP_{t-q} + \sum_{q=1}^N \beta_3 GCF_{t-q} + \sum_{q=1}^N \beta_4 SAV_{t-q} + \sum_{q=1}^N \beta_5 FDS_{t-q} + \sum_{q=1}^N \beta_6 TLF_{t-q} + u_{1t}$ ……(18)
- $GOVEXP_t = \mu_0 + \sum_k^r \emptyset_2 u_{t-k} + \mu_1 RGDP_{t-q} + + \sum_{q=1}^O \mu_2 GOVEXP_{t-q} + \sum_{q=1}^O \mu_3 GCF_{t-q} + \sum_{q=1}^O \mu_4 SAV_{t-q} + \sum_{q=1}^O \mu_5 FDS_{t-q} + \sum_{q=1}^O \mu_6 TLF_{t-q} + u_{2t}$ ……..…….(19)
- $GCF_{t=} \varphi_0 + \sum_k^r \emptyset_3 u_{t_k} + \varphi_1 RGDP_{t-q} + \sum_{q=1}^P \varphi_2 GOVEXP_{t-q} \sum_{q=1}^P \varphi_3 GCF_{t-q} + \sum_{q=1}^P \varphi_4 SAV_{t-q} + \sum_{q=1}^P \varphi_5 FDS_{t-q} + \sum_{q=1}^N \varphi_6 TLF_{t-q} + u_{3t}$ ……..…..(20)
- $SAV_t = \rho_0 + \sum_k^r \emptyset_4 u_{t_k} + \rho_1 RGDP_{t-q} + \sum_{q=1}^Q \rho_2 GOVEXP_{t-q} \sum_{q=1}^Q \rho_3 GCF_{t-q} + \sum_{q=1}^Q \rho_4 SAV_{t-q} + \sum_{q=1}^Q \rho_5 FDS_{t-q} + \sum_{q=1}^Q \rho_6 TLF_{t-q} + u_{4t}$ ……..(21)
- $FDS_{t=} \delta_0 + \sum_k^r \emptyset_5 u_{t_k} + \sum_{q=1}^R \delta_1 RGDP_{t-q} + \sum_{q=1}^R \delta_2 GOVEXP_{t-q} + \sum_{q=1}^R \delta_3 GCF_{t-q} + \sum_{q=1}^R \delta_4 SAV_{t-q} + \sum_{q=1}^R \delta_5 FDS_{t-q} + \sum_{q=1}^R \delta_6 TLF_{t-q} + u_{5t}$ ……(22)

- $TLF_{t=}\tau_0+\sum_k^r \emptyset_6 u_{t-k} +$

  $\tau_1 RGDP_{t-q}+\sum_{q=1}^{S}\tau_2 GOVEXP_{t-q}\sum_{q=1}^{S}\tau_3 GCF_{t-q}+\sum_{q=1}^{S}\tau_4 SAV_{t-q}+\sum_{q=1}^{S}\tau_5 FDS_{t-q}+$

  $\sum_{q=1}^{S}\tau_6 TLF_{t-q}+u_{6t}$……..(23)

The existence of co-integration implies Granger causality; however, does not show the direction of causality. To assess the direction, the study was employed a vector error correction (VEC) modeling. If the variables under study are co-integrated, a vector error correction model should be estimated rather than a VAR as in a standard Granger causality test (Granger, 1988), the following Granger (1988).

One the equilibrium conditions represented by the co integrating relation are imposed, the VEC model describes how, in each time period, output growth is adjusting towards its long-run equilibrium state. Since the variables are supposed to be co-integrated, then in the short term, devotion of output from its long-run equilibrium path will feed back on its future changes in order to force its movement towards the long run equilibrium state. The co integrating vectors from which the error correction terms were derived each indicate an independent direction where a stable, meaningful long run equilibrium state exists. The coefficient of the error-correction terms however, stand for the proportion by which the long-run disequilibrium in the dependent variables is corrected in short-term periods (Ghali and El-Sakka, 2004).

3.2.7Granger causality test

Depending on the theoretical facts have discussed, the reported F-statics of the Wald statistics for the joint hypothesis for each equation was under taken.

The null hypothesis is that Y does not granger-cause X in the first regression and that X does not granger cause Y in the second regression. Before testing the causalities of the VECM first granger causalities test between economic growth and financial development sector was examined to determine the long run causality in VAR context and then short run causalities has been estimated using VECM. The Granger causality test or well known as 'Joint F-test 'between total financial development and economic growth was used in order to check the direction of causality between two variables in Ethiopia.

The Granger procedure is selected because it consists more power full but simpler way of testing causal relationship Granger (1986). Using this test the following null and alternative hypothesis is estimated. For long-run causality test four hypotheses were tested

using VAR. First, 'growth hypothesis 'which asserts that financial development cause economic growth. The growth hypothesis is supported if there are unidirectional Granger-causalities from financial development to economic growth. Soyatas and Sari(2006) give empirical support for the growth hypothesis.

- $FDS_{t=}\alpha_0+\sum_k^r \emptyset_2 u_{t_k} + \sum_{q=1}^M \alpha_1 RGDP_{t-q}+\sum_{q=1}^M \alpha_2 GOVEXP_{t-q}+\sum_{q=1}^M \alpha_3 GCF_{t-q}+$
  $\sum_{q=1}^M \alpha_4 SAV_{t-q}+\sum_{q=1}^M \alpha_5 FDS_{t-q}+\sum_{q=1}^M \alpha_6 TLF_{t-q} + u_{2t}$……(24)

Equation (24) postulates that FDS is related to its past values, economic growth, financial development, saving, government expenditure, investment (GCF) and total labor force (TLF) and a certain proportion of equilibrating error.

The null hypotheses in this case:

H_0: Economic growth doesn't granger cause FDS.

H_1: Economic growth granger causes FDS.

Second, hypothesis' which suggests that policy on financial sector development have no effect on the economic growth. Unidirectional Granger-causality from economic growth to financial sector development would afford support for the finance policy hypothesis. Kraft (1978), support the policy in the case of the U.S. In this case VAR has the following form;

- $RGDP_t=\beta_0+\sum_k^r \emptyset_1 u_{t_k} +$
  $\sum_{q=1}^N \beta_1 RGDP_{t-q}+\sum_{q=1}^N \beta_2 FDS_{t-q}+\sum_{q=1}^N \beta_3 GOVEXP_{t-q}+\sum_{q=1}^N \beta_4 GCF_{t-q}$
  $+\sum_{q=1}^N \beta_5 SAV_{t-q} +$
  $\sum_{q=1}^N \beta_6 TLF_{t-q} + u_{1t}$……..(25)

Equation (25) postulates that Economic growth is related to past values of itself, financial development, Government expenditure, Gross capital formation (investment), saving, and total labor force a certain proportion of equilibrating error.

The null and alternate hypotheses in this case are;

H_0: FDS doesn't granger cause Economic growth.

H_1: FDS granger cause Economic growth.

Third, feedback hypothesis suggest that financial development and economic growth are interdependent. Bidirectional causality between financial development and economic growth show such behavior. Third, the feedback hypothesis asserts that financial development and economic growth are interdependent and act as complements to each

other. The existence of bidirectional Granger-causality between financial development and economic growth substantiates the feedback hypothesis.

Fourth, Neutrality hypothesis suggest that financial development and economic growth are independent. That is financial development and economic growth decisions are taken independently. Furthermore, the neutrality hypothesis views financial development as a relatively minor the composition of economic growth in which case finance policies may not adversely impact economic growth. The absence of Granger-causality between financial development and economic growth is supportive of the neutrality hypothesis. Studies by Soytas and Sari (2003), Chontanawat et al. (2006, 2008), Soytas et al. (2007), are supportive of the neutrality hypothesis in the USA. The above models are estimated in anticipation of yielding four district cases. That is,

- $\Delta RGDP_t=\beta_0+\sum_k^r \emptyset_1 u_{t_k} \sum_{q=1}^N \beta_1 \Delta GDP_{t-q}+\sum_{q=1}^N \beta_2 \Delta GOVEXP_{t-q}$
  $+\sum_{q=1}^N \beta_3 \Delta\, GCF_{t-q}+\sum_{q=1}^N \beta_4\, \Delta SAV_{t-q} + \sum_{q=1}^N \beta_5 \Delta FDS_{t-q} + \sum_{q=1}^N \beta_6 \Delta\, TLF_{t-q} +$
  u_{1t}…….....(26)
- $\Delta FDS_{t=}\mu_0+\sum_k^r \emptyset_2 u_{t_k} + \sum_{q=1}^O \mu_1 \Delta\, RGDP_{t-q}+\sum_{q=1}^O \mu_2\, \Delta GOVEXP_{t-q}+\sum_{q=1}^O \mu_3 \Delta\, GCF_{t-q}+$
  $\sum_{q=1}^O \mu_4\, \Delta SAV_{t-q}+\sum_{q=1}^O \mu_5\, \Delta FDS_{t-q} \sum_{q=1}^O \mu_6 \Delta\, TLF_{t-q} u_{2t}$……...(27)
- $\Delta GOVEXP_t=\varphi_0+\sum_k^r \emptyset_3 u_{t-k} + \sum_{q=1}^P \varphi_1 \Delta\, RGDP_{t-q}+\sum_{q=1}^P \varphi_2\, \Delta GOVEXP_{t-q}+$
  $\sum_{q=1}^P \varphi_3\, \Delta GCF_{t-q}+\sum_{q=1}^P \varphi_4\, \Delta SAV_{t-q} + \sum_{q=1}^P \varphi_5\, \Delta FDS_{t-q} +$
  $\sum_{q=1}^P \varphi_6 \Delta\, TLF_{t-q}+u_{3t}$……..(28)
- $\Delta GCF_{t=}\rho_0+\sum_k^r \emptyset_4 u_{t_k} + \sum_{q=1}^Q \rho_1 \Delta RGDP_{t-q}+\sum_{q=1}^Q \rho_2\, \Delta GOVEXP_{t-q} \sum_{q=1}^Q \rho_3\, \Delta GCF_{t-q}+$
  $\sum_{q=1}^Q \rho_4\, \Delta SAV_{t-q}+\sum_{q=1}^Q \rho_5\, \Delta FDS_{t-q} +$
  $\sum_{q=1}^Q \rho_6 \Delta\, TLF_{t-q}+u_{4t}$.....(29)
- $\Delta SAV_t=\delta_0+\sum_k^r \emptyset_5 u_{t_k} +$
  $\sum_{q=1}^O \delta_1 \Delta R\, GDP_{t-q}+\sum_{q=1}^R \delta_2\, \Delta GOVEXP_{t-q} \sum_{q=1}^R \delta_3\, \Delta GCF_{t-q}+\sum_{q=1}^R \delta_4\, \Delta SAV_{t-q}+$
  $\sum_{q=1}^R \delta_5\, \Delta FDS_{t-q}+ + \sum_{q=1}^R \delta_6 \Delta\, TLF_{t-q}+u_{5t}$……(30)
- $\Delta TLF_{t=}\tau_0+\sum_k^r \emptyset_6 u_{t-k} + \sum_{q=1}^S \tau_1 \Delta RGDP_{t-q}+\sum_{q=1}^S \tau_2\, \Delta GOVEXP_{t-q} \sum_{q=1}^S \tau_3\, \Delta GCF_{t-q}+$
  $\sum_{q=1}^S \tau_4 \Delta\, SAV_{t-q}+\sum_{q=1}^S \tau_5\, \Delta FDS_{t-q} +$
  $\sum_{q=1}^S \tau_6 \Delta\, TLF_{t-q}+u_{6t}$……...(31)

3.2.8 Test of Volatility

There are two approaches, impulse response function and variance (forecast error) decomposition, for characterizing the dynamic behavior of the VAR model.

The impulse response functions and variance decomposition technique suggested by Sims (1980) are useful devices in the VAR framework for testing the sources of variability. The impulse response functions can suggestion the response of the endogenous variables to a shock in another variable. The variance decomposition breaks down the variance of the forecast error for each variable into components that can be attributed to each of the endogenous variables.

Following Sims (1980) seminal paper, dynamic analysis of VAR model is normally carried out using the "orthogonalized" impulse responses, where the underlying shocks to the VAR model are orthogonalized using the Cholesky decomposition method.

This method assumes the system is recursive and the estimations of impulse response function and variance decomposition are orthogonalized so that the covariance matrix of the resulting innovations is lower triangular (Chen and Patel, 1998).

3.2.9 Impulse Response Function and Variance Decomposition

The Impulse response function is defined as the effect of a shock of size δ hitting a system t on the state of the system at time $t+n$ given that no other shocks hit the system. More formally, the path followed by the variable ym,t in response to a one time change in yi,t holding the other variable constant at all time, is called Impulse response Function. Analysis is used in dynamic models such as a VAR to describe the effect of an exogenous shock is one variable on the other variables of the system (Panagiotitidis,T, PelloniG. and Polasek W.2003).

While impulse response function trace the effects of a shock to one endogenous variable on to the other variable in the VAR. Variance decomposition separates the difference in endogenous variables in to the components shocks to the VAR. Thus, the variance decomposition is important information about the relative meaning of each random improvement in affecting the variable in the VAR.

3.3 Definitions of the variables and their expected sign

This study investigates the empirical relationship between financial development and economic growth in Ethiopia, These, relationships between financial development and

economic growth based on the data of government expenditure, investment (gross capital formation), gross domestic saving, total labor force and domestic credit to private sector. This study uses have been described as the following variables.

3.3.1 Dependent variable

A. Economic growth (RGDP): Economic growth indicator (dependent variable) in logarithm value. In this study, annual growth rate of real GDP is used as a proxy for economic growth (RGDP). This proxy has been used extensively in the literature (Wood, 1993; Odedokun, 1996; Shan and Jianhong, 2006; and Majid, 2008), and Hailay Tsigab Kahsay (2013).

The Gross Domestic Product describes as the value of final goods and service which were produced within the boundaries of countries during the time period of one year. The Gross Domestic Product used as a proxy variable of economic growth. (Muhammad Shahid 2014).

RGDP = growth rate of real gross domestic product (a proxy for economic growth)

3.3.2 Independent variables:- All variables were converted to natural logarithm.

A. Financial development Sector (FDS): This variable is captured through the aspect of financial depth (domestic credit to private sector). It is measured domestic credit to private sector in terms of its depth (size, level of activities and liquidity to market). This study used domestic credit to the private sector (FDS) as proxy of financial development sector. It is a percentage of GDP, (Yohannes Getachew,2016). This is due to the fact that, because of the situation of Ethiopia developing economies where banks are subject to mandated loans to priority sectors, or obligated to hold government securities. Financial depth; With inspiration from Financial Development and Structure Dataset (FDSD) and finance literature this study measures financial depth perspectives. (Deposits) (Asongu, 2011).

The study captures financial sector development utilising domestic credit to the private sector as a percentage of the GDP, that according to the literature (Tchamyou, 2019; Asongu and De Moor, 2017). Domestic credit to the private sector involves the financial resources provided to the private sector by financial corporations. (Chimere O. Iheonu and Patrick K. Ojiem, 2020).

According to Sheilla Nyasha, Yvonne Gwenhure, Nicholas M. Odhiambo (2016), credit to private financial development, is proxy by domestic credit to private sector divided by GDP (FDS). Credit to private sector financial development is proxied by various indicators in

modern literature – including the ratio of quasi-liquid liabilities (M2) as a percentage of GDP, M2 to nominal GDP, M3 to nominal GDP, and claims on, among others. However, due to the unavailability of sufficient time series data for Ethiopia on most of these indicators, this study utilizes the ratio of domestic credit to private sector to GDP (FDS) as a proxy of domestic credit to private sector-financial development. This indicator shows the overall size of the financial intermediary in a country (Levine, 1997; Calderon and Liu, 2003). A higher ratio of domestic credit to private sector to GDP shows a larger financial sector and consequently, a larger financial intermediation.(Yohannes Getachew,2016). It is expected to have positive effect on the economic growth.

FDS =share of domestic credit to private sector in GDP (a proxy for financial development sector)

B. Government expenditure (GOVEXP): This control variable captures the effect of government expenditure. The choice of variable is inspired by the fundamental role of public expenditure in spurring economic activities and development.

The explanatory (independent) variables are various levels and components of government expenditure. For the purpose of this study, government expenditure denotes country wide budgetary expenditure, including the federal government, regional and local governments. The level of government expenditure and composition of government expenditure are important determinants of growth, (Abdu Muhammed, Professor Melesse Asfaw, **2014).** It is expected to have positive effect on the economic growth.

C. Gross Domestic Saving (SAV) and Gross Capital Formation (GCF)

Savings and investment are another, explanatory (independent) variables and these are the intermittent variables in the multivariate model. The choice of these variables as alternating variables is underpinned in the theoretical and empirical links between each one of them and economic growth; and between each one of them and financial development. Traditional theories underscore the role of savings and investment in the economic growth process (Sheilla Nyasha, Yvonne Gwenhure, Nicholas M. Odhiambo, 2016).

According to endogenous growth models developed by Romer (1986) and Lucas (1988), a permanent increase in growth can be determined by higher savings and capital accumulation. The theoretical link between financial development, savings and investment is also, to a large extent, influenced by the work of McKinnon (1973) and Shaw (1973),

which emphasized that a well-developed financial sector is expected to increase savings and create a pool of resources for investment through efficiency improvement during the intermediation process (see also Odhiambo, 2008). Based on this argument, savings and investment variables are therefore chosen to be the intermitting variables.(Sheilla Nyasha, Yvonne Gwenhure, Nicholas M. Odhiambo, 2016). Both of them expected to have positive effect on the economic growth.

D. Gross Domestic Savings (GDS): The broadest definition of money – as a proportion of GDP – to measure the liquid liabilities of the banking system in the economy will also be used. It can be used M3 as a financial depth indicator because the other two monetary aggregates (M2 or M1) may be a poor proxy in economies with underdeveloped financial systems because they "are more related to the ability of the financial system to provide transaction services than to the ability to channel funds from savers to borrowers", (Yohannes Getachew, 2016). It is expected to have positive effect on the economic growth.

SAV = share of gross domestic savings in GDP (a proxy for savings)

E. Gross capital formation (GCF): This variable captures gross formation of capital, and permits us to see how investments increases output which subsequently leads to economic growth. (Chimere O. Iheonu, Simplice A. Asongu, Kingsley O. Odo and Patrick K. Ojiem, 2020). It is expected to have positive effect on the economic growth.

GCF = share of gross capital formation in GDP (a proxy for investment)

F. Labor force (TLF): The total labour force, or currently active population, comprises all persons who fulfill the requirements for inclusion among the employed or the unemployed. The labor force participation rate is a measure of an economy's active workforce. In 2020, the labor participation rate among the total population aged between 15 and 65 in Ethiopia amounted to around 81.69 percent, (Aaron O'Neill, 2021).

The developing countries faced the problem of low level of labour force participation. However different studies show that there is a strong relationship between economic growth and labour force participation rate. The skilled labour force enhance the economic growth (Duval, Eris and Furceri 2010 and Muhammad Shahid 2014). The study expected positive sign.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION

4.1. Descriptive Data Analysis

This study examines the effect of financial development sector on economic growth in Ethiopia and their causality. A time series data of 46 years (1974-2019) is used for the analysis of the relationship between financial development and economic growth. This study used Eviews version 9 to analysis the result. The analysis begins by describing the nature and trend behavior of some variables and financial development in the period under consideration by using descriptive analysis.

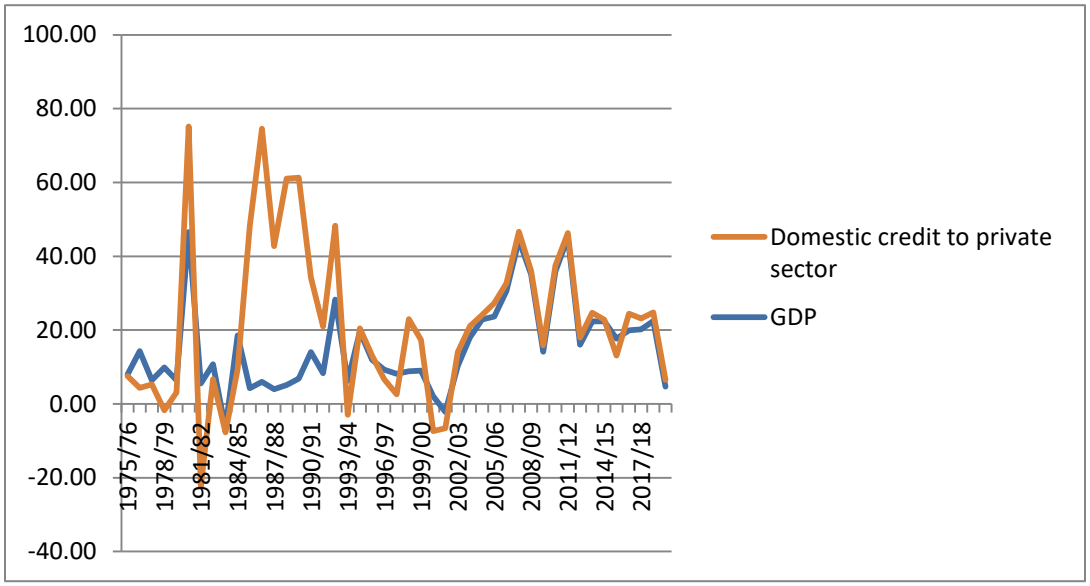
4.1.1 Trends of financial development and economic growth in Ethiopia

Financial depth, as literature reveals, is frequently measured in terms of size and the level of activity or intermediation of the financial sectors measured by the ratio of credit to the private sector to GDP. These measure the volume of credit supplied to the private sector is a very good signal of the performance of the financial sector in pooling savings and supply for investment. Based on these variables and their corresponding proxy measure, the financial depth in Ethiopia is responsible to be good (Yohannes Getachew, 2016).

Among the alternative measurements the focus of this study is to measure financial development specifically banks development depth proxy by domestic credit to private sector. The usual way to characterize financial systems is measuring the size of financial institutions relative to the size of the economy. Private credit issued by central banks, expressed as deposit money bank credit to the private sector as a percentage of GDP has a strong statistical link to long-term economic growth and to poverty reduction (Demirgüç-Kunt and Levine, 2008. However, size does not necessarily represent the effectiveness of the financial development. It may be correlated with economic growth due to output increases the demand for financial service increases too, which in turn has a positive effect on financial development (Christopoulos and Tsionas, 2001; Koivu, 2002). Implies credit does necessarily represent the effectiveness of financial sector. Financial access promoted economic growth, strengthens competition, and increases the demand for labor and brings return to the poor classes (World Bank, 2013). However, access is not referring to any form of finance; rather it considers the quality of financial services available to people at

competitive saving rate and reliable payment services. Financial sector functions should provide at least cost as possible unless the higher costs may discourage to households, firms, and governments. Efficiency is primarily designed to measure the cost of intermediating credit. Proxy variable of efficiency for financial institutions include overhead costs to total assets, GCF (investment), deposits spread, total labor force to total income, and cost to domestic credit to private sector ratio (Levine et al., 2012).

Figure 4.1 Growth rate of DCPS and GDP



Source: Own drawing (2021)

Figure: growth rate Private sector credits and GDP 1975-2019

When the domestic credit to private sector increase the net interest margin reduces as a result of decline in transaction costs, the amount of savings reallocated to investment grow up. Since economic growth directly correlated to the size of investment and low transaction costs accelerates economic growth (Koivu, 2002).

Even though this ratio has been increasing gradually over the years, there is ample room for further growth given the post 1991 participation of private commercial banks. Pre 1991 banks ordered to lend to prioritize sector mainly state farming and relevant projects besides to bank credit ceiling and predetermined interest rate to patronize the private sector. For instance, in l988, out of the Commercial Bank credit finance agriculture and industry received only 6 and l3 percent respectively which marginalize private credit. Private credit in total loans was only 22.6 percent between 1989 and 1991 besides, private sector's

investment very low. Following the domestic financial liberalization since 1992 new privately owned financial institutions increased the performance of private credit to GDP grown-up from 8.01 to 35.86 percent during 1 975 to 2010 with a slight decline recently.

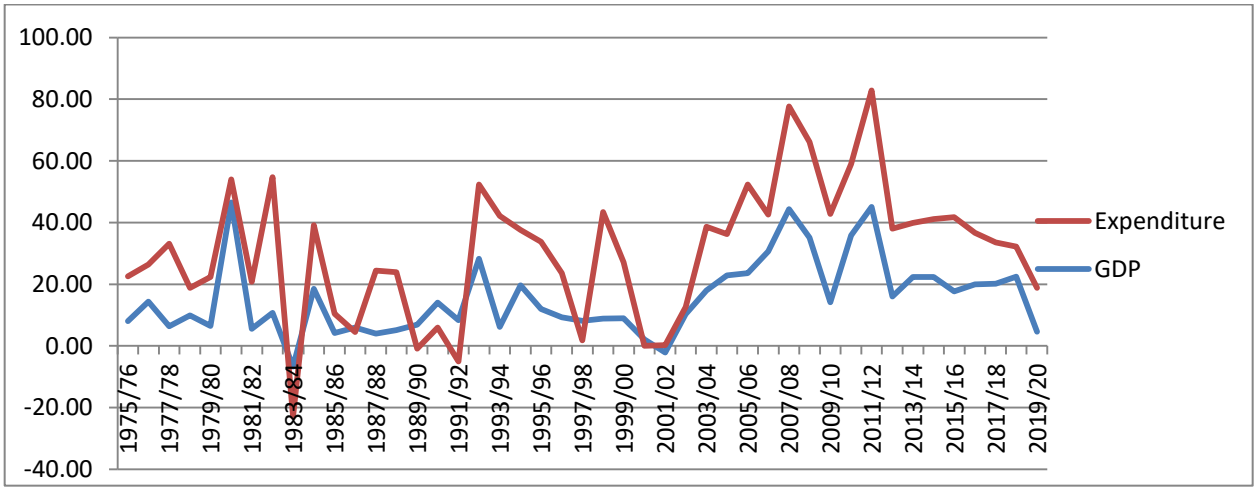
Fully liberalization of financial sector is not the option enhance financial sector it better to create partial liberalizations by building strong regulatory framework. According to Alemayehu Geda;2017 the set of policies relate to a carefully opening up of the financial sector as it cannot be protected forever, create a level playing field for the public and private financial sectors and time-specific capacity building for supervision and regulation at NBE in a very short time.

4.1.2 Trends of government expenditure and GDP

This study is to address the relationship that can be revealed between real gross domestic product and various composition of government expenditure like: agriculture, education, health, transport and communication, urban development and housing, total capital expenditure and total recurrent expenditure in Ethiopia. The Keynesian theory postulates that expansion of government spending accelerates economic growth. Regarding the link between public expenditure and economic growth, the theory of Keynesian macro economy assumed that high public spending leads to increase aggregate demand and in turn, increase the growth of the economy. On the other hand, the theory of Wagner inclined towards the opposite view. The second theory argues that an increase in the national income cause more public spending (Mwafaq M. Dandan 2011).

To Keynes, public expenditure is an exogenous factor and a policy instrument for increasing national income. In contrast, Wagner's law proposes that there is a long-run tendency for public expenditure to grow relative to some national income aggregates such as the Gross Domestic Product (GDP). In this study, both government expenditure and economic growth increases steadily though the similar trend. This shows that expenditure and economic growth increases at same way growth rate in the period under consideration. This is shown by figure 4.2. Higher growth rate of government expenditure may be associated with the key role financial development in the economic growth.

Figure 4.2 Growth rate of expenditure and GDP



Source: Own drawing (2021)

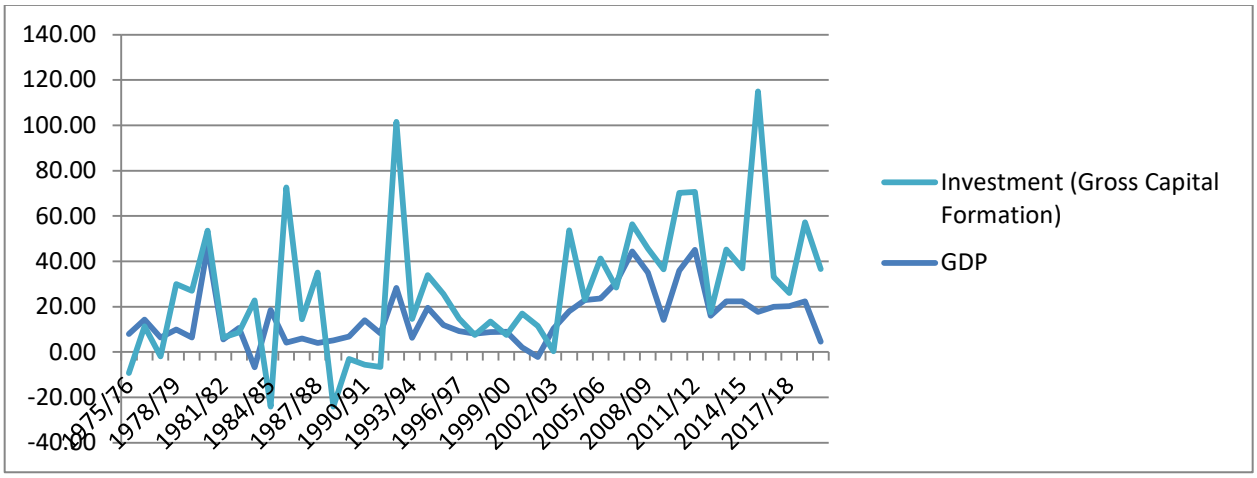
4.1.3 Trends of Investment (GCF) and GDP

The relevance of this study is also the importance of investment in boosting economic activities that can lead to better living standards and lower poverty rates. The African Development Bank (2018) has stated that the Ethiopia has the second larger number of popular country in Africa where more than 30% of the population, live on less than $1.90 a day. Murthy and Soumya (2007) presented some arguments for the importance of investment on poverty reduction and country has key factors that can aid in the improvement of economic growth.

Abubakar, Kassim and Yusoff (2015), the study explores how financial sector development affects domestic investment. Similar to this study, Ndikumana (2000) evaluated the dynamic serial correlation model indicated that there was a positive relationship between domestic investment and economic growth in Ethiopia.

In this study, like government expenditure and economic growth, gross capital formation and economic growth increases steadily though the similar trend.

Figure 4.3 Growth rate of GCF and GDP



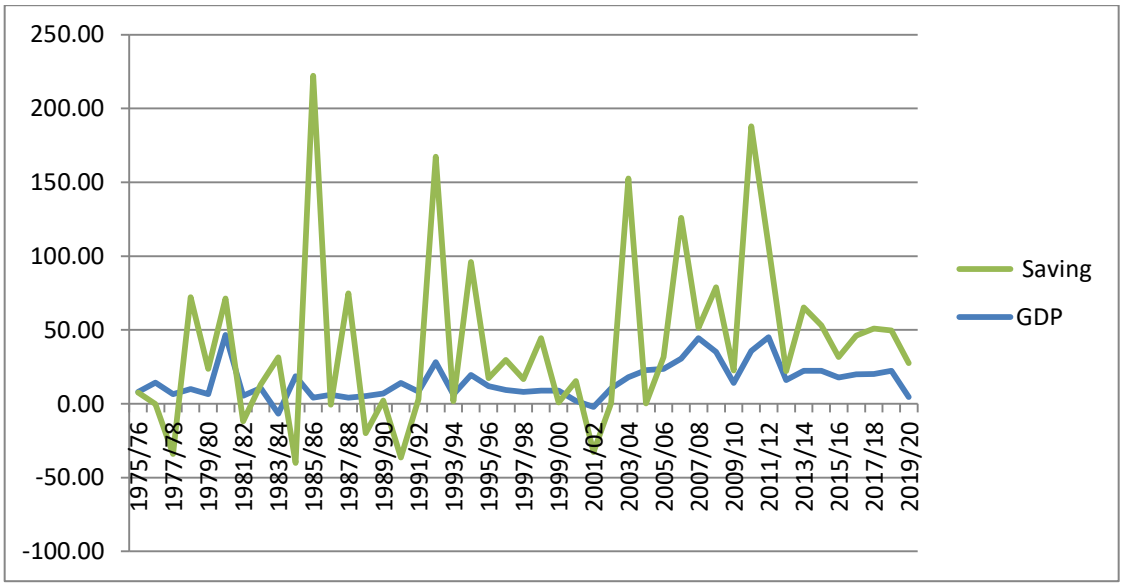
Source: Own drawing (2021)

4.1.4 Trends of saving and GDP

An alternative measure of financial depth, which is frequently used, is the ratio of bank deposit to GDP. The deposit and lending interest rate structure were discriminated among private, public institutions, cooperatives, and associations. Hence, the private sector was incurred the highest rate in all kind of loans for instance, agricultural loan was 7 percent for private, 6 percent for state enterprises and 5 percent for cooperatives. The deposit interest rate paid for private was 5.5 percent for time deposit whereas it was 7.5 percent for others. The performance was not smooth trend and pattern in the entire sample periods.

In this study, the graphs of savings and economic growth are plotted against time on fig. 4.4. They seem to follow similar trend for most of the study period. A decrease/increase in savings represents depreciation/appreciation of the study.

Figure 4.4 Growth rate of saving and GDP



Source: Own drawing (2021)

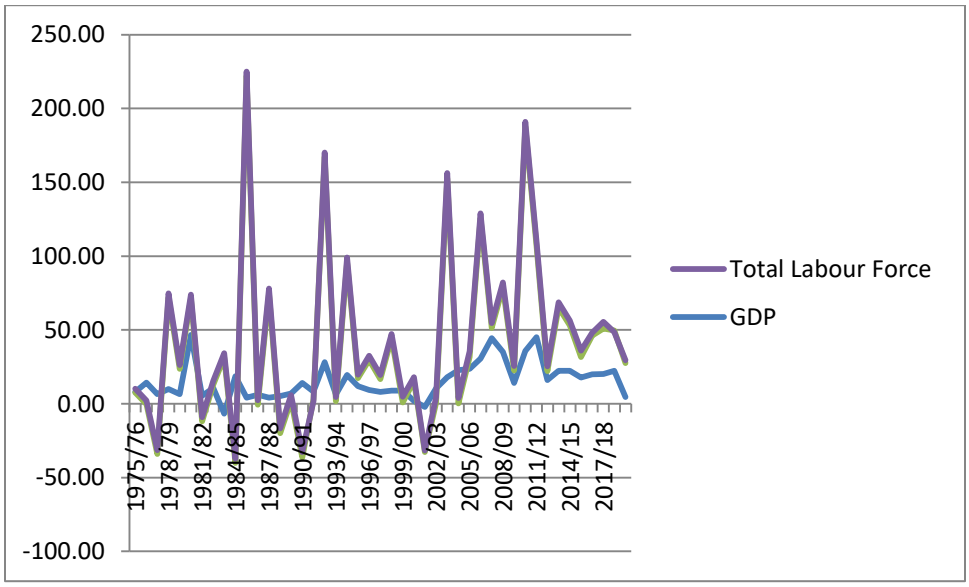
The figure shows: Growth rate saving and GDP 1975-2019

CBE share in total deposit has dropped to an average of to 87% in the post-reform period, the actual figure for 2002/03 being 75.5%. The sharp decline in CBE's share in total deposit (as percent of national total) observed in 2002/03 is primarily due to the performance of the other new private bank, (Alemayehu Geda 1999b).

Clearly there is evolving structural shift when deposit is observed by institutions. In general the trend is to move away from a dominant public sector towards a financial structure where the role of the private sector is becoming increasingly important. In general, during the two periods (before and after the reform), demand deposit by the private sector and individuals increased ; the share of cooperatives declined; and the share of the public enterprises and agencies declined Financial agencies share has also declined while the central government's share has increased. In terms of saving and time deposits the private sector has the lion share in both periods. This is attributed to the government's rule that restricts public enterprise and agencies form holding such deposit (Alemayehu Geda 1999b).

2.5.1 Trends of TLF and GDP

Figure 4.5 Growth rate of TLF and GDP



Source: Ethiopian plan and development Commission: Financial Development, 2019

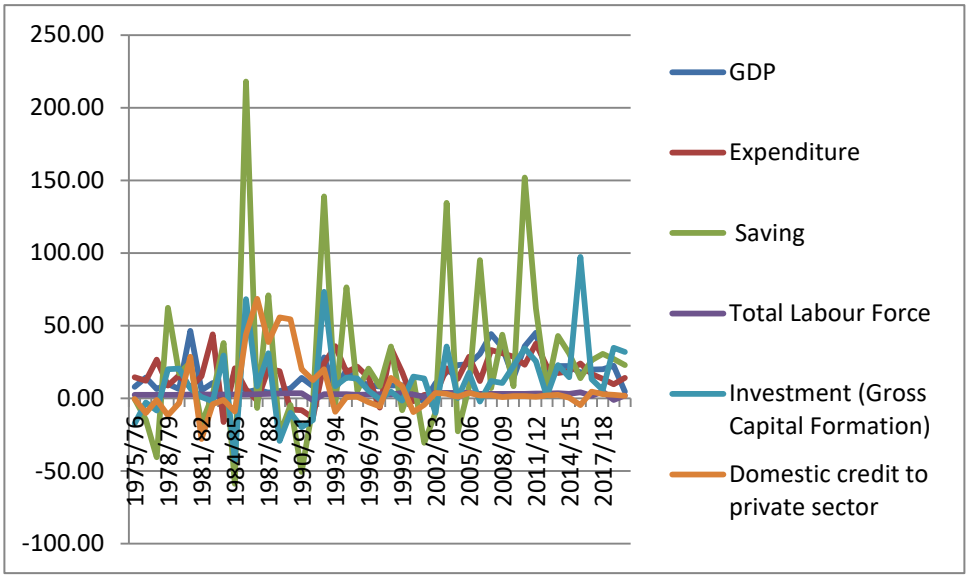
The data depicted in the figure above refers to the crude but widely used measure of total labor force which refers to the share of the labor force that is with work and actively seeking for jobs. Based on this measure our country as whole has experienced a similar trend in the last three decades. The year, 2017 was the highest and 2018 was the lowest. Whether it is the maximum or the minimum, the level of total labor force is not perturbing because our world has experienced more than threefold of this figure during the great depression and still this time it's a commonplace level of total labor force. The unparalleled fact here for our country is the people work but paid back less - lower than subsisting oneself with basic needs. The working poor is special name, sounds a perfect explanation of the imperfect living and distorted and distorted living standard of Africa.

4.1.6 Trends of Financial Development, Government Expenditure, GCF, Savings, TLF and Economic Growth

Developing countries financial sectors are characterized by commercial banks which have a lion share for over 80 percent of the financial systems' total assets. The sector is also characterized by lack of competition, and relatively small by world standards. Moreover, Ajakaiye (2005) revealed that the financial sector of Ethiopia is at their elementary stage

comparing to the rest of the world. For instance, in the blow table show GCF (investment) growth rate was 13.72 percent in 2001, increased marginally to 17.582 percent by 2005. Abebaw (2012) after assessing the Ethiopian financial performance between 2001 -2008 he finds the banking sector of Ethiopia constitute 95 percent of asset, 96.53 percent of deposits, 94 percent of loans and deposits and 76.78 percent of equity of the financial sector on average. Kiyota et al (2007), Ethiopian bank concentration measured by the asset of the three largest banks found 88 percent compare to 59 percent for Kenya, 67 percent for Tanzania, 63 percent for Uganda, and 81percent for SSA as a whole. Moreover, in 2008 the Ethiopian bank concentration drop to 67 percent out of it Commercial Bank of Ethiopia report 58percent which is the highest in East Africa standard. It implies that bank competition in Ethiopia had remained at its lowest degree. Consequently, there is up and dawn rate of saving and lower rate of domestic credit to private sector that discourages investment performance.

Figure 4.6 Percentage Growth rate of the Finance variables of Ethiopia over previous year 1974



Source: Own drawing (2021)

Economic growth

Real GDP: It's an interesting articulation of economic growth from Maddison (1970), with his own wording: …the rising of income level is generally called economic growth in rich-countries and in poor ones it is called economic development.

Based on the measure of RGDP, Ethiopia individually and the region as a group found at the underneath of national standards. As the figure above depicts some year's exhibit a very high growth rate while other with a negative growth rate. In Ethiopia there is a clearly observed variation in the growth rate of the economy as a whole and particularly in the growth rate of per GDP. Some countries might have big economic size but low per-capita GDP for instance, from Africa countries Ethiopia has the next to Nigeria the second most populous country and with big economic size and low GDP per capita.

The growth rate of GDP was increased continuously by double digit i.e. increased by the range of 12% up to 24% begin 2002/03 up to 2018/19. But during 2019/20 growth rate of GDP is decreased to 4.6%. The reason behind this low growth rate is agricultural sector damaged by locust and the economy sector affected by Covid 19.

4.2 Descriptive Statistics

Table 4.1 shows the descriptive statistics for the variables. The values of skewness most of the variables are positive for all variables. The Kurtosis which measures whether data are flat relative to normal distribution with an predictable variables are required to have normal distribution before they are used in any parametric statistical method. Skewness and Kurtosis give indication as the nature of distribution of variables. Skewness is a measure of symmetry or the not have of symmetry. The Skewness for normal distribution is zero and any symmetric data should have skewness near to zero. The probability value of all variables is high accepting that the normal distribution for all the variables representing a normality of their financial development sector conditional distributions. The JarqueBera test is used to confirm hypothesis about the reality that a given is a sample of normal random variable with unknown mean and dispersion. The mean to median ratio of each variable is within the unit nearness and standard deviation is on the low side showing small variability.

The confirmation from the table shows that all the variables are normally distributed. Also, the variables GOVEXP, GCF, SAV, FDS and TLF are positively skewed with GDP. The small standard deviation compared to the mean implies that slow growth rate over the period.

Table 4. 1 Summary of Descriptive statistics for financial variables

Descriptev Statistics	LNRGDP	LNFDS	LNGOVEXP	LNGCF	LNSAV	LNTLF
Mean	11.211	5.9753	9.6498	10.99	9.10072	17.131
Median	10.887	6.5724	9.3299	10.667	8.63701	17.104
Maximum	14.852	6.8903	13.05	14.037	13.6368	17.771
Minimum	8.62173	4.07754	6.94013	9.55506	6.36077	16.5168
Std. Dev.	1.86589	1.03737	1.78929	1.21532	2.13874	0.38424
Skewness	0.55774	0.8415	0.45498	0.99494	0.76052	0.11243
Kurtosis	2.11924	1.88829	2.05758	3.01964	2.34649	1.81358
Jarque- Bera	3.87172	7.79764	3.28933	7.59003	5.25285	2.79478
Probability	0.1443	0.02027	0.19308	0.02248	0.07234	0.24724
Sum	515.739	274.868	443.892	505.577	418.633	788.062
Sum Sq.Dev.	156.67	48.4258	144.07	66.4647	205.84	6.64387
Observations	46	46	46	46	46	46

Source: Own computation (2021) using Eviews 9.0

4.3 Unit root test

It is necessary to test the nature of stationary of the variables before running regression analysis. This helps us to avoid the possibility of running spurious regression, which makes the result to be unreliable and not consistent. This test can be done using the Augmented Dickey-Fuller unit root tests. When the ADF test statistics is larger than the critical value in absolute terms at 5% level of significance, the null hypothesis of unit root is rejected, and if the ADF test statistics is less than the critical value in the absolute terms, it can be fail to reject the null hypothesis. The results of ADF test for unit root of variables used in presented in the following table.

Table 4. 2 The Results of Augmented Dickey Fuller Test

Variables	ADF t-statistics at level, I(0)		ADF t-statistics at first difference, I(1)		Order integration decision
	Intercept	Intercept and trend	Intercept	Intercept and trends	
LNRGDP	1.692948(NS)	-0.75171 (NS)	-4.544799** (S)	-5.079084** (S)	Stationary at I(1)
LNGOVEXP	0.398391(NS)	-1.27941 (NS)	-5.854245** (S)	-4.879855** (S)	Stationary at I(1)
LNSAV	0.33217 (NS)	-2.08666 (NS)	-8.543075** (S)	-7.018233** (S)	Stationary at I(1)
LNTLF	0.218172 (NS)	-2.21710 (NS)	-7.155309** (S)	-8.043269** (S)	Stationary at I(1)
LNGCF	-1.830267 (NS)	-2.205823 (NS)	-7.557990** (S)	-4.412766** (S)	Stationary at I(1)
LNFDS	-2.54077 (NS)	-2.0331 (NS)	-3.755618** (S)	-3.279650** (S)	Stationary at I(1)

Mackinnon(1996) with constant, no trend		With constant and trend	
Test critical values:	1% level=-3.088509	Test critical values:	1% level=-4.180984
	5% level= -2.92973		5% level=-3.215523
	10% level= -2.603064		10% level=-3.028259

Source: Own computation (2021) Using EVIEWS 9.0

*** indicate 1% level of significance

Where NS and S represent not stationary and Stationary respectively.

Table 4.2 shows unit root results of the series at level and first differences. The absolute values of the calculated test statistics for all variables are less than its critical values at 5%

level of significance. The result indicates that economic growth, government expenditure, saving, total labor force, gross capital formation and financial development sector are non-stationary at level. Thus, the null hypothesis of each variable has unit root at a level which cannot be rejected by the ADF test. However, economic growth, government expenditure, saving, labor force, gross capital formation, and financial development sector were found to be stationary at their first difference, and thus it can be reject the null hypothesis, and the model can be accepted since the coefficients of variables in all cases are negative and statistically significant. The result imply that all the variables included in the models are integrated of order one, I (1).

Thus, with the establishment of the order of integration, the study proceeds to testing for long-run relationship by employing Johansen approach to test co-integration. However, before applying this test, it can be needed to determine first the appropriate lag length, and check the stability of the VAR since Johansen's co-integration test and thus VAR and VER is very sensitive to lag length determination.

4.4 Optimum lag length

In the Johansson approach, the first step is testing for co-integrating a VAR model is to determine the optimal lag length of the VAR. Johansson co-integration analysis is very sensitive to the number of lags included in the model, the more lags included, the more initial values lost. If include too few lags, the size of the test will be incorrect (Wooldridge, 2000).The stability of VAR and VECM is Shown that the VAR and VECM are stable. The optimal is determined with sequential modified likelihood Ratio test statistics (LR), the Final prediction Error (FPE), the Akaike information criterion (AIC), the Schwarze Information Criterion (SC) and the Hannan-Quinn information criterion (HQ).

Lag that provides the minimum value is chosen as the optimal lag length that means, among the IC that provides majority lag has been choose as optimal lag length. While, checking up to four lag orders to include the 5% level of significance suggest that lag 1 be the optimum lag length. This has been confirmed by LR, FPE, SC and HQ in both cases. The smaller the value of the information criteria is better the models. The lag exclusion test confirms the first lag to be the appropriate lag. The next step is to estimate Johansson test

of co integration, VAR, VECM, Granger causality and impulse response and variance decomposition models.

Table 4.3 VAR Lag Order Selection Criteria

VAR Lag Order Selection Criteria						
Endogenous variables: LNRGDP LNFDS LNGCF LNGOVEXP LNSAV LNTLF						
Exogenous variables: C						
Date: 06/28/21 Time: 16:06						
Sample: 46						
Included observations: 42						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	26.79764	NA	1.50E-08	-0.990364	-0.742125	-0.89938
1	290.5168	439.5319*	2.98E-13*	-11.83413*	-10.09646*	-11.19721*
2	328.4457	52.37808	3.02E-13	-11.92599	-8.698887	-10.7431
3	377.8167	54.07297	2.15e-13	-12.56270	-7.846169	-10.8339
4	407.2276	23.8088	5.72E-13	-12.24893	-6.04297	-9.9742
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Source: Own computation (2021) using Eviews 9.0

Co integrating test is usually preceded by the test of optimal lag length as the result of the test is affected by the number of lags included in the VAR model. The likelihood Ratio test (LR), The Final prediction Error test (FPE), the Akaike Information Criteria (AIC), the Schwarz information criteria (SIC) and the Hannan-Quinn Information Criteria. (HIC) are used to determined, the optimal lag length of the VAR model for co integration test. Table shows that all criteria suggest a lag length of one at 5% level of significance and this lag length are used in this study.

4.5 Johansson Co integration Test

The existence of the same order of integration, therefore allows us to test for co integration among the variables, to determine the number of co integrating vectors two test statistics called the maximum Eigen value (λmax) and trace statistics (λtrace) are computed.

The trace tests the null hypothesis of r co integrating vectors against the alternative hypothesis of k co integrating vectors, where k is the number of endogenous variables, for r=0,1,2,…….,k-1.

The maximum Eigen-Value test, on the other hand tests the null hypothesis of r co integrating vectors against the alternative hypothesis of r+1 co integrating vectors.

It can be seen from table (4.4) that the unrestricted co integration rank tests both trace statistics (λtrace) and maximum Eigen value (λmax) show the existence of co integrating vectors in the system. This means the null hypotheses of no co integration is rejected by both the (λmax) and (λtrace) statistics.

If the test statistics is greater than the critical values, the null hypothesis that there exists r co integrating vectors against the alternative hypothesis that there are r+1 (for (λtrace) or more than r (λmax) conclude that there is no co integrating vector. Against the alternative hypothesis that there are r+1 (for λtrace) or more than r (for λmax) is rejected. Thus both λtrace and maximum Eigen value (λmax) conclude that there is no co integrating vector among the variables and there is only one Eigen value (λmax) significant at 1% level and this outcome determines that the rank of the co-integration is unity. It can be conclude that among the variables there is one long run relationship. The result of testing the number of co integrating vector is shown in table (4.4).

Table 4. 4 Johansson Co Integration Test

Date: 06/13/21 Time: 10:19
Sample (adjusted): 3 46
Included observations: 44 after adjustments
Trend assumption: Linear deterministic trend
Series: LNRGDP LNFDS LNGCF LNGOVEXP LNSAV LNTLF
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.711044	112.4332	95.75366	0.0022
At most 1	0.456937	57.80804	69.81889	0.3088
At most 2	0.328697	30.94469	47.85613	0.6695
At most 3	0.182961	13.40915	29.79707	0.8720
At most 4	0.076344	4.518168	15.49471	0.8577
At most 5	0.023002	1.023893	3.841466	0.3116

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

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.711044	54.62517	40.07757	0.0006
At most 1	0.456937	26.86336	33.87687	0.2707
At most 2	0.328697	17.53553	27.58434	0.5342
At most 3	0.182961	8.890987	21.13162	0.8411
At most 4	0.076344	3.494275	14.26460	0.9085
At most 5	0.023002	1.023893	3.841466	0.3116

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

Source: Own computation (2021) using Eviews 9.0

Trace statistics confirm the variable is co-integrated of at most one. Table (4.4) reports that the null of no co-integration vector is rejected by trace statistics at 5% significance level. On the other hand, one co-integration vector is not rejected by tests, it can be concluded that there exists only one co-integration vector, and thus there exists meaningful long run relationship between the economic growth and financial development, government expenditure, GCF (investment), saving and total labor force (TLF).

In addition to this, the existence of one co-integrating vector indicates that the first row β coefficient and the first column of α vectors are important for further analysis. Thus, table (4.4.1) and table (4.4.2) below reports β and α vectors respectively.

Table 4.4.1: Standard Beta (β) Coefficient/Long Run Co-Integrating Vectors (Linearzed)

1 Co-integrating Equation(s):		Log likelihood	308.4913		
Normalized co-integrating coefficients (standard error in parentheses)					
LNRGDP	LNFDS	LNGCF	LNGOVEXP	LNSAV	LNTLF
1	-0.04807	-0.03948	-1.10159	-0.05251	0.791524
	-0.01776	-0.00584	-0.06097	-0.01712	-0.59562

Source: Own computation based on the data of Ministry of Finance (2021) using Eviews 9.0

Note: since the table is not in equation form, the real sign of the coefficients are changed

At it is presented in table 4.4.1, the long run co integrating vector indicates that FDS, GCF, SAV and GOVEXP have registered the expected sign and statistically significant. A 1% change in FDS, GCF, SAV and GOVEXP will result in 0.048071%, 0.03948%, 0.05251% and 1.101592% increase in GDP respectively. GOVEXP has a positive significant effect on economic growth; this is due to the fact that government expenditure established that value added and levels of the institutional that make it possible for generous economic benefits to have a positive impact on the growth and individuals are willing to consume that to work hardly to despite monetary incentives as long as there are attractive economic opportunities. This finding is consistent with other studies (Thomas Biegert, 2017). TLF shows the opposite sign, and it is not statistically significant.

Table 4.4.2: Adjustment coefficients

Adjustment coefficients (standard error in parentheses)	
D(LNRGDP)	-0.24708 (0.08354)
D(LNFDS)	-0.31496 (-0.51471)
D(LNGCF)	-0.1772 (-0.77402)
D(LNGOVEXP)	1.235616 (-0.32697)
D(LNSAV)	2.16173 (-1.33812)
D(LNTLF)	-0.00406 (-0.03783)

Source: Own computation (2021) using Eviews 9.0

The value of α coefficient obtained from the cointegrating run parameters towards the equilibrium relationships. For example, the adjustment coefficients of economic growth (RGDP), financial development (FDS), investment or gross capital formation (GCF) and total labor force (TLF) are negative indicating the existence of adjustments towards long run equilibrium. That is the speed of adjustments RGDP, FDS, GCF and TLF to their long run equilibrium by 24.7%, 31%, and 17.7% and 0.4% respectively. On the other hand, the adjustment coefficients of Government Expenditure (GOVEXP) and saving (SAV) are positive which indicate the extent to which these variables may derive from their long run steady state path after a certain shock. Based on this it would be possible to analyze both the long run and the short run relationship between these variables in Ethiopia for the period under consideration.

4.6 The Vector Error Correction Model

4.6.1 Long-Run vector error correction model

A vector error correction model is a restricted VAR model that has co integration restrictions built in to the specification. It is designed for use with non- stationary series that are known to be co-integrated. The vector error correction specification restricts the long-run behavior of the endogenous variables to converge to their co-integrating relationships while allowing a wide range of short-run dynamics. The co integrating term (the error correction term) corrects the deviation from long-run equilibrium gradually through a series of partial short run adjustments.

Table 4.5 The long run Vector Error Correction Model

Vector Error Correction Estimates		
Date: 06/13/21 Time: 12:01		
Sample (adjusted): 3 46		
Included observations: 44 after adjustments		
Standard errors in ( ) & t-statistics in [ ]		
Cointegrating Eq:	CointEq1	
LNRGDP(-1)	1.000000	
LNFDS(-1)	-0.04807	
	-0.01776	
	[-2.70650]	
LNGCF(-1)	-0.03948	
	-0.00584	
	[-2.10134]	
LNGOVEXP(-1)	-1.10159	
	-0.06097	
	[-18.0686]	
LNSAV(-1)	-0.05251	
	-0.01712	
	[-2.33613]	
LNTLF(-1)	0.791524	
	-0.59562	
	[1.43486]	
C	-12.9513	

Source: Own computation (2021) using Eviews 9.0

The long run relationship is derived by normalizing growth in RGDP from table (4.5).The normalized co-integration equation can be written as:

RGDP = 12.95126+0.04807FDS+0.03948GCF +1.10159GOVEXP + 0.05251SAV – 0.791524TLF.

As the above table 4.5 t-statistics and standard error shows, all variables were registered the expected positive sign except TLF. Then FDS, GCF, GOVEXP and SAV are statistically significant. It can be interpreted that these long-run relationships between the variables as follows: Since all variables are in logarithm functional form it takes elasticity interpretations.

- The numbers in addition under the estimated coefficients are the asymptotic standard errors. For the coefficients that are normalized to 1. Where, c is constant and it exerts a positive effect on growth in RGDP. From the above equation it can be observed that FDS, GCF, GOVEXP and SAV have a positive and statistically significant relationship with RGDP in the long run, whereas TLF has a negative and insignificant effect on economic growth in Ethiopia. A1% change in FDS, GCF, GOVEXP and SAV will result in 0.04807%, 0.03948%, 1.10159% and 0.05251% increase in RGDP respectively, on average, keeping another factor constant. The studies found that financial development sector, gross capital formation, government expenditure and saving have's positive effect on long run economic growth (RGDP) in Ethiopia. Thus, it can be concluded that, in the long run improving financial development, investment, government expenditure and saving contribute for economic growth in Ethiopia. This finding is consistent with other studies (Hailay Tsigab 2013).

4.6.2 Short Run Vector Error Correction Model

If two series are integrated of order one, I, e,(1) could the model their relationship by taking first difference of each series and including the difference in VAR. from the Johansson test of co-integration table (4.6) known that there exists a long-term relationship between our variables with ECONOMIC GROWTH, so after identifying the existence of long-run relationship among the relevant variable the vector error correction model (VECM) is estimated in order to evaluate the short run properties of co integrated series.

The vector error correction has co integration relations built in to the specification so that it restricts the long run behavior of endogenous variables to converge to their co integrating relationships while allowing for short run adjustment dynamics (Harris, 1995). The co integration 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. First estimating the short run impact of RGDP, FDS, GOVEXP, GCF, SAV and TLF on

economic growth is done. Table (4.6) shows the parameters coefficient estimation of ECM (i.e. dynamic short run model). The result from the following table (4.6) shows that, in the short run only the one year lagged value of FDS and SAV are significant affecting current growth of RGDP, whereas, GCF (investment), GOVEXP and TLF are not statistical significance in affecting growth in the current economic growth. Thus, the impact on economic growth can be explained on average in the short run as, a 1% growth in Financial Development and Savings of the lagged one year increases the current economic growth by 21.8% and 26.4% respectively, keeping other factor constant. Thus, obtained results are consistent with the Solow hypothesis. In the short run GCF and TLF have a positive sign but it is not statistically significant.

Table 4.6 VEM Estimation of Coefficient in the Short Run

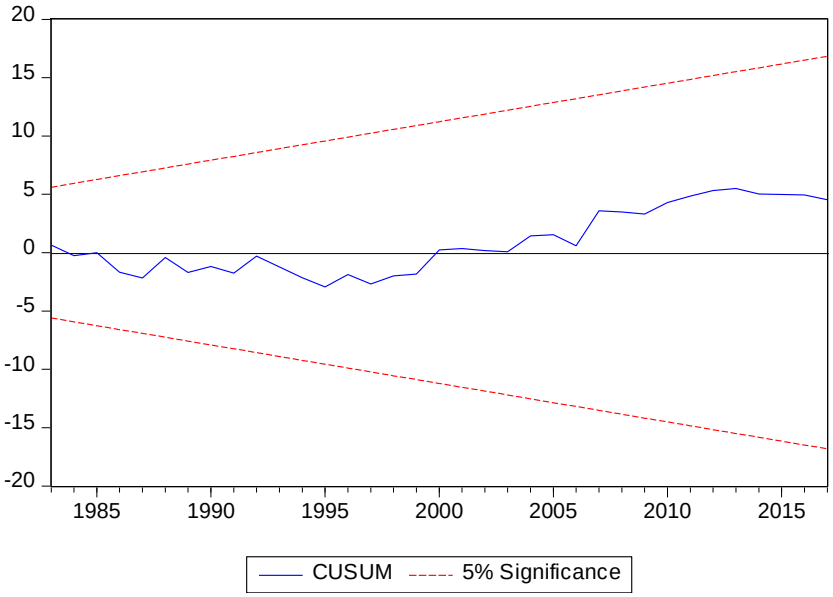
Dependent Variable: D(LNRGDP)				
Method: Least Squares (Gauss-Newton / Marquardt steps)				
Date: 06/13/21 Time: 12:53				
Sample (adjusted): 3 46				
Included observations: 44 after adjustments				
D(LNRGDP) = C(1)*(LNRGDP(-1) - 0.0480709473623*LNFDS(-1) -				
0.0394748036543*LNGCF(-1) - 1.10159248895*LNGOVEXP(-1) -				
0.0525117561949*LNSAV(-1) + 0.791524461316*LNTLF(-1) -				
12.95125709) + C(2)*D(LNRGDP(-1)) + C(3)*D(LNFDS(-1)) +				
C(4)*D(LNGCF(-1)) + C(5)*D(LNGOVEXP(-1)) + C(6)*D(LNSAV(				
-1)) + C(7)*D(LNTLF(-1)) + C(8)				
	Coefficient	**Std.Error**	**t-Statistic**	**Prob.**
C(1)=CointEq	-0.24708	0.08354	-2.32077	0.0002
C(2)= LNRGDP(-1)	0.274646	0.404358	0.679216	0.5013
C(3)=LNFDS(-1)	0.21863	0.051759	-2.24293	0.0219
C(4)=LNGCF(-1)	0.056537	0.147587	0.383076	0.7039
C(5)=LNGOVEXP(-1)	-0.22697	0.335873	-0.67576	0.5035
C(6)=LNSAV(-1)	0.264545	0.088693	2.727738	0.0015
C(7)=LNTLF(-1)	0.137308	2.166355	0.063382	0.9498
C(8)=Constant	0.123715	0.061712	2.004722	0.0526
R-squared	0.679694	Mean dependent var		0.139863
Adjusted R-squared	0.599623	S.D. dependent var		0.13951
S.E. of regression	0.140443	Akaike info criterion		-0.92506
Sum squared resid	0.710076	Schwarz criterion		-0.60066
Log likelihood	128.3513	Hannan-Quinn criter.		-0.80476
F-statistic	2.918651	Durbin-Watson stat		2.158635
Prob(F-statistic)	0.002256			

Source: Own computation (2021) using Eviews 9.0

The speed of adjustment or the error correction term from the above model is represented by C (1) and come up with the expected sign and level of significance. In an empirical sense, it implies 24.7% of the disturbance in the short run is corrected each year or it adjusts any disequilibrium towards long run equilibrium state path or it indicates that 24.7 % of the disequilibrium from the long run path will be correcting in one year. When a shock occurs in the system each year, about 24.7% of it will be adjusted towards its long-run equilibrium. The coefficient indicates that there is moderate correction for divergence of GDP from equilibrium, implying economic agents taking past experience they correct about 24.7% of errors in one year and the remaining 75.3% in the next three year, and imply a moderate high speed of adjustment to equilibrium.

R^2 is 67.9% which indicate that the fitted value explains the model well, indicates 67.9% of the growth in RGDP is explained by the variables included in the regression. 'F' test which shows the jointly significant at 5% level of significance. Moreover, the overall significance (F-test) established all variables are jointly significant. Also, in order to strength our analysis, the stability of the estimated parameters in the model is examined using stability test of recursive residuals. The stability of the model is checked using CUMSUM method and the graphs that show the result is presented as follows. The following figure confirms that the coefficients of the model are stable over a sample interval.

Figure 4.7: Parameter Stability Test VECM: Recursive Estimates



Source**:** Own drawing (2021), and EViews version 9 using NBE data

The graphs show that the dependent variable LNRGDP is stable at 5% of level of significance because the true line found between the upper and lower lines.

4.7 Diagnostic Tests

The Diagnostics test was also employed for VECM to detect model misspecification and as a guide for model improvement. These tests include serial correlation, hetoscadasticity and normality tests. The serial correlation test can be done using Breusch-Godfrey Serial Correlation. LM Test investigates the serial correlation which helps to identify the relationship that may exist between the current values of the regression residual and lagged value. The null-hypothesis of the LM test that the residuals are not serially correlated is accepted at 5% level of significance.(See appendix B). The Jarque-Bera normality test is used to see whether the regression errors are normally distributed. The null-hypothesis that the residuals are normal is accepted (see appendix B).

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 was accepted and independent of the regressors and that there is no problem of misspecification. The null hypothesis that the residuals are homoscedastic is accepted at 5% significance level. This indeed is not surprising, since hetreroscedasticity is not much problem in time series (Green, 2003), (see appendix B).

4.8 Granger Causality Tests/long run Causality

The dynamic relationship is the simplest technique use to examine the cause and effect relationship between variables in a bivariate system and it is applied in the context of the simple linear regression model. However, the simple linear regression model fails to capture the underlying dynamic causality between variables which is efficiently analyzed by Granger (1969) in terms of the Granger causality test. To further investigate the dynamic relationship between the variable, employed Granger causality test using the VAR model. The institution behind of this test is that to find out whether changes in one variable cause the other to change. In order to conclude the direction of causation between two variables, the Granger causality test analysis must make sense. The following table 4.7 shows Granger causality test

Table 4.7 Granger Causality Tests/long run causality

Pairwise Granger Causality Tests			
Date: 06/13/21 Time: 22:43			
Sample: 1 46			
Lags: 1			
Null Hypothesis:	Obs	F-Statistic	Prob.
LNFDS does not Granger Cause LNRGDP	45	0.18651	0.6681
LNRGDP does not Granger Cause LNFDS		0.03359	0.8555
LNGCF does not Granger Cause LNRGDP	45	0.02139	0.8844
LNRGDP does not Granger Cause LNGCF		0.9534	0.7102

Source: Own computation (2021)

As it can be seen from the table above, it is fail to reject the null hypothesis that RGDP does not granger cause of FDS those and similarly, failed to reject the null hypothesis that FDS does not granger cause of RGDP, therefore this indicates that there is no granger causality run from GDP to FDS and vice versa in the long run. According to (Gujjrati, 2004), independence is suggested when the sets of *x* and y coefficients are not statistically significant in both the regressions. So my study shows that in long run financial sector and economic growth are not statistically significant so both are interdependence causality. The study shows that the interactions of financial development sector and economic growth have no long-run and short-run relationship in Ethiopia. This means that financial development sector cannot be the cause and effect on economic growth and economic growth also cannot be the cause and effect on financial sector.

4.9 Short Run Granger Causality Wald Test: Vector Error Correction Model

As long as, the error correction term has negative sign and got statistical significance that can be tested the short run causality between financial sector and economic growth. To examine the short run causality, there can be used the technique of Wald coefficient restriction. Table 4.8 shows the result of the tests.

Table 4.8 VEC Granger Causality Wald Test Result When RGDP Is Dependent Variable

VEC Granger Causality/Block Exogeneity Wald Tests
Date: 06/13/21 Time: 23:03
Sample: 1 46
Included observations: 44

Dependent variable: D(LNRGDP)

Excluded	Chi-sq	df	Prob.
D(LNFDS)	1.544881	1	0.2139
D(LNGCF)	0.146747	1	0.7017
D(LNGOV...	0.456648	1	0.4992
D(LNSAV)	0.529603	1	0.4668
D(LNTLF)	0.004017	1	0.9495
All	4.301268	5	0.5069

Source: Own computation (2021)

There is no short run causality running from financial development sector to economic growth because the probability of Chi-Square is greater than 5% level of significance, thus, it can be accepted the null hypothesis that says there is no short run causality running from financial development sector to economic growth.

Table 4.9 VEC Granger Causality Wald Test Result When FDS Is Dependent Variable

Dependent variable: D(LNFDS)

Excluded	Chi-sq	df	Prob.
D(LNRGDP)	0.236835	1	0.6265
D(LNGCF)	0.569720	1	0.4504
D(LNGOV...	0.304798	1	0.5809
D(LNSAV)	0.200687	1	0.6542
D(LNTLF)	0.284864	1	0.5935
All	1.430240	5	0.9210

Source: Own computation (2021)

In the table (4.9) above where FDS is dependent variable the null hypothesis economic growth (RGDP) does not Granger cause financial development and the alterative hypothesis is economic growth Granger because FDS does Granger cause. From the table it shown that the P value is 0.6265, which is higher than 5% and based on the "P-value" this study tends to accept H0 that means not reject the null hypothesis. That is, RGDP does not granger cause FDS in the short run.

4.10 Test of volatility: Impulse response and variance decomposition

Impulse response is a method of assessing the relations among the variables in the VAR. It can be used either to assess the dynamic behavior of the VAR or to investigate the policy impact of the variables that constitute the VAR. The coefficient of VAR or VEC models only show the direct or ceteris paribus effect. They do not consider the lagged explanatory variables in each equation are inserted. That is both with the lag and contemporaneously and thus does not reflect the full impact of one variable on the other. Due to this, the analysis relies to a great extent on impulse response function to estimate the total short and long run an increase in financial sector development on economic growth.

In sum, impulses response shows how one variable, say economic growth responds over time to a shock in variable say one of the using financial variables and compares this response to shocks from other variables.

The variance decomposition helps in identifying the degree to which one variable influences the other. In this study variance decomposition was used to break down and ascertain the degree to which financial development sector influences the other variable and vice versa. To make it clear, variance decomposition shows the portion (or relative importance) of variance in the prediction for each variable in the system that is attributable to its own innovations and to shocks to other variables in the system.

4.10.1 Impulse Response Of VAR Model

Impulse response function helps us to trace the effect of a one standard deviation shock to one of the innovations on current and future values of the endogenous variables. It can be identified that the positive or negative impact of the variables and determine how long it would take for that effect to work.

Table (4.10) indicates the following results. In response to a one standard deviation disturbance output economic growth (RGDP) itself future output increase by 0.097518 in the first year and it is increased to 0.10732 in the second year and increase to 0.120411 in the fifth years. But never in the long die out in the long run and reaches at 0.131402 the tenth year.

A one standard deviation disturbance originating from financial development sector (FDS) results in an appropriately percent 0.021055 increase in output in second year, decreased to 0.02028 in the third and it further increase to 0.051593 in the fifth year and shows in

fluctuation way it did not die out in the time horizon and consequently it reaches 0.069231 in the 10th year. A one standard deviation disturbance originating from government expenditure (GOVEXP) results in an approximately 0.01811 increase in output in the third year, decreased 0.01716 in the fourth year, increased 0.01885 in the fifth year, decreased 0.00103 sixth year and shows in fluctuation way it never die out in the long run and consequently it reaches 0.02888 at the 10th year. A one standard deviation disturbance originating from total labor force (TLF) produces a 0.015151 increase in the second year and it further increase to 0.027872 in the fifth year and it did not die out in the time horizon and consequently it reaches to 0.041013 in the 10th year.

A one standard deviation disturbance originating from saving (SAV) produces a 0.017294 increase in the second year and it further increase to 0.018173 in the seventh year and it did not die out in the time horizon and consequently it reaches to 0.027118 in the 10th year. A one standard deviation disturbance originating from (investment) GCF produces a -0.00111 decreased in the second year and it further decreased to -0.00415 in the fifth year and it did not die out in the time horizon and consequently it reaches to -0.00117 in the 10th year. GCF has no permanent impact on RGDP, and its effect does die out. In other words, investment has no a long-run impact on economic growth which is in line with the above findings. The Impact of TLF and GDP are permanent, whereas FDS, GOVEXP, SAV and GCF are not permanent.

Table 4. 10 Impulse response of GDP

Response of LNRGDP:						
Period	LNRGDP	LNFDS	LNGOVEX	LNGCF	LNSAV	LNTLF
1	0.097518	0	0	0	0	0
2	0.10732	0.021055	0.01218	-0.00111	0.017294	0.015151
3	0.114845	0.02028	0.01811	-0.00736	0.013024	0.019517
4	0.117099	0.040749	0.01716	-0.00501	0.011384	0.025748
5	0.120411	0.051593	0.01885	-0.00415	0.011865	0.027872
6	0.123406	0.062147	0.00103	-0.00199	0.016544	0.031364
7	0.123999	0.066139	0.01001	-0.00067	0.018173	0.03371
8	0.126793	0.068077	0.01736	-0.00023	0.02175	0.036462
9	0.129827	0.069021	0.02351	-0.00046	0.024749	0.038788
10	0.131402	0.069231	0.02888	-0.00117	0.027118	0.041013

Source: Own computation (2021) using Eviews 9.0

4.10.2 Variance Decomposition of VAR Model

The impulse response functions trace the result of a shock to one endogenous variable on the other variables in the VAR, whereas, variance decomposition separates the variation in an endogenous variable in the component shocks to the VAR. The relative importance 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 4.11Variance Decomposition of RGDP

Variance Decomposition of LNRGDP:

Period	S.E.	LNRGDP	LNFDS	LNGCF	LNGOVEXP	LNSAV	LNTLF
1	0.129917	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.184759	94.67632	0.515212	0.426714	1.514968	1.620815	1.245972
3	0.218370	90.86950	1.362203	0.573415	1.533325	2.898081	2.763470
4	0.242954	87.53130	2.571689	0.506070	1.342298	3.646050	4.402594
5	0.263470	84.04217	3.995819	0.431119	1.166383	4.212457	6.152050
6	0.281697	80.40671	5.484358	0.417711	1.022929	4.715463	7.952831
7	0.298439	76.74262	6.936316	0.485918	0.912355	5.178212	9.744581
8	0.314128	73.14970	8.288573	0.636345	0.832499	5.606910	11.48597
9	0.329007	69.69648	9.505280	0.859804	0.779958	6.005573	13.15291
10	0.343209	66.42437	10.57045	1.143473	0.751212	6.377119	14.73338

Source: Own computation (2021) using Eviews 9

Table (4.11) reports the results of the variance decomposition of welfare growth in Ethiopia within a 10-period horizon. The variance estimates indicate that a greater proportion of the variation in RGDP is due to its own innovations. The variation due to the other variable is smaller. When it can be found the partial effect of factor inputs GOVEXP (0.751212%), as a percent of RGDP and GCF (1.143473%), as a percent of RGDP. This showing it has less important impact on future growth rate of economic development in Ethiopia. FDS, SAV, GOVEXP; TLF and GCF have permanent effects over all period.

The finding evidence shows that financial development may be more important in Ethiopia in the long run. This may be due to the fact that in Ethiopia, financial development is play role for economic growth in Ethiopia.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

This investigation analyzes of financial development and economic growth in Ethiopia using annual time series data for the period 1974/5-2019/20. The existing data from the, MOF, CSA, NBE, PDC (plan and development commission) concerning financial development reveal that, in Ethiopia. With the help of co integration and vector error correction analysis, the financial development and economic growth were examined in the long-run as well as in the short-run and their causalities. The results suggest that the financial development and economic growth works through the patterns and trends of financial development and short and long run relation financial development and economic growth and their causalities.

The study found the trend and pattern of financial development sector is after the reform period, most of the using variables by this study financial sector increases rapidly and keeps a upward trend. Indifferently, the finding shows that the trends of financial sector are increasing slowly initially and then it increasing at faster rate. After the reform period; financial sector increases rapidly and keeps a upward trend peak in the mid, 2000s until the early years of 2014s.

The study finding shows that financial development, gross capital formation/investment/, savings and government expenditure have a positive and statistically significant relationship with economic growth in the long run. However, total labor force (TLF) has a negative and statistically not significant.

Nonetheless, the adjustment coefficients of government expenditure and savings have positive which indicate the extent to which these variables may derive from their long run steady state path after a certain shock.

The finding evidence shows that financial development, gross capital formation, savings and government expenditure may be relatively more important input than total labor force in Ethiopia in the long run. The results suggest financial development, investment, savings and government expenditure are that the key role in economic growth in the long run.

The study also found that, in the short run the one year lagged value of financial development and savings have, a positive and statistical significant affecting current growth of RGDP, whereas one year lag of gross capital formation and total labor force have positive but it has no significant effect on affecting current growth of RGDP. Thus, obtained results are consistent with the Solow hypothesis.

The study confirms that the country is on the right truck to go for a short run relationship of economic growth and financial development sector. When a shock occurs in the system each year, about 24.7% of it will be adjusted towards its long-run equilibrium. The coefficient indicates that there is moderate correction for divergence of RGDP from equilibrium,

The study found that there is no causality running from financial development and economic growth and vice versa is also true both in the short and long run.

From econometric analysis using EVIEW-9 package, after undergone all the necessary and relevant steps to arrive at the following conclusions of about my research hypothesis:

- Based on the first research hypothesis regarding to relationship, financial development and economic growth in Ethiopia - an issue well established by previous works but still demanding some more investigations using recent data; it was found that there is strong relationship between financial development and economic growth under this study. Thus, I accept the alternative hypothesis. That means financial development sector has contribution to economic growth of Ethiopia.
- From the second query regarding the time serious nature of data of this study an investigation on whether there is check no unit root between financial development and economic growth and all variables stationary in ADF t-statistics at first difference, I(1) and the test equation at constant (intercept) at 1% and 5% level of significance. Therefore this study was accepted the alternative hypothesis based on the findings from this analysis. That means there is no unit root and the series is stationary.
- The study finding shows that financial development and economic growth have statistically significant relationship with economic growth in the long run. From the third research hypothesis this studies accept the alternative hypothesis that means there is co integration between series.

To conclude, the above all findings are done drawn from macroeconomic perspective and even the data has passed through different transformations which all requests the preciseness, which in turn questions the generalizability of the results and credibility for policy options. In fact, it is not only the case for this study solely, rather is the case for most researches held on macroeconomic frameworks.

5.2 Recommendations

The summary of the previous section has identified which financial developments have significant effect on economic growth. Based on these findings, it can be forwarded that the following policy options as a recommendation:

- The government of Ethiopia has to strengthen efforts on policies that will enhance growth which will in turn improve financial development sector of the economy.
- A general approach toward strengthening of these factors may also help to improve competence in domestic credit to private sector that cause size and liquidity to market, Ethiopia may benefit from financial deepening in the future. Such an approach should also help country to gain more from economic growth.

The study finding shows that government expenditure has a positive and statistically significant relationship with economic growth in the long run. Thus,

- The government should identify the government expenditure benefit by expanding government project and creating a job opportunities that ensures the benefits and consumption of the people and that cause economy growth the work it does.

The study finding shows that savings and investment/GCF/ have a positive and statistically significant relationship with economic growth in the long run. Thus,

- This implies that continuous appreciation of saving rate has a direct impact on encouraging economic growth. This would improve terms of financial development and it is hoped that the points raised thus far will help to chart an appropriate policy to raise the level of savings.
- The most important mechanism for spurring growth is investment since it helps savings and economic growth. Thus, the country is required to set an encouraging environment such as adequate access to credit in order to stimulate domestic investment. Therefore, the government should reduce lending rate through monetary policy in order to boost so as to bring high and sustained economic growth.

- Expand microfinance institution banks to far flung areas of the country to mobilize domestic saving from small depositors.
- Increase the deposit rate of the commercial banks through monetary policy at the disposal of the central bank. Thus, obtained results are consistent with the Solow hypothesis.

  The study finding shows that savings and financial development have a positive and statistically significant relationship with economic growth in the short run. Thus,
- Improving the coordination of all efforts to support saving and financial development and economic growth, eliminating extravagance and minimizing gaps.
- The government should ensure the short-term activities of financial institution through attractive of saving issues.

  The study found that there no causality running from either financial development to economic growth or from economic growth to financial development. Thus,
- The government should focus on strengthen financial development and economic growth as well as linking each other in Ethiopia.
- Economic growth and financial development link, experienced expert, government bodies and policy makers need to focus it.

  All the above bulleted conclusions and the recommendations as well finally requests for deep and co-integration and VECM analysis of each of the topics raised in this study from microeconomic perspectives, so that the expectation of the governments and peoples of Ethiopia were realized. Therefore, there can be finally, suggested that far reaching measures coupled with stable economic environment and good governance must be ensured for the financial development sector reforms to yield appropriate fruits in Ethiopia.

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Appendixes

Appendixes **A: Unit Root**

i) Economic Growth (RGDP)

Null Hypothesis: D(LNRGDP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.140203	0.0001
Test critical values:	1% level	-3.588509	
	5% level	-2.929734	
	10% level	-2.603064	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNRGDP,2)
Method: Least Squares
Date: 06/16/21 Time: 22:16
Sample (adjusted): 3 46
Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNRGDP(-1))	-0.775313	0.150833	-5.140203	0.0000
C	0.108276	0.029661	3.650433	0.0007

R-squared	0.386160	Mean dependent var	-0.000720
Adjusted R-squared	0.371544	S.D. dependent var	0.173540
S.E. of regression	0.137574	Akaike info criterion	-1.084923
Sum squared resid	0.794916	Schwarz criterion	-1.003823
Log likelihood	25.86830	Hannan-Quinn criter.	-1.054847
F-statistic	26.42168	Durbin-Watson stat	1.993439
Prob(F-statistic)	0.000007		

ii) Financial Development Sector/FDS/

Null Hypothesis: D(LNFDS) has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.055618	0.0381
Test critical values:	1% level	-3.600987	
	5% level	-2.935001	
	10% level	-2.605836	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNFDS,2)
Method: Least Squares
Date: 06/16/21 Time: 22:20
Sample (adjusted): 6 46
Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNFDS(-1))	-0.475171	0.155507	-3.055618	0.0042
D(LNFDS(-1),2)	-0.026675	0.178418	-0.149510	0.8820
D(LNFDS(-2),2)	0.041940	0.165149	0.253955	0.8010
D(LNFDS(-3),2)	0.453180	0.144164	3.143506	0.0033
C	0.030824	0.021535	1.431337	0.1610

R-squared	0.460540	Mean dependent var	0.003483
Adjusted R-squared	0.400600	S.D. dependent var	0.162579
S.E. of regression	0.125870	Akaike info criterion	-1.193286
Sum squared resid	0.570356	Schwarz criterion	-0.984314
Log likelihood	29.46237	Hannan-Quinn criter.	-1.117190
F-statistic	7.683337	Durbin-Watson stat	2.054284
Prob(F-statistic)	0.000139		

iii) Government Expenditure/govexp/

Null Hypothesis: D(LNGOVEXP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.854245	0.0000
Test critical values:	1% level	-3.588509	
	5% level	-2.929734	
	10% level	-2.603064	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNGOVEXP,2)
Method: Least Squares
Date: 06/16/21 Time: 22:22
Sample (adjusted): 3 46
Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNGOVEXP(-1))	-0.898688	0.153510	-5.854245	0.0000
C	0.122161	0.028086	4.349557	0.0001

R-squared	0.449341	Mean dependent var	-5.69E-05
Adjusted R-squared	0.436230	S.D. dependent var	0.165977
S.E. of regression	0.124623	Akaike info criterion	-1.282657
Sum squared resid	0.652298	Schwarz criterion	-1.201557
Log likelihood	30.21845	Hannan-Quinn criter.	-1.252581
F-statistic	34.27219	Durbin-Watson stat	2.010797
Prob(F-statistic)	0.000001		

iv) GCF/gross capital formation/

Null Hypothesis: D(LNGCF) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.557990	0.0000
Test critical values:	1% level	-3.588509	
	5% level	-2.929734	
	10% level	-2.603064	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNGCF,2)
Method: Least Squares
Date: 06/16/21 Time: 22:24
Sample (adjusted): 3 46
Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNGCF(-1))	-1.141135	0.150984	-7.557990	0.0000
C	0.111723	0.035233	3.170982	0.0028

R-squared	0.576285	Mean dependent var	0.010623
Adjusted R-squared	0.566196	S.D. dependent var	0.328268
S.E. of regression	0.216210	Akaike info criterion	-0.180745
Sum squared resid	1.963362	Schwarz criterion	-0.099645
Log likelihood	5.976390	Hannan-Quinn criter.	-0.150669
F-statistic	57.12321	Durbin-Watson stat	1.966142
Prob(F-statistic)	0.000000		

v) Savings/SAV/

Null Hypothesis: D(LNSAV) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.543075	0.0000
Test critical values:	1% level	-3.588509	
	5% level	-2.929734	
	10% level	-2.603064	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNSAV,2)
Method: Least Squares
Date: 06/16/21 Time: 22:25
Sample (adjusted): 3 46
Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNSAV(-1))	-1.268084	0.148434	-8.543075	0.0000
C	0.188975	0.063298	2.985464	0.0047

R-squared	0.634732	Mean dependent var	0.004763
Adjusted R-squared	0.626035	S.D. dependent var	0.645534
S.E. of regression	0.394761	Akaike info criterion	1.023317
Sum squared resid	6.545122	Schwarz criterion	1.104416
Log likelihood	-20.51297	Hannan-Quinn criter.	1.053392
F-statistic	72.98413	Durbin-Watson stat	1.959774
Prob(F-statistic)	0.000000		

vi) Total Labor Force/TLF/

Null Hypothesis: D(LNTLF) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.155309	0.0000
Test critical values:	1% level	-3.588509	
	5% level	-2.929734	
	10% level	-2.603064	

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

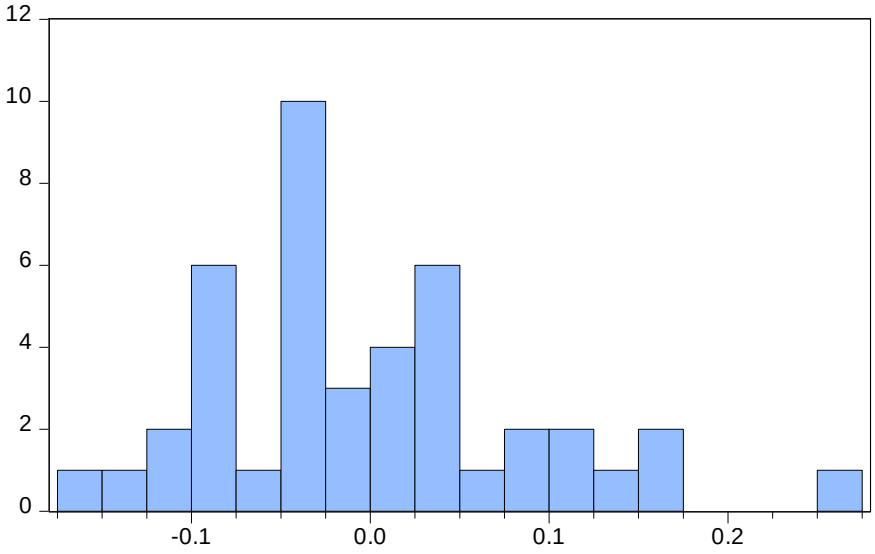
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LNTLF,2)
Method: Least Squares
Date: 06/07/21 Time: 03:01
Sample (adjusted): 3 46
Included observations: 44 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNTLF(-1))	-1.104427	0.154351	-7.155309	0.0000
C	0.030893	0.004629	6.673588	0.0000

R-squared	0.549349	Mean dependent var	-0.000109
Adjusted R-squared	0.538619	S.D. dependent var	0.015916
S.E. of regression	0.010811	Akaike info criterion	-6.172127
Sum squared resid	0.004909	Schwarz criterion	-6.091028
Log likelihood	137.7868	Hannan-Quinn criter.	-6.142052
F-statistic	51.19845	Durbin-Watson stat	1.959173
Prob(F-statistic)	0.000000		

Appendix B: Diagnostic Tests

i) Normality Test



Series: Residuals	
Sample 4 46	
Observations 43	
Mean	-1.28e-16
Median	-0.020464
Maximum	0.256542
Minimum	-0.154352
Std. Dev.	0.085211
Skewness	0.749754
Kurtosis	3.638056
Jarque-Bera	4.758021
Probability	0.092642

ii) Hetroscedasticity test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.494966	Prob. F(18,24)	0.9351
Obs*R-squared	11.64117	Prob. Chi-Square(18)	0.8652
Scaled explained SS	6.984091	Prob. Chi-Square(18)	0.9903

iii) Serial correlation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.110108	Prob. F(2,27)	0.8961
Obs*R-squared	0.347877	Prob. Chi-Square(2)	0.8403

Appendix C: Granger Causality Tests

Table 4.7 Granger Causality Tests/long run causality

Pairwise Granger Causality Tests
Date: 06/13/21 Time: 22:43
Sample: 1 46
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
LNFDS does not Granger Cause LNRGDP	45	0.18651	0.6681
LNRGDP does not Granger Cause LNFDS		0.03359	0.8555
LNGCF does not Granger Cause LNRGDP	45	0.02139	0.8844
LNRGDP does not Granger Cause LNGCF		7.94510	0.0073
LNGOVEXP does not Granger Cause LNRGDP	45	0.03385	0.8549
LNRGDP does not Granger Cause LNGOVEXP		11.7150	0.0014
LNSAV does not Granger Cause LNRGDP	45	0.00448	0.9470
LNRGDP does not Granger Cause LNSAV		18.0177	0.0001
LNTLF does not Granger Cause LNRGDP	45	2.02225	0.1624
LNRGDP does not Granger Cause LNTLF		0.12555	0.7249
LNGCF does not Granger Cause LNFDS	45	0.07244	0.7891
LNFDS does not Granger Cause LNGCF		0.17427	0.6785
LNGOVEXP does not Granger Cause LNFDS	45	4.5E-05	0.9947
LNFDS does not Granger Cause LNGOVEXP		0.04258	0.8375
LNSAV does not Granger Cause LNFDS	45	0.14784	0.7025
LNFDS does not Granger Cause LNSAV		0.48716	0.4890
LNTLF does not Granger Cause LNFDS	45	0.02322	0.8796
LNFDS does not Granger Cause LNTLF		9.2E-05	0.9924
LNGOVEXP does not Granger Cause LNGCF	45	7.32564	0.0098
LNGCF does not Granger Cause LNGOVEXP		0.34111	0.5623
LNSAV does not Granger Cause LNGCF	45	1.02027	0.3182
LNGCF does not Granger Cause LNSAV		0.91285	0.3448
LNTLF does not Granger Cause LNGCF	45	3.10769	0.0852
LNGCF does not Granger Cause LNTLF		0.61158	0.4386
LNSAV does not Granger Cause LNGOVEXP	45	1.87964	0.1777
LNGOVEXP does not Granger Cause LNSAV		15.4860	0.0003
LNTLF does not Granger Cause LNGOVEXP	45	1.33312	0.2548
LNGOVEXP does not Granger Cause LNTLF		0.05243	0.8200
LNTLF does not Granger Cause LNSAV	45	6.71965	0.0131
LNSAV does not Granger Cause LNTLF		0.05627	0.8137

Table 4.8: VEC Granger causality Wald test result when RGDP is dependent variable

VEC Granger Causality/Block Exogeneity Wald Tests
Date: 06/13/21 Time: 23:03
Sample: 1 46
Included observations: 44

Dependent variable: D(LNRGDP)

Excluded	Chi-sq	df	Prob.
D(LNFDS)	1.544881	1	0.2139
D(LNGCF)	0.146747	1	0.7017
D(LNGOV...	0.456648	1	0.4992
D(LNSAV)	0.529603	1	0.4668
D(LNTLF)	0.004017	1	0.9495
All	4.301268	5	0.5069

Table 4.9: VEC Granger causality Wald test result when FDS is dependent variable

Dependent variable: D(LNFDS)

Excluded	Chi-sq	df	Prob.
D(LNRGDP)	0.236835	1	0.6265
D(LNGCF)	0.569720	1	0.4504
D(LNGOV...	0.304798	1	0.5809
D(LNSAV)	0.200687	1	0.6542
D(LNTLF)	0.284864	1	0.5935
All	1.430240	5	0.9210

Appendix D: Granger Causality Tests

Table 4.10: Impulse response of GDP

Response of LNRGDP:						
Period	LNRGDP	LNFDS	LNGOVEP	LNGCF	LNSAV	LNTLF
1	0.097518	0	0	0	0	0
2	0.10732	0.021055	0.01218	-0.00111	0.017294	0.015151
3	0.114845	0.02028	0.01811	-0.00736	0.013024	0.019517
4	0.117099	0.040749	0.01716	-0.00501	0.011384	0.025748
5	0.120411	0.051593	0.01885	-0.00415	0.011865	0.027872
6	0.123406	0.062147	0.00103	-0.00199	0.016544	0.031364
7	0.123999	0.066139	0.01001	-0.00067	0.018173	0.03371

8	0.126793	0.068077	0.01736	-0.00023	0.02175	0.036462
9	0.129827	0.069021	0.02351	-0.00046	0.024749	0.038788
10	0.131402	0.069231	0.02888	-0.00117	0.027118	0.041013

Appendix E: Variance Decomposition

Table 4.11: Variance Decomposition of GDP

Variance Decomposition of LNRGDP:

Period	S.E.	LNRGDP	LNFDS	LNGCF	LNGOVEXP	LNSAV	LNTLF
1	0.129917	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.184759	94.67632	0.515212	0.426714	1.514968	1.620815	1.245972
3	0.218370	90.86950	1.362203	0.573415	1.533325	2.898081	2.763470
4	0.242954	87.53130	2.571689	0.506070	1.342298	3.646050	4.402594
5	0.263470	84.04217	3.995819	0.431119	1.166383	4.212457	6.152050
6	0.281697	80.40671	5.484358	0.417711	1.022929	4.715463	7.952831
7	0.298439	76.74262	6.936316	0.485918	0.912355	5.178212	9.744581
8	0.314128	73.14970	8.288573	0.636345	0.832499	5.606910	11.48597
9	0.329007	69.69648	9.505280	0.859804	0.779958	6.005573	13.15291
10	0.343209	66.42437	10.57045	1.143473	0.751212	6.377119	14.73338