



**The Relationship between Financial Development and
Economic Growth: Evidence from the Ethiopian Economy**

*A Thesis Submitted in Partial Fulfillment for the Award of
Masters of Business Administration in Finance*

By: Bethlehem Getahun

March, 2021

Addis Ababa, Ethiopia

DECLARATION

I, Bethlehem Getahun Bikila, declare that this thesis is the outcome of my effort and I have duly acknowledged all ideas borrowed from several sources while writing this thesis. I also confirm that this thesis has never been presented for the award of any degree in any institution or university.

Name: - Bethlehem Getahun Bikila

Signature: - _____

STATEMENT OF CERTIFICATION

This is to certify the thesis entitled “**The Relationship between Financial Development and Economic Growth: Evidence from the Ethiopian Economy**” which has been submitted by Bethlehem Getahun for the award of Master’s Degree in Business Administration is in line with the research ethics regulation of the university.

Approved by the examining committee:

Name of Advisor Dr. Abebe Yitayew Signature_____

Name of Internal Examiner Dr. Degefe Duressa Signature_____

Name of External Examiner Dr. Lemessa Bayissa Signature_____

Chair of Department or Graduate Program Coordinator

ACKNOWLEDGMENT

Above all, I thank Almighty God and his mother, St. Virgin Marry, for enabling me to do this research paper with courage from the beginning till the end.

I would like to express my thanks and full-hearted gratitude to my advisor Dr. Abebe Yitayew for his support, advice, and valuable comments to accomplish this paper.

My appreciation also goes to the National Bank of Ethiopia and Ethiopian Insurance Corporation staff members for their kind cooperation in supplying the required materials.

Lastly, I am very much indebted to my parents and family members for their unwavering support throughout my academic journey.

CONTENTS

DECLARATION	ii
STATEMENT OF CERTIFICATION	iii
ACKNOWLEDGMENT.....	iv
LIST OF TABLES	ix
LIST OF FIGURES	x
ACRONYMS	xi
ABSTRACT.....	xii
CHAPTER ONE	1
INTRODUCTION	1
1.1 Background of the Study.....	1
1.1.1 Financial Development.....	1
1.1.2 Economic Growth.....	2
1.1.3 The Impact of Financial Development on Economic Growth.....	2
1.1.4 Overview of the Ethiopian Financial Sector and Economy	3
1.2 Statement of the Problem	4
1.3 Objective of the Study.....	6
1.3.1 General Objective of the Study	6
1.3.2 Specific Objectives of the Study	6
1.4 Hypothesis of the Study	6
1.5 Significance of the Study	7
1.6 Scope and limitation of the Study	8
1.7 Organization of the Study	8
CHAPTER TWO	9

LITERATURE REVIEW	9
2.1 Introduction	9
2.2 Theoretical Literature Review	9
2.2.1 Motives for the Emergence of Financial Industry	9
2.2.2 Theories on the Causal Linkage of Finance and Growth	10
2.2.2.1 Supply Leading Hypothesis	10
2.2.2.1.1 The McKinnon-Shaw Model.....	10
2.2.2.1.2 Tobin's Model.....	11
2.2.2.1.3 Endogenous Growth Model	11
2.2.2.1.4 The Theory of Functional Approach.....	12
2.2.2.2 Demand Following Hypothesis.....	19
2.2.2.3 Feedback Hypothesis	20
2.2.2.4 Neutrality Hypothesis	21
2.2.3 Proxies that Measure Financial Development	22
2.3 Empirical Literature Review	25
2.3.1 International Studies	25
2.3.2 Ethiopian Studies.....	37
2.4 Conclusion and Research Gap.....	38
2.5 Conceptual Framework	38
CHAPTER THREE	40
RESEARCH METHODOLOGY	40
3.1 Introduction	40
3.2 Research Design.....	40
3.3 Model Specification	40
3.4 Description of Variables.....	42

3.4.1 Dependent Variable	42
3.4.2 Independent Variables	42
3.4.3 Control Variables.....	43
3.5 Data Sources.....	44
3.6 Estimation Techniques	44
3.6.1 Unit Root Test	44
3.6.2 ARDL Bound Test for Cointegration	44
3.6.3 Long-run and Short-run Estimation.....	45
3.6.4 Granger Causality Test	45
3.6.5 Diagnostic Tests and Stability Test	45
CHAPTER FOUR.....	46
DATA ANALYSIS AND INTERPRETATION	46
4.1 Introduction.....	46
4.2 Unit Root Test Analysis	46
4.3 Choice of Lag Length.....	48
4.4 Diagnostic Tests	49
4.4.1 Test for Autocorrelation	49
4.4.2 Test for Heteroscedasticity	49
4.4.3 Test for Normality	50
4.5 Model Stability Analysis.....	51
4.6 Bound Test for Cointegration.....	52
4.7 Estimation of the Short-run Relationship.....	53
4.8 Estimation of the Long-run Relationship	54
4.9 Granger Causality Test.....	56
CHAPTER FIVE	59

SUMMARY, CONCLUSION AND RECOMMENDATIONS.....	59
5.1 Introduction	59
5.2 Summary of Major Findings	59
5.3 Conclusion.....	60
5.4 Policy Recommendations.....	61
5.5 Suggestions for Further Research	62
REFERENCES	63
APPENDICES	71

LIST OF TABLES

Table 4.1 Augmented Dickey-Fuller (ADF) test result	46
Table 4.2 Philip-Perron (PP) test result	47
Table 4.3 Optimal lag length selection	48
Table 4.4 Breusch-Godfrey Serial Correlation LM Test Result	49
Table 4.5 Heteroskedasticity Test: Breusch-Pagan-Godfrey Result.....	49
Table 4.6 Heteroskedasticity Test: Harvey Result.....	50
Table 4.7 Heteroskedasticity Test: ARCH Result	50
Table 4. 8 Bound Test Result.....	52
Table 4.9 Estimation of short-run coefficients	53
Table 4.10 Estimation of long-run coefficients	54
Table 4.11 Pairwise Granger causality test results	57

LIST OF FIGURES

Figure 1.1 Trends of broad money supply as a percentage of GDP and credit to the private sector as a percentage of total domestic credit	3
Figure 2.1 Theoretical approach to finance and growth nexus.....	12
Figure 2. 2 Conceptual framework	39
Figure 4.1 Normality Test.....	50
Figure 4.2 CUSUM Test Result.....	51
Figure 4. 3 CUSUM of Squares Test Result.....	52

ACRONYMS

ADF	Augmented Dickey-Fuller
ARDL	Autoregressive Distributed Lag Model
ATM	Automatic Teller Machine
DFID	Department for International Development
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
MENA	Middle East and North Africa
NBE	National Bank of Ethiopia
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Square
PP	Phillips–Perron
UAE	United Arab Emirate
UNCTAD	United Nations Conference on Trade and Development
VAR	Vector Autoregressive Model
VECM	Vector Error Correction Modeling
WB	World Bank

ABSTRACT

This paper examines the nexus between financial sector development and economic growth at a country level in Ethiopia from 1983-2019. The study utilized the autoregressive distributed lag (ARDL) model and Granger causality test to inspect the relationship and casual bond between finance and growth. The econometric analysis disclosed that the private sector credit, total insurance premium, government expenditure, gross fixed capital formation, and labor force have a positive and significant influence on the Ethiopian real GDP per capita in the long-run. On the contrary, broad money supply and interest rate spread negatively and significantly affect the Ethiopian real GDP per capita in the long-run. The Granger causality test analysis reveals that the causality direction runs from financial development proxies (private sector credit and interest rate spread) to economic growth. Furthermore, the study found evidence that supports the neutrality and demand following views when broad money supply and total insurance premium are used as indicators of financial development, respectively. The study recommends that priority should be given to policies that enhance the financial sector development.

Keywords: *Financial development, Economic growth, ARDL, Granger causality test*

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

1.1.1 Financial Development

Financial development is the enhancement of financial intermediation services regarding their quality, quantity, and efficiency. To say financial intermediaries and markets are developed, it is a prerequisite that their core financial functions must be provided in the best way by easing the effects of market imperfections (Levine, 2005).

According to DFID (2004), financial institutions and markets development can be enhanced when: a financial sector efficiency and stability improve, the amount of money intermediated by a financial sector increases, an effective regulatory framework exists for financial institutions and markets, financial inclusion increases, the number of diversified institutions which operate in the sector increases, financial intermediaries efficiently allocate capital to private enterprises, the competitiveness of financial institutions and markets grows, and a financial sector provides a greater variety of financial products and services. In simple words, there is no sole measure that includes all dimensions of financial development.

A well-developed financial system facilitates the efficient flow of funds from savings to investment by bringing savers and borrowers together via its financial institutions and markets (Abubakar & Gani, 2013). This fund transmission mechanism appreciates investment activities and serves as a building block for private sector development. Economies with better financial development implement optimal resource allocation methods to ensure financial resources of surplus units goes to the most productive projects and sectors (Paul et al., 2015). Generally, the greater the financial development of an economy, the higher the mobilization of savings and its allocation to high yielding projects and firms.

1.1.2 Economic Growth

In this modern era, attaining high and sustainable economic growth is one of the macroeconomic goals of all economies because it raises the standard of living and creates new job opportunities. Economic growth refers to an increase in an economy's total production of goods and services over a specific period (Haller, 2012). It mainly focuses on the progress of a nation's material well-being. In other words, economic growth focuses on the quantitative aspect of economic activities. Tahir et al. (2015) stated that the growth level of an economy is commonly measured by the annual percentage change in real GDP and real GDP per capita. A long-term sustainable economic growth occurs when the efficiency of resource utilization improves, production capacity increases at an aggregate level, and the pace of economic activities exceeds the population growth of an economy.

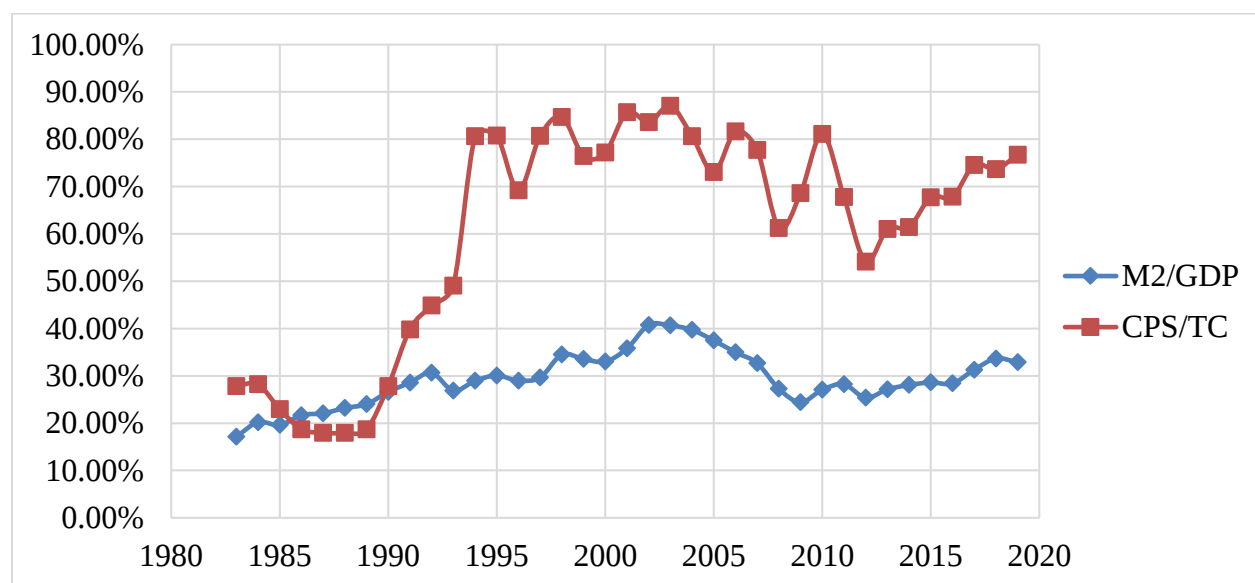
1.1.3 The Impact of Financial Development on Economic Growth

A sound financial system plays a crucial role in accelerating the growth of the real sector in an economy (Ofori-Abebrese et al., 2017). Efficient financial intermediaries mobilize savings and canalize the savings to those who are in a financial deficit. This function of financial intermediaries increases both money supply and loanable funds in the economic environment and ultimately stimulate economic activities. Abubakar& Gani (2013) mentioned that of all functions of banks and microfinance institutions, the credit creation role highly contributes to the economic growth of nations. The provision of credit to various promising firms and industries serves as a fuel to expand their activities more than before. Besides financing existing firms, banks and microfinance institutions also finance entrepreneurs to implement their innovative idea (Tahir et al., 2015). Eventually, the innovative activities of entrepreneurs improve productivity and increase the employment level of an economy. Other than the credit creation role, banking industries also ease business transactions of local and international traders by providing different payment mechanisms (Ang, 2008). Additionally, insurance sectors also facilitate investment activities by reducing uncertainty and providing funds that can be used both for short-term and long-term investment opportunities (Oitsile et al.,2018). Stock markets also ignite economic growth by providing firms with the facility to raise capital for expansion through selling shares to the investing communities. In summary, financial intermediaries and markets spur economic growth by increasing the rate of capital accumulation and technological progress.

1.1.4 Overview of the Ethiopian Financial Sector and Economy

The Ethiopian financial sector has experienced remarkable changes in terms of ownership, the number of institutions, the menu of instruments traded, and the regulatory framework since the country implemented liberalization policy in 1992 (Alemayehu, 2006). The financial liberalization program provided strong incentives for the expansion of both the bank and non-bank financial institutions. Currently, Ethiopia's financial sector is dominated by a bank-based financial structure and encompasses 18 banks (17 commercial banks and 1 development bank), 17 insurance companies, and 38 microfinance institutions (NBE, 2019). The majority of the financial intermediaries are privately owned. As of 2019, the branch network of banks and insurance companies reached 5564 and 568 branches, respectively. The total capital of the banking sector, the insurance sector, and microfinance institutions as of June 30, 2019 were Birr 101.5 billion, Birr 8.2 billion, and Birr 16.6 billion, respectively, showing a growth rate of 18.4%, 49.5%, and 20.3% as compared to the same period of the preceding year (NBE, 2019). In 2019, the total deposits mobilized by banks and microfinance institutions reached Birr 899.6 billion and Birr 41.9 billion, respectively, and the total premiums collected by the insurance sector reached Birr 9.1 billion (NBE, 2019).

Figure 1.1 Trends of broad money supply as a percentage of GDP and credit to the private sector as a percentage of total domestic credit



Source: researcher own computation based on NBE and WB data

As shown in the above figure, the broad money supply as a percentage of GDP displayed an increasing trend from 1983 to 2002, with slight fluctuation during the 1993-1997 period. However, from 2003 to 2009, the ratio showed a decreasing trend due to the tight monetary policy taken by the government to lower the inflation rate. After 2010, M2/GDP went up and reached 32.9% in 2019. In addition, the ratio of private sector credit to total domestic credit showed a volatile fluctuating trend. This ratio registered 18.7% as its lowest value and 87% as its highest value during 1988 and 2003, respectively. After the reform period, the credit provided to the private sector escalated, and it takes the largest portion of the total domestic credit.

The performance of the Ethiopian economy has shown significant progress since the present government followed a market-oriented economy starting from 1992. The post-reform period was characterized by a rising real GDP owing to the measures undertaken to encourage the private sector as part of the economic reform (Tada, 2001). This has been sustained, and the real GDP of Ethiopia reached Birr 1.99 trillion in 2019, representing an increase of 8% as compared to the real GDP of a year earlier.

1.2 Statement of the Problem

The nexus between financial development and economic growth has been a controversial issue and received a growing concern in the field of economics (Onuonga, 2014). Now a day, most empirical researchers give more emphasis to the causality direction between finance and economic growth than investigating only the impact of financial development on economic growth (Calderona & Liub, 2003). Ascertaining the causality pattern between the two became vital since it forwards important messages for policymakers whether to concentrate on policies that induce economic growth or financial sector development. Due to its importance from policymakers' perspectives, the interest in identifying the causality issue between financial development and economic growth has increased in the finance and growth literature.

Since recently a heated argument was raised by researchers whether finance precedes growth or vice versa, Shan et al. (2001) expressed this contentious issue as an egg and chicken problem. This is because of the existence of divergent opinions in theories and mixed empirical results among researchers. Till now, many researchers could not reach to a general agreement about the causality direction on this subject.

The outcomes of different empirical studies on the causal relationship between financial development and economic growth have generated four divergent views. The first point of view is supply- leading hypothesis. This view denotes that the increase in the supply of financial intermediation services by efficient financial intuitions and markets lead to real sector development. Empirical studies that advocate this view include those of Abu-Bader & Abu-Qarn (2008), Alhassan & Fiador (2014), Bayar et al. (2014), Ghildiyal et al. (2015), Paul et al. (2015), Best et al. (2017), Nyasha et al. (2017) Tsetsenzaya et al. (2019), Sheefeni & Andreas (2019), Mouloudi & Benladgham (2020) and, Paudel & Acharya (2020).

The second point of view is the demand following hypothesis. In contrast to the above postulation, this view assumes that real sector development creates demand for financial sector service and accelerate the growth of the financial sector. In other words, the causality direction runs from economic growth to financial sector development with no feedback effect. Empirical studies that support this type of causation include those of Horng et al. (2011), Roman (2012), Simwaka et al. (2012), Ndlovu (2013), Akinci et al. (2014), Sibindi & Godi (2014), Olayungbo (2015), Tahir et al. (2015), Yildirim (2015), and Awad & Al Karaki (2019).

The third point of view is the bi-directional or feedback hypothesis. According to this view, financial development and economic growth are mutually causative. This signifies that a developed financial sector stimulates economic growth, and the growth of the economy further fuels financial sector development. Empirical studies that advocate this view include those of Al-Malkawi et al. (2012), Ikikii & Nzomoi (2013), Musamali et al. (2014), Saad (2014), Onuonga (2014), Qamruzzaman & Jianguo (2017), Mamun et al. (2018), and Mugableh (2019).

The last point of view is the neutrality hypothesis. According to this view, there is no causal link between financial sector development and real sector growth. This implies that financial development and economic growth are independent of each other. Empirical studies that support this type of causation include those of Kumar et al. (2015), Mwangonda et al. (2018), and Luangpituska (2019).

All these divergent views give enough motives to investigate the link between financial development and economic growth in Ethiopia. However, the literature search has shown that few studies have been conducted in Ethiopia (see Roman, 2012; Murty et al., 2012; Dagim, 2015;

and Nyasha et al., 2017). As a result, this study tries to contribute to the existing literature on this topic by distinguishing itself from other studies conducted in Ethiopia in the following aspects. Firstly, it uses broad money supply minus currency as an appropriate indicator of financial depth. The deduction of currency is necessary since less currency circulates inside the banking system of developing economies. Secondly, this study comprises a proxy of insurance sector development as one of the independent variables. This paper represents Ethiopian insurance sector development by total insurance premium as a ratio of nominal GDP. Thirdly, this research uses interest rate spread to measure the efficiency of the banking industry. Finally, this study analyzes the short-run and long-run relationships between finance and growth using the recently developed autoregressive distributed lag (ARDL) model.

1.3 Objective of the Study

1.3.1 General Objective of the Study

The general objective of the study is to examine the nexus between financial development and economic growth in Ethiopia.

1.3.2 Specific Objectives of the Study

1. To investigate the impact of financial deepening on the economic growth of Ethiopia both in the short-run and long-run.
2. To assess the impact of financial efficiency on the economic growth of Ethiopia both in the short-run and long-run.
3. To ascertain the causality pattern between the selected financial development proxies and economic growth in Ethiopia.

1.4 Hypothesis of the Study

The researcher formulates the following hypotheses.

The provision of financial assets such as loans, deposits, and insurance policies facilitate the growth of an economy. As more financial assets are supplied in an economy, the activities of the real sector will boom. Empirical studies of Abubakar & Gani (2013), Yildirim (2015), Ofori Abebrese et al. (2017), and Mouloudi & Benladgham (2020) found a positive link between

financial depth and economic growth. Based on this, financial deepening is hypothesized as follows.

H₁ Financial deepening has a positive and significant impact on the economic growth of Ethiopia.

As the spread between deposit and lending rate becomes wider, less portion of the savings goes to finance the real sector activities. And this will reduce economic growth. This fact is supported by Caporale et al. (2009), Abubakar & Gani (2013), and Saad (2014). Therefore, interest rate spread is hypothesized as follows.

H₂ Interest rate spread has a negative and significant impact on the economic growth of Ethiopia.

Most scholars suggest that there is a causal linkage between finance and growth. This implies that either financial sector development causes economic growth, economic growth drives financial sector development, or finance and growth cause each other. These types of causations are supported by Levine (1997), Gurley and Shaw (1967), and Patrick (1966), respectively. Based on these assumptions, the following hypothesis is formulated.

H₃ There is a causal linkage between financial development and economic growth in Ethiopia.

1.5 Significance of the Study

The researcher believes that the findings of the study will benefit the following stakeholders.

Regulators: - The study will help policymakers to understand the situation of the financial sector and the economy, and come up with policies that can stimulate the financial sector development and the growth of the economy.

Banks and insurance companies: - This research will provide useful information to the financial intermediaries by showing to what extent they contribute to the economic growth of Ethiopia. This may benefit the intermediaries to make adjustments for a better operation.

Investors: - The paper will benefit the current and potential investors to gain an understanding of financial intermediaries' role in the improvement of economic growth in Ethiopia. This can help the investors to make proper investment decisions.

Researchers and Students: - This study will be used as an invaluable reference for further research in the area of finance and growth nexus.

1.6 Scope and limitation of the Study

This study focuses on the finance and growth nexus of Ethiopia from the period 1983 to 2019. The researcher selected this period based on the availability of data for all chosen variables. This study is not free of weakness. Due to inadequate financial accessibility data, the researcher does not include financial access as one of the financial development indicators. Since the study employs data gathered from various sources, and the data reported on the same variable differ from organizations to organizations, the data quality is questionable. However, to minimize this problem, the study collects the data from the most acknowledged sources.

1.7 Organization of the Study

The remaining part of the paper continues as follows. Chapter two is concerned with the reviews of theoretical and empirical literature related to financial development and economic growth nexus. Chapter three discusses the research design, econometric model, and estimation procedures employed in the study. Chapter four deals with the econometric analysis and its interpretation. Finally, the last chapter concludes the empirical results, provides policy implications on the overall findings, and proposes possible areas for further research at the end of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter of the study reviews both theoretical and empirical literature about the linkage between financial development and economic growth, sequentially. The theoretical part explains the reason for the emergence of a financial system, the four theoretical views on the causal relationship between finance and growth, and proxies of financial sector development. The empirical part summarizes past studies on the subject matter conducted at an international and national level. Lastly, this chapter presents the gaps in empirical researches and the conceptual framework of the study, which eases the econometric model construction.

2.2 Theoretical Literature Review

2.2.1 Motives for the Emergence of Financial Industry

Market frictions such as information, transaction, and contract enforcement costs induced financial intermediaries, markets, and contracts to emerge (King & Levine, 1993a). Gathering information about firms' performance and knowing the state of markets before individuals finance firms required research and evaluation skills. Thus, Leland and Pyle (1977) and Ang (2008) mentioned that individuals with surplus funds invested a lot of effort and money to get relevant information on firms and industries and identify the most promising ones among all firms and industries who demanded external finance. Individuals or firms with deficits also spent much time to find the best external fund source that offers less lending rate in the market. In the process of transacting, some lenders and borrowers reached agreements through third parties (brokers), and the participants were required to pay brokerage commission fees (Ang, 2008). As a result, the preference for such type of bargaining method exposed the participants to negotiation costs in each deal they undertake. Merton and Bodie (1995) asserted that besides individual financiers' exposition to costs for acquiring information and executing financial transactions, individual lenders also faced high contract enforcement charges when borrowers

failed to keep their promise on time. Therefore, there was a high demand for reliable information, ways that ease transactions, and mechanisms for the smooth execution of financial contracts at a lesser cost. Eventually, these demands paved the way for the emergence of financial intermediaries and markets (Levine, 2005).

2.2.2 Theories on the Causal Linkage of Finance and Growth

Different theoretical perspectives exist on the causal linkage between financial sector development and economic growth (Ang, 2008). Based on the possible causal relationships, scholars raised four divergent views on finance and growth nexus, namely: supply leading hypothesis, demand following hypothesis, feedback hypothesis, and neutrality hypothesis (Graff, 1999). Among these four possible relationships, three of them support the existence of a cause and effect relationship between finance and growth in the real sector. Each of these competing views explains whether finance matters for growth or vice versa.

2.2.2.1 Supply Leading Hypothesis

The supply leading hypothesis posits that financial sector development catalyzes the development of an economy (Fry, 1978). According to this view, the direction of the causality flows from the financial sector to real sector growth. This hypothesis assumes that even though many factors positively affect the economic growth of a nation (especially the growing ones), a developed financial industry takes the lion share amongst all factors. Accordingly, deep and accessible financial institutions and markets amplify the pace of real sector outputs' growth (King & Levine, 1993a).

The theme of supply leading hypothesis is consistent with the assumptions of McKinnon and Shaw model, Tobin's model, endogenous growth model, and functional approach theory.

2.2.2.1.1 The McKinnon-Shaw Model

McKinnon-Shaw model (1973, cited by Fry, 1978) is one of the models that explain the role of finance in economic development. Their model emphasized how a liberalized financial system spurs economic growth of nations. A financial industry that allows a high or positive real deposit interest rate encourages more savings and maximizes investment. As interest rate liberalization policies are implemented in an economy, the supply of credit and engagement of entrepreneurs

in high yielding projects boost up. As a result, financial intermediaries and markets provide their services efficiently and effectively in the economy. Eventually, at an aggregate level, capital accumulation and productivity in real sectors rise. Generally, the McKinnon-Shaw model assumes a liberalized financial sector induces the increment of deposits, enlarges credit allocation efficiency, and ultimately improves the quality and quantity of investment. Thus, economic development is enhanced via financial industry development.

2.2.2.1.2 Tobin's Model

Tobin's model (1965) also explains how monetary factors intensify economic activities and lead an economy towards stable growth. His model states that individuals' portfolio decisions and monetary factors determine the process of capital accumulation in an economy. As an economy provides monetary assets that are competitive to real assets, individual and institutional investors invest their wealth in monetary assets, including them as one of assets in their portfolios. In due course, investment activities boom, and the growth of the economy improves. Tobin further mentioned that when the rate of return in holding money reduces, individuals' investment decisions divert to capital assets. Therefore, individuals' preference for allocating their resources between capital assets and monetary assets depends on their respective yields. In summary, Tobin considers monetary asset and capital assets as substitutes to promote the capital accumulation of nations.

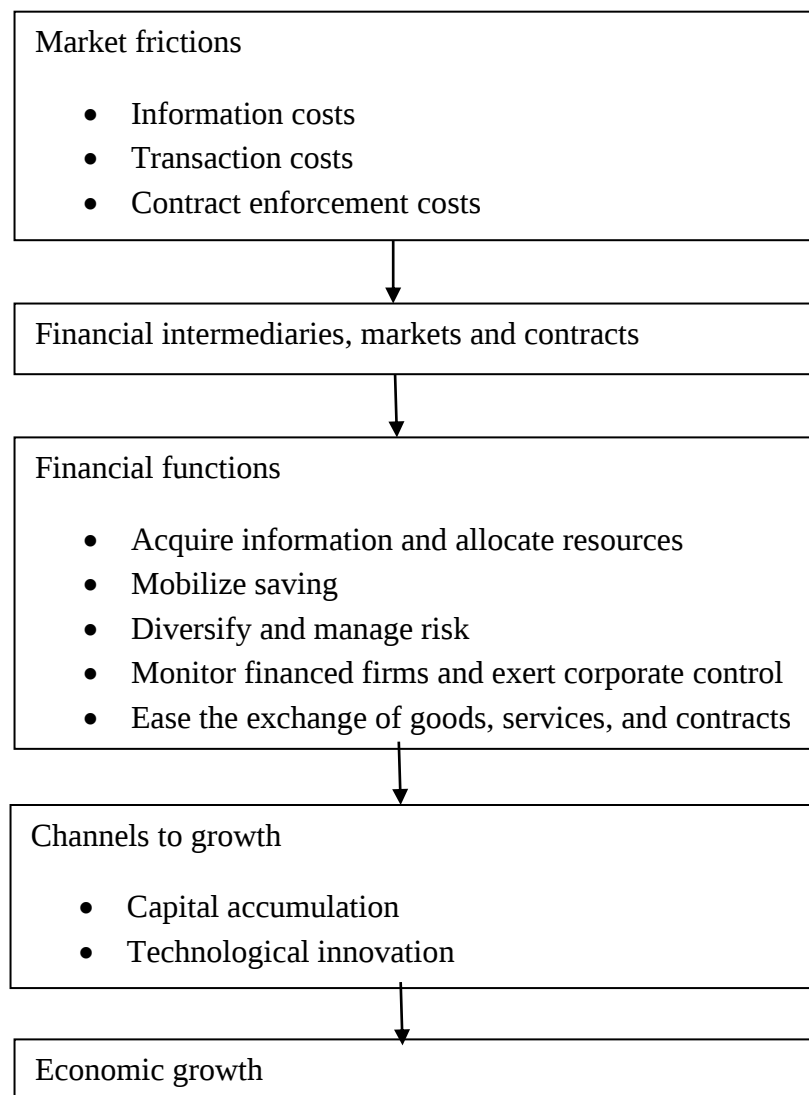
2.2.2.1.3 Endogenous Growth Model

The endogenous growth model posits that technological progress positively affects the rate of long-run growth of economies more than other factors (Romer, 1986). According to endogenous growth theory, investment in human capital and innovative activities spurs the growth of real outputs. Additionally, Pagano (1993) stated that financial intermediaries support research development activities and technical innovations to sustain the long-run growth of nations. The model highlights that technological ideas improve the productivity level and lead to rapid growth rates. Thereby, as innovators and researchers get financial assistance from financial institutions, economic activities lift. In this regard, an efficient financial system plays an essential role in facilitating continual growth (Pagano, 1993).

2.2.2.1.4 The Theory of Functional Approach

Levine (1997) developed the functional theory and explained the positive contribution of a well-functioning financial industry to the growth of a nation. Financial intermediaries and markets ignite economic growth through their core financial functions. Even though financial institutions and markets vary across countries and time in terms of their legal and regulatory system, innovative products in their business environment, and macroeconomic stability, their core financial functions are static in all economies (Levine, 2005; Merton and Bodie, 1995). The following figure shows how financial intermediaries and markets accelerate economic growth.

Figure 2.1 Theoretical approach to finance and growth nexus



Source: (adapted from Levine,1997: 691)

The core functions of financial intermediaries and markets positively influence economic growth in the following ways.

I. Acquire Information on Investment Opportunities and Allocate Capital

The level of credit supply in financial industries depends on the quality of information about prospective borrowers' conditions and their purpose (reason) to obtain external funds (Leland & Pyle, 1977). As more qualified information on the potential investment opportunities is provided to banks, the credit supply in the financial environment increases. Therefore, on behalf of lenders (savers), financial intermediaries collect and process the necessary information about the prospective borrowers to appropriately allocate savers' money in high-yielding firms and projects (Levine, 2005). This function of financial intermediaries and markets diminishes the information asymmetry between lenders and borrowers, information acquiring, and processing costs. Ang (2008) also mentioned that before granting loans, financial intermediaries' expertise screen loan requests, examine the performance of potential borrowers, and evaluate the conditions and values of collaterals. As a result, the ability of financial intermediaries to develop expertise leads to the reduction of the costly process in researching profitable investment outlets.

Financial markets such as stock markets also provide price information about stocks or shares of firms with less cost. Shares price information in stock markets shapes individuals' and institutional investors' resource allocation decisions (Merton & Bodie, 1995). The share price of firms to some extent represents how well the firms are performing in their business environment. Holmstrom and Tirole (1993) revealed that the size and liquidity of a stock market determine the easiness or difficulty of acquiring the necessary information from the stock market. According to Levine (1997), the liquidity of the stock markets depends on the concentration of ownership of shares. As the concentration of ownership of shares is diminished, the number of shares traded in the stock market and the liquidity of the stock market increase. When a stock market becomes more liquid, the process of gathering information about shares price turns out to be much simpler (Holmstrom & Tirole, 1993). Thus, a well-functioning stock market distributes information to the market participants easily and quickly as changes in stock prices occur. In general, share prices forward important information for investors in which firms and sectors to invest their resources.

Knowing the inside information and true nature of firms and projects that demanded external finance improves the capital allocation activity of financial intermediaries (Leland & Pyle, 1977). Therefore, gathering private information of firms and projects via financial intermediaries and markets avoids the adverse selection of unproductive firms and projects. As the number of participants in stock markets increases, the provision of information amplifies. As a result, accurate share price information disseminates in the market; and investors allocate their resources in an efficient manner (Merton & Bodie, 1995).

As the informational imbalance between lenders and borrowers lessen, the growth of economies escalates (Ang, 2008). The provision of relevant and reliable information encourages individuals to save more and allows financial intermediaries and markets to allocate loanable funds efficiently. Thus, existing promising sectors and new start-up companies utilizing the supplied funds increase the production of goods and services in the economic environment.

II. Mobilize Savings

Financial institutions and markets mobilize savings from several individuals to transfer these resources to deficit economic units. Ang (2008) stated the cost of savings mobilization via financial intermediaries is much lesser as compared to individuals. Accordingly, depository financial institutions easily attract multiple savers by assuring the repayment of their money based on their agreement, and ultimately, facilitate the gathering process of financial resources in the economy. A well-developed financial system offers various financial instruments that are suitable for all surplus units and pools vast capital (Merton & Bodie, 1995).

As depository financial institutions provide incentives to investors, mobilization of savings becomes easy, and the amount of total savings is maximized. One of the incentives provided to savers by banks and microfinance institutions is interest payment (King & Levine, 1993b). Such financial institutions compensate depositors for providing their financial resources to support investment activities of disparate sectors. Fry (1978) emphasized the importance of financial regulations in determining the pooling process of funds in an economy. Economies with fewer restrictions on their financial system allow a high deposit rate, appreciate individuals saving habit, and supply more funds to productive sectors.

Saving mobilization plays a significant role in the process of the economic development of nations. This function of financial intermediaries and markets has a direct impact on capital accumulation and investment (Levine, 2005). A financial sector with a better ability to pool individuals' funds eases the allocation of funds to the most profitable firms and projects. Eventually, such financial industries intensify the cumulative productivity level of economies.

III. Monitor Financed Firms and Exert Corporate Control

Besides allocating capital, financial intermediaries and markets assess the performance of firms and the progress of projects. After financing firms and projects, the utilization of supplied financial resources matters for the intermediaries and markets (Ang, 2008). If firms and projects employ the borrowed funds appropriately, their capacity to pay the loan with its interest will rise. As a result, Levine (2005) states that financial institutions and markets can guarantee savers that their money is invested in promising sectors and projects; and assure the collection of the contracted funds on time based on the credit agreements. Consequently, savers offer more funds to the banking sector and financial markets. The banking industry also supplies more capital in the economic environment since the industry is confident that borrowers will successfully use savers' financial resources (Levine & Zervos, 1998).

Savers delegate the monitoring role of financed firms and projects to financial intermediaries (Diamond, 1984). Using the assigned authority, the intermediaries gather information on clients' performance ex-post of finance. The cost advantage of intermediaries in collecting such information relative to individual lenders eases their tasks. Leland and Pyle (1977) pointed out that the intermediaries reduce monitoring costs by developing monitoring experts, and taking advantage of economies of scale. Therefore, as the number of loan contracts continues to rise, the average cost of gathering information on the present status of borrowers decreases. Through the delegated task, banks control borrowers' behavior and try to enforce loan contracts smoothly.

As banking industries supervise loan contracts appropriately, moral hazard problems are diminished (Levine, 2005). In the same vein, Diamond (1984) indicated that holding a diversified portfolio of assets also reduces the uncertainty of the repayment of loans. As a result, the implementation of such methods assures depositors that their resources are in good hands.

The interests of shareholders and managers of financial intermediaries vary (Levine, 2005). For this reason, shareholders control the intermediaries' managers in the process of allocating their financial resources to deficit economic units. As the shareholders (owners) of the intermediaries efficiently exercise corporate control through their representatives, the boards of directors guide managers to select firms and projects that are feasible and positively contribute to the economic growth of the country (Ang, 2008). Moreover, some intermediaries compensate their managers by making them shareholders of the intermediaries. This performance-based compensation scheme allows the managers' and the shareholders' interest to be aligned. Thus, this maximizes the efficiency of capital allocation in the economic environment.

According to Holmstrom and Tirole (1993), the implementation of proper mechanisms for monitoring financed projects and firms, and exerting corporate control has a direct impact on intermediaries' performance. Eventually, this function of intermediaries positively affects financed firms' productivity and also the growth of nations. As the intermediaries verify firms' and projects' returns at a lower cost compared to individual financiers and efficiently allocate resources of savers, the rate of aggregate growth improves (Diamond, 1984).

IV. Diversify and Manage Risk

After mobilizing and allotting resources to external finance demanders, diverse financiers face various types of risks. Among the diverse financiers, financial intermediaries and markets provide the most efficient methods to manage and control risks that arise while conducting their activities (Merton & Bodie, 1995). Unlike individual financiers, financial intermediaries assess the type and level of financial risks attached to each investment opportunity before granting funds. Ang (2008) indicated that the intermediaries' ability to forecast potential financial risks leads to effective capital allocation.

The risk appetite of individual lenders and institutional financiers is disparate (Levine, 2005). Individual lenders are risk-averse. So, they prefer to finance less risky projects and firms, which means projects and firms with low returns. On the contrary, institutional financiers such as banks and microfinance institutions reallocate savers' capital to diversified projects and firms with higher expected returns (Patrick, 1966).

Liquidity risk is one of the most common risks financiers face in their business climate. As noted by Levine (2005), liquidity risk is the risk of failing to convert financial instruments into cash or cash equivalent at agreed prices easily and quickly. Information asymmetries and high transaction costs hinder financiers' capacity to change financial assets into purchasing power as they become due. As banks allocate savers' resources to long-term investment opportunities, their ability to meet cash flow obligations became questionable (Ang, 2008). Thus, banking industries try to mitigate liquidity risk by matching the maturity date of loan contracts with long-term deposit contracts. Applying such robust risk management methods allow the intermediaries to get more trust from their capital suppliers. Following a similar thought, King and Levine (1993b) revealed that liquid financial markets facilitate security holders to sell their securities quickly whenever they want at a fair price. Thus, liquid financial markets increase the supply of financial resources and transform these resources to finance long term innovative projects.

After granting credit facilities, financial intermediaries are exposed to credit risk. Credit (default) risk refers to the possibility of borrowers failing to fulfill their payment obligations on time. To reduce default risk, banks examine potential borrowers' characteristics, financial status, and conditions of markets in which borrowers operate their activities before advancing loans (Merton & Bodie, 1995). For most types of loan contracts, banks require collaterals against the loans to keep as security. If the borrowers' default on the loan payments, banks sell the pledged assets and use the proceeds to recover from losses. Patrick (1966) and Levine (1997) further state that banks allocate savers' financial resources in diversified portfolios intending to spread risks among diverse borrowers.

Risk diversification is the other method employed to minimize exposures to financial risks (King & Levine, 1993b). The allocation of loanable funds to diversified projects and innovative enterprises reduce the failure of repayment of loans at an aggregate level. As financial industries apply risk diversification policies, the allotment of funds to innovative firms and projects with higher expected return increases (DFID, 2004).

The ability of financial industries to control and diversify financial risks has a positive impact on the overall economic performance of nations. This function of a financial system prospers

economic growth via accelerating the rate of technological innovations (King & Levine, 1993b). Financial intermediaries allocate capital to innovative projects which have promising potential to facilitate the growth economies. Thus, when diversified new projects are financed, the productivity level of various sectors increases (Patrick, 1966). Similarly, Ang (2008) mentioned that risk diversification improves the efficiency of financial resources allocation, and ultimately, promotes investment in innovative activities.

V. Facilitate the Trade of Goods, Services, and Contracts

The reduction of transaction costs is one of the aims of financial intermediaries and markets as they emerge. Financial intermediaries offer different financial products to clear and settle payments (Levine, 2005). Depository financial institutions such as banks provide money substitutes like checking accounts, ATM cards, credit cards, debit cards, and online banking systems for the execution of various transactions in a simple way (Merton & Bodie, 1995). Lieberman (1977) pointed out that since these innovative financial products in the banking sector substitute money, and allow efficient payment mechanisms, the demand for cash decreases. The provision of a letter of credit by commercial banks also eases commercial transactions between parties in different economies. These commercial banks appreciate the import and export activities of economies in international trade.

Besides financial intermediaries, financial markets also simplify the transaction of goods, services, and contracts (Levine, 1997). Some secondary financial markets create physical places to execute financial transactions between the participants. Such financial markets facilitate the trade of bonds and shares that are already issued. The other financial market that facilitates the exchange of goods and assets is a derivative market. A derivative market provides instruments that ease future transactions by determining their prices and the payment period before transacting (Merton & Bodie, 1995).

Accordingly, such financial innovations and instruments in the depository institutions and financial markets decrease transaction costs. As the range of financing options for business-oriented sectors increases, the performance of the sectors improves, trade activities boost, and eventually, industrialization and economic growth in the nation expand. (DFID, 2004).

All of the above core functions together stimulate economic growth by facilitating capital accumulation and technological innovation (Levine, 1997; Ang, 2008). Capital accumulation is one of the channels that appreciate economic growth by enlarging the scale of production in real sectors. Merton and Bodie (1995) asserted that a financial system with an increased saving rate and effective capital allocation method positively affects the accumulation of capital. Besides allocating capital to existing firms and enterprises, efficient financial intermediaries finance new innovative projects that require enormous investment.

2.2.2.2 Demand Following Hypothesis

The demand following hypothesis postulates that the causality direction runs from economic growth to financial sector development. Robison (1952, cited by Abubakar and Gani, 2013) argued that enterprises lead and finance follows. As an economy becomes more industrialized, income per capita increases and the habit of saving in different income segments develops, and this, in turn, generates a rising trend of aggregate saving in the economy (Kuznets, 1955). Gurley and Shaw (1967) asserted that the level of demand for financial intermediation services depends on the growth of nations. As economies grow, existing firms and industries aim to expand their activities, and new firms and industries will gradually emerge. Governments also aim to execute different grand projects and expand infrastructure facilities. As a result, firms and governments highly demand external funds either from direct or indirect external financing sources and other financial products. In the process of satisfying these demands, the economy promotes the commencement of new financial intermediaries and markets, as well as the introduction of new types of financial services (Patrick, 1966). Hence, according to Gurley and Shaw (1967), the economic growth of nations enhances the increment of financial assets in an economy rapidly relative to real assets based on the following assumptions.

- I. As real development occurs, the demand for ease access to factors of production in manufacturing sectors emanates. As a result, the economy appreciates the increment in credit supply and range of financial assets to meet the demands of the deficit sectors.
- II. When income rises, the demand for investment in various financial assets booms.

Thus, from the demand following perspective, financial sector development is an outcome of economic growth.

2.2.2.3 Feedback Hypothesis

Patrick (1966) proposed this hypothesis and stated that a bi-directional causal linkage exists between finance and growth in the real sector. This hypothesis is a hybrid of supply leading and demand following hypotheses. In other words, financial development and economic growth cause each other; sequentially, depending on the stage of economies' development. As economies undergo different levels of economic development, the causal direction between finance and growth alters.

Patrick (1966) explained how the direction of causality changes as economies go through the early and advanced stages of development as follows.

The early-stage of economic development: - At the beginning of the growth process, some efficient financial intermediaries and markets provide financial intermediation services. Over time, these financial intermediaries and markets proceed, and the supply of financial services increases in the economy over the demand. As modernized sectors are launched, financial intermediaries mobilize savings and redirect them to the most promising firms. The loaned funds support the sectors' activities and lead to higher productivity. In addition to this, the intermediaries encourage entrepreneurial innovations. The consultation and financial assistance enable entrepreneurs to effectively commercialize new products and services, introduce new methods of production, and establish new industries. And this ultimately increases the productive capacity of the economy and creates more job opportunities in the nation. Thus, in the early stage of development, finance serves as an engine for economic growth.

The advance-stage of economic development: - As the modernized agricultural sector's and other industrialized sectors' production of goods and services increases, the supply leading characteristics of finance eventually fades away. At this stage, the activities of real sectors increase, and these sectors highly demand various types of financial products and services. As the demand for capital boosts, financial intermediaries engage in the credit creation process and provision of other financial services. Moreover, when the economy needs more sophisticated financial services, new financial intermediaries and markets, and new types of financial assets emerge. As a result, the financial sector deepens, and this leads to financial sector development.

Accordingly, finance stimulates the growth of real sectors. As these real sectors grow, they facilitate financial sector development by creating more demand for financial services. The causality pattern between the two variables changes as an economy shifts from the early to the advanced stage. Similarly, the characteristics of finance also vary in industries and sectors that differ in their development level. Government policies determine the timing for such developmental changes in industries and sectors (Patrick, 1966).

2.2.2.4 Neutrality Hypothesis

This hypothesis explains the absence of causal relation between finance and economic growth. Both financial development and economic growth are mutually independent and rely on other factors. Graff (1999) argued that the empirically established relationship between the two variables implies merely the existence of a positive correlation between them rather than causation. He further claims that as an economy boosts up, the financial sector performs well only because of historical peculiarity. Similarly, Lucas (1988) criticized the overemphasis given to the role of finance in promoting the development of economies.

Consequently, the proponents of this hypothesis believe that both finance and growth follow a separate path. According to Graff (1999), real factors and the historical performance of the financial sector determine economic growth and financial sector development, respectively. Real factors such as physical capital and human capital etc. predominately contribute to the economic growth of nations.

The neutrality assumption is consistent with the Modigliani-Miller capital structure irrelevance theory. According to Modigliani and Miller (1958), markets are perfect, and firms are indifferent in the raise of capital either from internal or external sources. In other words, financial intermediaries don't matter. Nonetheless, some scholars criticized these assumptions. Abubakar and Gani (2013) mentioned that transaction and information costs are not nil in the real-world, and the capital structure of firms matters for their continual existence. They also asserted that the extreme use of internal sources for expansion and other purposes lead to the collapse of firms since the firms' value falls. As a result, the neutrality hypothesis gets less support from empirical researchers.

2.2.3 Proxies that Measure Financial Development

Scholars proposed different proxies that evaluate the development of financial intermediaries and markets. Among the several indicators stated in the works of financial development literature, this study summarized the relevant proxies that measure the functions of financial intermediaries and markets. The proxies are categorized into depth, efficiency, and accessibility indicators; and are presented as follows.

Financial institutions' and markets' depth indicators are some of the most common proxies employed for identifying financial industries' development. Financial deepening measures the size of formal financial intermediaries and markets relative to the economy. Financial deepening refers to the provision of the broadest range of financial assets such as loans, deposits, other money market funds, insurance policies, shares, and bonds with an increased amount to all segments of society (Lynch, 1996). To say a financial system is deep, financial assets supplied in its economy should signal increment in volume at a faster rate than real assets accumulation (Levine, 2005).

The extent of money supply in an economy measures the deepness of the financial system. Different scholars have been using ratios of varied types of monetary aggregates (such as M1, M2, and M3) to nominal gross domestic product (GDP) as some of the financial depth measurers (Lynch, 1996). M2 or broad money consists of currency, demand deposits, and time deposits. However, Demetriades and Hussein (1996) criticized the use of this proxy in developing economies with less developed financial systems since less currency circulates inside their banking environment. Therefore, the ratio of M2 minus currency in circulation to nominal GDP appropriately indicates the size of money intermediated by financial institutions in growing nations (Demetriades & Hussein, 1996). Some scholars prefer the ratio of M3 to nominal GDP. M3 comprises M2 plus money market instruments such as commercial papers, and liabilities of other financial intermediaries (Levine, 1997).

The ratio of broad money (M2) to Narrow money (M1) also indicates the development of a financial system in an economic environment (Lynch, 1996). This ratio measures how fast the collection of savings is moving forward as compared to currencies circulating to facilitate transactions.

The ratio of commercial banks' deposits to the sum of commercial banks' deposits and central bank's assets is used as a financial development indicator (King & Levine, 1993a). This ratio evaluates the comparative significance of commercial banks in intermediation activities over the central bank. On the other hand, Levine, Loayza, and Beck (2000) criticized this ratio for excluding other intermediaries and not representing the capital allocation role of intermediaries.

The degree of financial intermediaries' capital allocation also determines the depth of the intermediaries in an economy. Even though commercial bank deposits finance credit, it is essential to directly measure the effectiveness of banks in capital allocation role (Lynch, 1996). Proxies that indicate the credit provision role of intermediaries highly signify the enhancement of a financial system, especially in nations where bank-based structure dominates. The ratio of total domestic credits provided by financial intermediaries to nominal GDP is a proxy that assesses the capital allocation activity of the intermediaries. But, Lynch (1996), and Gregorio and Guidotti (1995) mentioned that this ratio might not accurately reflect the exact functions of the intermediaries since it included credit allocated to governmental sectors.

Financial intermediaries' capital allocation process varies from public enterprises to private enterprises. As they funnel capital to governmental sectors, the intermediaries do not choose investment projects, require collaterals, and diversify risk to the same dimension as the private sector credit provision method (King & Levine, 1993a). Therefore, lending to the private enterprise accurately indicates the capital allocation activity of banks and other intermediaries. Other than measuring the growth of financial sectors, credit allocated to the private sector is also directly linked to investment and economic growth of nations (Calderona & Liub, 2003). Many scholars suggested the ratio of private sector credit to nominal GDP as the best appropriate proxy to measure financial sector development (Lynch, 1996; Demetriades and Hussein, 1996; Gregorio and Guidotti, 1995). According to Levine (2005), the ratio of private sector credit to total domestic credit (excluding credit to financial industry) is a measure that signals the portion of credit channeled to the private sector from the overall provided credit in an economy.

The deepening of insurance companies in an economy is measured by the premiums they collect. The most common proxies are the ratio of life insurance premiums to GDP, and non-life insurance premiums as a share of GDP (World Economic Forum, 2012).

To determine the entire financial system depth of an economy, measuring the size of both financial institutions and markets is necessary. The size and liquidity of stock markets indicate the development level of stock markets (Levine & Zervos, 1998). The ratio of the total value of listed shares (stock market capitalization) as a percentage of GDP measures the deepness of stock markets relative to nations' aggregate outputs (Levine, 1997). In other words, this proxy represents the extent of capital mobilization via the equity financing method in an economy. The World Economic Forum (2012) suggested that the ratio of the total market price of traded shares to GDP signifies the liquidity of traded shares on a macroeconomic scale. Turnover ratio (total value of traded shares /stock market capitalization) reflects the level of shares' liquidity in stock markets (Levine & Zervos, 1998). The higher the turnover ratio, the lower the transaction fees required while buying and selling shares. The other financial market is the bond market. For these financial markets, variables like public bond issues as a percentage of GDP and the ratio of private bond issues to GDP measure their size (World Economic Forum, 2012).

Proxies of financial service accessibility are the other indicators of financial industry development (Graff, 1999). A financial sector that guarantees the ease of access to financial intermediation services for all individuals and business organizations enlarges the variety of financial products. Most scholars identified the indicators of financial service accessibility based on demographic penetration. According to the World Economic Forum (2012), the penetration rate of banks to societies is measured by the number of bank branches per 100,000 adults. Since banks open branches in different geographical areas to serve local communities, this proxy appropriately measures the degree of access to banks. The spread of branches over different locations determines the amount of saving along with other factors. The other proxy that indicates the accessibility to financial services provided without going to banks is automatic teller machines (ATMs) per 100,000 adults (World Economic Forum, 2012). These proxies indicate how many branches and ATMs are needed to serve the average number of people. The higher the demographic penetration, the easier the access to financial institutions.

The efficiency of financial industries also indicates the quality of the industries. One of the proxies that measure the effectiveness of banks is interest rate spread (Abubakar & Gani, 2013). The interest rate spread of the banking sector indicates the difference between the average lending rate and deposit rate (Caporale, et al., 2009). This proxy shows the average percentage

yield of the industry after compensating depositors for utilizing their financial resources. The other indicator is the net interest margin. This proxy indicates the net interest gained (interest received minus interest paid) relative to income-producing assets. Generally, the efficiency of financial intermediaries signals how well they are performing their duties in the financial environment.

2.3 Empirical Literature Review

This section provides reviews of empirical evidence on the finance and growth nexus, which are conducted recently. The researcher categorized the findings of recent empirical studies on this subject in two subsections, namely: international studies and Ethiopian studies, and reviewed as follows.

2.3.1 International Studies

Using a time series approach and autoregressive distributed lag (ARDL) model, Ghildiyal et al. (2015) investigated the linkage between financial depth and economic growth of India in terms of the bank-based and market-based financial structure over the period 1991-2014. The authors utilized the ratio of broad money supply to GDP, private sector credit as a percentage of GDP, and stock market capitalization as a percentage of GDP as financial deepening indicators. The researchers found that broad money supply and stock market capitalization have a positive and significant impact on real GDP per capita in the long run, whereas credit to the private sector has a negative and significant effect in the long run. The Granger causality test of the study revealed that financial development spurs the economic growth of India.

Caporale et al. (2009) applied the generalized method of moments (GMM) on the panel data of 10 European Union members to examine the nexus between financial development and economic growth from 1994-2007. They employed financial depth and financial efficiency indicators as proxies of financial development. The empirical evidence pointed out that both the broad money supply and the ratio of stock market capitalization to GDP positively and significantly affect the countries' economic growth. Besides, banks claims to the private sector as a proportion of GDP has a positive but insignificant effect on economic growth, and interest rate spread is negatively and significantly correlated with economic growth. Furthermore, the study concluded that the causality direction runs from financial development proxies (broad

money supply, stock market capitalization ratio, and interest rate spread) to the nations' economic growth. The paper also found no causality between private sector credit and economic growth.

Utilizing the autoregressive distributed lag model on the quarterly time-series data of Botswana from 1994 to 2013, Oitsile et al. (2018) examined the relationship between the insurance sector development and economic growth, taking insurance premium as a proxy. Their model also included deposit interest rate, gross fixed capital formation, and inflation rate as other variables that affect economic growth. Their study found that total insurance premium negatively and significantly affects economic growth in the long run. And deposit interest rate, gross fixed capital formation, and inflation showed a significant positive effect on the economic growth of Botswana.

Tahir et al. (2015) checked the contribution of banks' lending activity in the economic growth of Pakistan for the period 1973 to 2013 using the vector error correction model. The study employed real GDP as a dependent variable, while bank credit to the private sector, lending interest rate, inflation rate, and government expenditure were taken as independent variables. Their result reveals that bank credit to the private sector, inflation, and lending interest rate negatively affect the real GDP. The regression analysis also indicated that government expenditure positively influences the real GDP of the economy. Their research found that private sector credit is driven by growth in output, thus implying evidence of demand following hypothesis.

Kumar et al. (2015) examined the effect of financial development on the economic growth of South Africa over the period 1971-2011. The authors measured financial development by credit issued to the private sector as a percentage of GDP. They employed the autoregressive distributive lag (ARDL) approach. The study found that financial sector development negatively and significantly affects the economic growth of South Africa. Besides, the authors confirmed that the two variables are independent of each other, indicating support for the neutrality hypothesis. They also mentioned that the causality direction between financial sector development and real sector growth depends on the choice of the proxies used for financial development.

Mwangonda et al. (2018) looked at whether the Tanzanian financial sector development follows economic growth or vice versa from 1967 to 2011. The study employed the ratio of M2 to GDP as a measure of financial deepening within the ARDL approach. They also included real interest rate, inflation rate, real exchange rate, and gross capital formation as a share of GDP as controlling variables. The study showed that there is a negative and significant long-run relationship between broad money supply and economic growth. The researchers also revealed that inflation and gross capital formation positively and significantly influence real GDP, while the real interest rate and real exchange rate encourages real GDP; however, their effects were found insignificant. Moreover, the authors found that neither broad money supply nor real GDP causes each other.

Abubakar & Gani (2013) utilized the cointegration approach and vector error correction modeling (VECM) framework to test finance and growth linkage in Nigeria from 1970-2010. They used liquid liabilities of commercial banks, interest rate spread, and private sector credit to measure the development of the Nigerian banking sector. Additionally, the authors model included government expenditure, trade openness, and gross fixed capital formation as other independent variables. They found that liquid liabilities of commercial banks, trade openness, and gross fixed capital formation have a significant positive effect on economic growth. Conversely, private sector credit, interest rate spread, and government expenditure affected Nigeria's real GDP negatively and significantly.

A study conducted by Kjosevski (2011) investigated the impact of insurance sector development on the economic growth of Macedonia from 1995-2010 within the ordinary least square (OLS) method. He employed three proxies to measure the Macedonia insurance sector development, namely life insurance premiums as a percentage of nominal GDP, non-life insurance premiums as a percentage of nominal GDP, and total insurance premiums as a percentage of nominal GDP. Kjosevski revealed that both non-life insurance premiums and total (life and non-life) insurance premiums positively and significantly affected the real GDP of Macedonia. On the other side, he found that life insurance premium has a negative influence on the economic growth of Macedonia.

Akinci et al. (2014) tested the relationship between financial development and economic growth for OECD member countries for the period 1980-2011 using an unbalanced panel data cointegration method. They used the ratio of domestic credit to GDP, broad money supply to GDP, financial system deposits to GDP, and total bank deposit to GDP as indicators of financial development. The finding of the study showed the existence of one-way causality running from economic growth to the three proxies of financial sector development, namely domestic credit, total bank deposits, and financial system deposits. The authors also found bidirectional causality evidence between the broad money supply and the economic growth of OECD countries. The research supported the demand following hypothesis predominantly.

From Ghana, Ofori-Abebrese et al. (2017) assessed the link between the financial industry and the growth of the economy from 1970-2013. The authors applied the autoregressive distributive lag (ARDL) approach. They used domestic deposit and private sector credit as proxies of financial sector development, and government spending, trade openness, population growth rates, and gross capital formation included as control variables in their model. The authors' findings indicated that private sector credit and government spending positively and significantly influenced the real GDP per capita of Ghana. They also found that domestic deposits, trade openness, population growth rate, and gross capital formation negatively affect the growth of the economy; however, trade openness and population growth rate were found to be statistically insignificant. Additionally, the study indicated that the causal pattern flows from private sector credit to the real GDP per capita of Ghana. For the Ghanaian financial sector deposits, the causality direction runs from economic growth to financial development.

Yildirim (2015) inspected the causal bond between insurance sector development and the economic growth of Turkey from 2006-2014. The researcher used the VAR (vector autoregressive) model and the Granger causality test. The study employed life insurance premium penetration, non-life insurance premium penetration, and total insurance premium penetration as indicators of insurance industry development. Yildirim found that all proxies of the insurance sector development exert a positive and significant impact on the economic growth of Turkey. The outcomes of the Granger causality test revealed that there was one-way causation running from Turkish real GDP towards the three insurance sector development indicators.

Awad & Al Karaki (2019) investigated the impact of bank lending activities on Palestine's economic growth using quarterly data for the period 1996-2015. They employed the VAR framework and incorporated total credits provided by banks, labor force, and gross capital formation as independent variables in their model. The researchers concluded that bank lending activities, labor force, and gross capital formation have a positive and significant impact on Palestine's economic growth. Besides, they found proof of one-way causality linkage running from economic growth to banks lending activities.

Employing total insurance penetration as a proxy of insurance sector development, Olayungbo (2015) analyzed the impact of the insurance industry on the economic growth of Nigeria for the period 1976-2010. The study used the Granger causality estimation technique and found that the Nigerian real GDP causes aggregate insurance penetration in the economy. The result generally indicated that economic growth played a much important role in the development of the insurance sector.

Mugableh (2019) carried out a study on the relationship between monetary policy and economic growth in Jordan from 1990 to 2017. The author used the autoregressive distributive lag (ARDL) method. The study used a broad money supply, interest rate, and inflation rate as monetary policy indicators. The paper found that interest rate and broad money supply have a significant and positive effect on economic growth, while the inflation rate negatively and significantly affected economic growth in the long-run. The causality test showed the existence of bi-directional causation between all monetary policy variables and the economic growth of Jordan.

Using time-series data from 1970 to 2011, Ali (2013) examined the link between financial development and economic growth from the Sudanese perspective. The study adopted the autoregressive distributive lag approach. He employed liquid liabilities as a percentage of nominal GDP, money supply as a percentage of nominal GDP, and the ratio of private sector credit to nominal GDP as measures of financial development, and other four variables that affect economic growth. The study found that broad money supply, government expenditure, inflation, and trade openness exert a negative impact on real GDP per capita. He also found that liquid liabilities, private sector credit, and investment positively correlated with economic growth.

Tsetsenzaya et al. (2019) investigated the causal connection between financial development and economic growth in Mongolia using quarterly data from the period of 2001 to 2017. The authors employed various proxies that measure the depth, accessibility, and efficiency of the Mongolian financial sector and performed the Granger causality test. Their findings revealed that all indicators of financial deepening, accessibility, and efficiency cause Mongolian economic growth.

Puatwoe & Piabuo (2017) used the ARDL estimation technique to discover the short-run and long-run relationship between financial development and economic growth in Cameroon. The study covered annual time series data from 1980-2014. They choose broad money supply, private sector credit, and bank deposits as proxies of financial development; and government expenditure and private investment as control variables. The results of their research pointed that except for government expenditure and money supply, all variables exert a negative impact on economic growth in the short-run. However, all variables used in the model show a positive and significant impact on the Cameroon real GDP in the long-run.

Luangpituska (2019) studied the causal link between financial efficiency and the economic growth of Thailand. The researcher proxied the efficiency of the Thailand banking environment by interest rate spread, net interest margin, and the ratio of overhead costs to total assets. Based on statistical data from the 1991-2017 period and using the Granger causality test, the author found the non-existence of causality linkage between all indicators of financial efficiency and real GDP per capita of Thailand.

The Study of Ikikii & Nzomoi (2013) examined the effect of stock market development on the economic growth of Kenya, using stock market capitalization and stock market trade volume as indicators of stock market development. The study used quarterly data from 2000 to mid-2011. They found that both stock market capitalization and stock market trade volume have a positive and significant impact on the real GDP of Kenya. The researchers also revealed that the causality direction runs from stock market development indicators to economic growth with feedback effect, implying support for bi-directional causality pattern.

Sheefeni & Andreas (2019) figure out the causal linkage between credit extended to the private sector and economic growth in Namibia using a quarterly dataset for the period of 2000-2017. Their econometric model included credit extended to the private sector, broad money supply, and lending rate as independent variables. The main finding indicates that both credits extended to the private sector and broad money supply cause economic growth, while lending rates neither cause nor follow economic growth. Overall, the study witnessed that the majority of financial development proxies appreciate the economic growth of Namibia.

At a country level in Bangladesh, Qamruzzaman & Jianguo (2017) conducted a study to see the financial sector's role in igniting the growth of the economy using credit provided to the private sector and the ratio of broad money to narrow money as proxies of financial development. Other than financial development proxies, their model included inflation, trade openness, government expenditure, and gross fixed capital formation as control variables. Using the ARDL approach, their result disclosed that except inflation, all the other variables produced a positive and statistically significant effect on Bangladesh's real GDP per capita during the period 1980-2016. The study also confirmed the existence of bidirectional causality between financial development and economic growth.

Alhassan & Fiador (2014) applied the Granger causality test under the autoregressive distributed lag framework to investigate the link between insurance penetration and economic growth in Ghana from 1990-2010. The empirical findings show the existence of a long-run positive relationship between insurance penetration (life, non-life, and total) and the economic growth of Ghana. The study also reported a unidirectional causality running from insurance sector proxies to real GDP and not in the opposite direction.

Saad (2014) explored the causality issue between financial development and economic growth in the Lebanon context over the period 1972-2012. He employed vector error correction modeling (VECM) as the methodology of the study to investigate the short-run and long-run impact of finance on the Lebanese economic growth. The study represented the financial development of the economy by an index financial development and interest rate spread. The financial development index consists of the ratio of credit extended to the private sector to nominal GDP,

the ratio of bank deposits liabilities to nominal GDP, and the ratio of bank claims on the private sector to domestic credit. The researcher model also comprised macroeconomic variables such as government expenditure, trade openness, and investment. The empirical analysis unveiled that government expenditure and investment exert a positive and significant impact on the real GDP per capita, while trade openness and interest rate spread negatively and significantly affect economic growth in the long-run. The researchers also found a negative and insignificant impact of the financial development index on Lebanese economic growth in the long-run. The Granger causality test of the study signifies the presence of bidirectional causality between financial development proxies and the real GDP per capita.

In seeking to understand the causal relationship between finance and economic growth of Zimbabwe, Ndlovu (2013) employed the granger causality test for time series data from 1980-2016. The study proxied financial development by private sector credit, liquid liabilities of banks, and stock market capitalization as a percentage of nominal GDP. The empirical finding of the study exhibited that the private sector credit and liquid liabilities of banks follow the real GDP per capita, whereas stock market capitalization neither precedes nor follows economic growth.

Yimiao et al. (2017) used the ordinary least squares estimation technique to find the impact of financial development on the economic growth of China during the period between 1980-2016. The study employed broad money supply and domestic credit provided to the private sector as indicators of Chinese banking sector development. The researchers' results demonstrated that both broad money supply and bank claims on the private sector exert a negative impact on the economic growth of China, but this impact was insignificant. On the contrary, the control variables such as trade openness, gross fixed capital formation, and labor force exhibited a positive and statistically significant effect on the growth of the economy.

In a more recent paper, Paudel & Acharya (2020) researched the association between financial development and economic growth using the time series data from Nepal for the period 1965-2018. The study used three proxies of financial sector development, namely broad money supply, domestic credit provided to the private and public sector, and credit provided to the private

sector. As an econometrics tool, the authors applied the autoregressive distributive lag approach. In the short-run, broad money supply has a negative and insignificant impact, while total domestic credit and private sector credit have a positive and significant influence on Nepalese real GDP per capita. They also found that all proxies of financial development are positively and significantly associated with the economic growth of Nepal in the long-run. Overall, the research suggested that the Nepalese financial sector accelerate economic growth.

Mouloudi & Benladgham (2020) evaluated the causal nexus between the insurance sector and economic growth in Morocco by employing the time series data covering 1980-2017. The authors used the autoregressive distributed lag approach to estimate the relationship. Real GDP was used as a dependent variable representing economic growth, while the independent variables are as follows: life insurance premium, non-life insurance premium, total insurance premium, inflation, and foreign trade volume. The research reported that life insurance premiums, non-life insurance premiums, total insurance premiums, and foreign trade volume positively influence the real GDP in the long run, but the non-life insurance premiums impact was insignificant. And inflation has a significant and negative impact on the real output growth in Morocco. On causality, there is a causality running from insurance penetration to real GDP and not vice versa.

Using annual time series data for a period of 21 years spanning from 1980 to 2010, Simwaka et al. (2012) examined the relationship between financial development and economic growth in Malawi. The author utilized the autoregressive distributed lag (ARDL) approach and the Granger causality test to determine the correlation and causal pattern between the variables. They employed the ratio of private sector credit to nominal GDP, bank deposits as a percentage of nominal GDP, and private sector credit as a ratio of domestic credit as indicators of banking industry development. The investigation result signifies a positive and significant relationship between all financial development indicators and Malawi's long-term economic growth. They also found that economic growth spurs the financial sector when the ratio of private sector credit to nominal GDP and credit extended to the private sector as a ratio of domestic credit employed as proxies of financial development. However, bank deposits neither cause nor follow the real GDP of Malawi, conforming support to neutrality hypothesis. The study concluded that the financial sector takes the lion share in expanding the Malawian economic activities.

Al-Malkawi et al. (2012) empirically assessed the linkage between financial sector development and economic growth over United Arab Emirate's annual data from 1974 to 2008. The study employed a broad money supply as a ratio of nominal GDP, government expenditure, inflation, and trade openness as independent variables. Using the ARDL framework, the authors found that all of the independent variables negatively and significantly affect UAE real GDP in the long-run. The researchers concluded that the feedback hypothesis is valid in the United Arab Emirates.

Best et al. (2017) examined the relationship between financial deepening and economic growth of Jamaica for the period of 1980-2014. They used monetization variable (broad money supply), domestic credit provided to the private sector as a percentage of nominal GDP, and the ratio of bank liquid reserves to bank assets to express financial deepening. The variables were analyzed using the vector autoregressive framework and Granger causality test. The empirical findings implied that there exists strong positive evidence that financial deepening affecting the growth of the economy. The study results also showed that the Jamaican economy remains at the supply leading stage.

Employing the Granger causality test based on the vector error correction model (VECM), Sibindi & Godi (2014) investigated the causal relationship between insurance sector development and economic growth of South Africa. The researchers conducted the study for a period of 23 years (1990-2012). Insurance sector development is proxied by insurance density (short-term, long-term, and aggregate insurance). The empirical results revealed that the direction of causality runs from real GDP per capita to long-term insurance, as well as from real GDP per capita to aggregate insurance. However, there is no causation between short-term insurance and real GDP per capita. The study concluded that support for demand following hypothesis majorly exists on the insurance and economic growth nexus of South Africa.

Mamun et al. (2018) studied the impact of stock market development on the growth of Bangladesh using the autoregressive distributed lag estimation technique. The data collected for 24 annual observations from 1993-2016. The researchers have taken the stock market capitalization ratio, broad money supply, interest rate spread, and real effective exchange rate as

explanatory variables. According to the findings of the study, stock market capitalization ratio, broad money, and interest rate spread positively affect the real GDP while real effective exchange rate negatively influences the growth of the economy in the short-run. In the long-run, the study found that except for interest rate spread, all of the explanatory variables have a positive and significant effect on economic growth. On the other hand, the interest rate spread negatively and statistically significantly associated with real GDP in the long run. Additionally, the researcher's causality test result corroborated the feedback hypothesis between the stock market development and economic growth nexus.

Horng et al. (2011) explored the impact of the insurance sector on the economic growth of Taiwan for the period of 1961-2006. The authors represented the insurance sector of the economy by insurance density. The authors represented the insurance sector of the economy by insurance density. By employing the Granger causality test, the researchers found that real GDP granger causes insurance density. In other words, the study believed that the Taiwanese insurance sector is reactive to the demand generated from economic growth.

A study conducted by Paul et al. (2015) examined the nexus between banking sector development and economic growth in Rwanda by using the vector autoregressive model. The study incorporated three proxies of banking sector development against real GDP per capita, a proxy for economic growth. The study utilized quarterly time series data from 2000(Q1) to 2015(Q2) in its investigation. Their result depicted that broad money supply is negatively and significantly associated with economic growth while private sector credit and bank deposit liability positively and significantly affect the real GDP per capita in the long-run. The researchers also found that Rwandan banking development accelerates economic growth.

Musamali et al. (2014) appraised the impact of financial development and economic growth for 50 African countries, using panel data on broad money supply and the ratio of private sector credit to nominal GDP that ranges between 1980-2008. The study disclosed that both financial development proxies exert a positive and significant effect on the economic growth of the countries. They also mentioned that the private sector credit impact was much stronger than the broad money supply. From the causality test, the authors noticed that causality between the financial development indicators and real GDP per capita of the economies is bi-directional.

Bayar et al. (2014) conducted a study to find out the role of stock market development in stimulating the economic growth of Turkey. The study employed 57 quarterly observations from 1999-2013. Three stock market development indicators such as stock market capitalization, total value of stocks traded, and turnover ratio of stocks traded were used and analyzed by using the Johansen-Juselius cointegration test and Granger causality test. The empirical result showed that the stock market capitalization, total value of stocks traded, and turnover ratio of stocks traded positively influenced Turkish real GDP. In the case of causality, all proxies of stock market development cause the economic growth of Turkey.

Nyasha & Odhiambo (2016) investigated the impact of both banking sector development and stock market development on the economic growth of Australia during the period 1980 to 2012. The researchers used the banking sector development index and stock market development index as proxies of financial development. They also included gross saving as a percentage of GDP, gross fixed capital formation, and trade openness as other independent variables in their model. Utilizing the ARDL bound testing approach, the authors found that except for trade openness, all of the independent variables positively affected the real GDP in the short run. In the long-run, the stock market development index and gross fixed capital formation positively influenced economic growth while the rest independent variables exerted a positive impact on Australian real GDP.

Using a times series annual from 1980 to 2011, Onuonga (2014) examined the causal linkage between financial development and economic growth in Kenya. The study employed the broad money supply as a percentage of GDP and private sector credit as a ratio of GDP as financial sector indicators. The autoregressive distributed lag model was applied for analyzing the data. The findings of the study reported that the broad money supply and private sector credit positively affected the economic growth in the short-run; however, the private sector credit effect was found to be insignificant. The study also found that proxies of financial development exerted a positive and significant impact on the Kenyan economic growth in the long run. The author concluded that financial development and economic growth in Kenya appear to complement each other, implying support for the feedback hypothesis.

Abu-Bader & Abu-Qarn (2008) tested the causal nexus between finance and economic growth of six MENA countries (Algeria, Egypt, Israel, Morocco, Syria, and Tunisia). The authors analyzed the data by deploying the VAR framework. They utilized broad money minus currency as a ratio of nominal GDP, private sector credit as a percentage of nominal GDP, and private sector credit as a percentage of total credit as measures of financial development. The causality test revealed that financial sector development causes economic growth of all economies, except for Israel. The study supports the supply leading hypothesis on average.

Osman (2014) analyzed the nexus between credit extended to the private sector and the economic growth of Saudi Arabia. This study applied the autoregressive distributed lag model and included private sector credit, commercial bank's deposits, inflation, trade openness, and government expenditure as independent variables in the model. The study found that all variables exerted a positive and significant impact on real GDP in the long-run, except commercial banks' deposits.

2.3.2 Ethiopian Studies

Roman (2012) analyzed the impact of financial development on Ethiopian's aggregate growth by employing annual time series data started from the year 1980 to 2013. The study used the VAR (vector autoregressive) approach to find the impact. The independent variables used in the study were domestic saving, private sector credit as a percentage of GDP, foreign aid, and labor force. The study outcome shows that except for domestic saving, the rest variables have a significant positive relation with real GDP in the long-run. Moreover, she also found that the causality pattern runs from the Ethiopian real GDP to private sector credit and not the other way around.

Murty et al. (2012) explored whether bank credit matters for the economic growth of Ethiopia using the multivariate Johansen cointegration approach. The study considered time series annual data from 1971/72 to 2010/11. The variables used in the study were bank credit to the private sector, deposit liabilities, human capital, trade openness, government expenditure, and inflation. The empirical findings reported that private sector credit, deposit liabilities, human capital, and trade openness exert a positive and significant impact on long-term growth. Besides, inflation and government expenditure have a negative and significant influence on economic growth in the long-run.

Dagim (2015) explored the impact of financial development on the economic growth of Ethiopia for the period of 1980-2013. The researcher employed the private sector credit sector as a ratio of nominal GDP, inflation, trade openness, and labor force as explanatory variables in his model. Using the ordinary least square (OLS) method, the study finding exposed that that private sector credit, inflation, and labor force have a positive impact while trade openness has a negative influence on economic growth in the long-run.

In another study that used annual data for the 1980-2014 periods, Nyasha et al. (2017) looked at how economic growth relates with variables like broad money supply as a ratio of GDP, gross saving as a ratio of GDP, and gross fixed capital formation as a percentage of GDP in Ethiopia. Applying the Granger causality test, the researcher concluded that the bank-based financial development proxied by broad money supply causes economic growth in the long run. Additionally, gross saving spurs economic growth, and gross fixed capital formation neither causes nor follows the real GDP of Ethiopia.

2.4 Conclusion and Research Gap

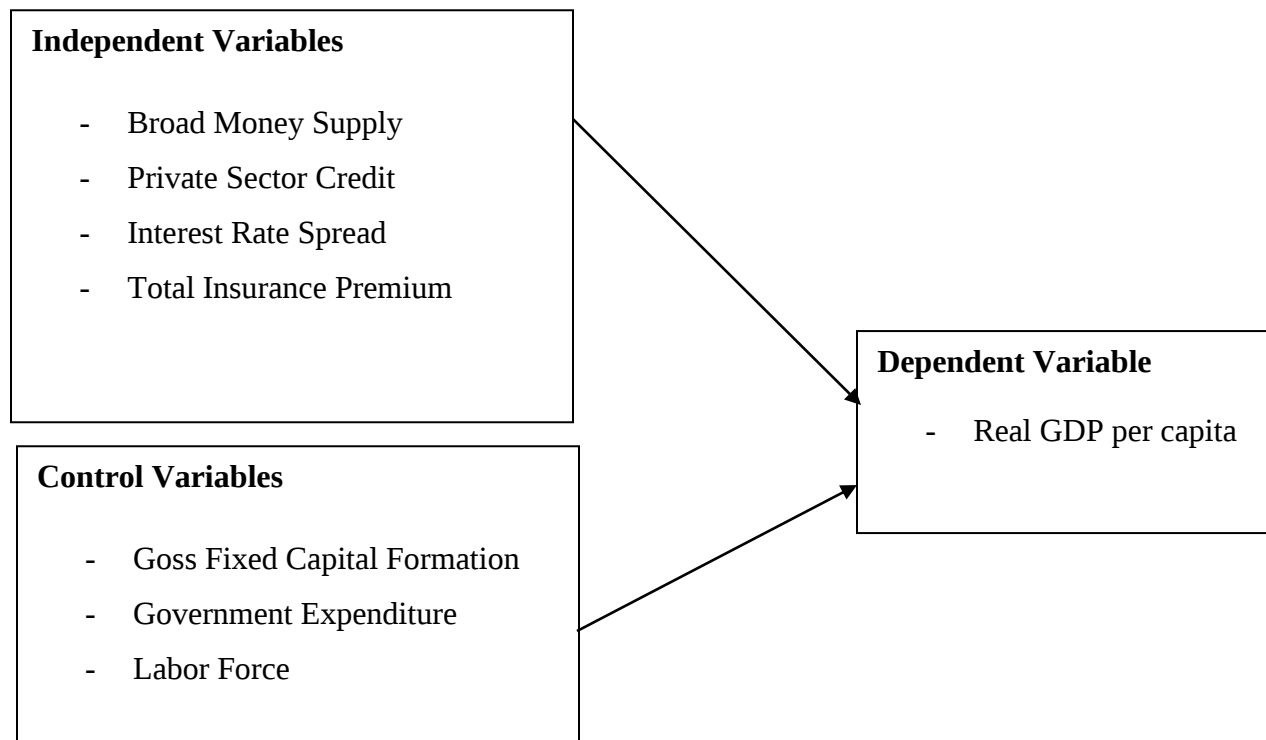
From the reviewed theoretical and empirical works, it is possible to conclude that there is no clear-cut evidence about the causal link between financial development and economic growth. In addition to that, this study observed that most of the prior empirical studies used only one or two proxies that represent financial sector development. Most of them focused on analyzing the link between one segment of the financial sector and economic growth. However, it is preferable to include various segments of the financial sector to capture the development of the whole financial system. Therefore, this paper intends to bridge the gap by utilizing four proxies that measure the development of the banking and insurance industries.

2.5 Conceptual Framework

A conceptual framework of a study is a visual presentation of variables used in the study which are drawn from literature. After reviewing diverse literature, the researcher came up with the following conceptual paradigm to assess the nexus between finance and growth.

The conceptual paradigm of this study is illustrated below.

Figure 2. 2 Conceptual framework



Source: finance and growth nexus literature

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter of the study explains the research design employed, the econometric model specification, the variables used in the econometric model, the data sources, and the tests that should be conducted to attain the objectives of the study.

3.2 Research Design

Research design is a conceptual blueprint that guides a research study to obtain answers to its research questions (Kothari, 2004). It is a framework that describes how a research project is carried out accurately. This study adopts an explanatory research design. Explanatory research design is the appropriate research design for the study since it allows the researcher to analyze a cause and effect relationship between the dependent and independent variables.

3.3 Model Specification

Based on theoretical literature and models applied in previous studies of finance and growth nexus, the researcher employed the following model.

$$Y = f(FD, X) \dots \dots \dots (3.1)$$

Where Y is economic growth, FD is a set of financial development indicators, and X is a set of other variables that influence economic growth.

The functional form of equation (3.1) can be re-expressed as:

$$RGDPPC = f(M_2, DCPS, IRS, TIP, GFCF, GE, LF) \dots \dots \dots (3.2)$$

The econometric form of the above model can be specified as follows:

$$\ln RGDP_{PCt} = \beta_0 + \beta_1 \ln M_{2t} + \beta_2 \ln DCPS_t + \beta_3 \ln IRS_t + \beta_4 \ln TIP_t + \beta_5 \ln GFCF_t + \beta_6 \ln GE_t + \beta_7 \ln LF_t + \varepsilon_t \dots \dots \dots (3.3)$$

Where:

$\ln$ = Natural logarithm sign,

$RGDPPC_t$ = Real GDP per capita at time t ,

$M2_t$ = Broad money supply at time t ,

$DCPS_t$ = Domestic credit to the private sector at time t ,

IRS_t = Interest rate spread at time t ,

TIP_t = Total insurance premium at time t ,

$GFCF_t$ = Gross fixed capital formation at time t ,

GE_t = Government expenditure at time t ,

LF_t = Labor force at time t ,

ε_t = Error term

t = Time

β_0 = Intercept parameter

β_1 - β_7 = Slope parameter

In equation (3.3), except IRS all other variables are logged to ease the interpretation of results.

IRS is not expressed in the form of logarithm since it is a rate.

Equation (3.3) can be re-arranged in to ARDL model as follows:

$$\begin{aligned} \Delta \ln RGDPPC_t = & \alpha + \sum_{i=1}^p \beta_1 \Delta \ln RGDPPC_{t-i} + \sum_{i=0}^{q1} \beta_2 \Delta \ln M2_{t-i} + \sum_{i=0}^{q2} \beta_3 \Delta \ln DCPS_{t-i} + \\ & \sum_{i=0}^{q3} \beta_4 \Delta IRS_{t-i} + \sum_{i=0}^{q4} \beta_5 \Delta \ln TIP_{t-i} + \sum_{i=0}^{q5} \beta_6 \Delta \ln GFCF_{t-i} + \sum_{i=0}^{q6} \beta_7 \Delta \ln GE_{t-i} + \\ & \sum_{i=0}^{q7} \beta_8 \Delta \ln LF_{t-i} + \delta_1 \ln RGDPPC_{t-1} + \delta_2 \ln M2_{t-1} + \delta_3 \ln DCPS_{t-1} + \delta_4 IRS_{t-1} + \delta_5 \ln TIP_{t-1} + \\ & \delta_6 \ln GFCF_{t-1} + \delta_7 \ln GE_{t-1} + \delta_8 \ln LF_{t-1} + \varepsilon_t \dots \dots \dots (3.4) \end{aligned}$$

Where:

Δ = First difference operator

β_{1-8} = Coefficients of short run variables

δ_{1-8} = Coefficients of long run variables

p and q1-q7= maximum lag length

3.4 Description of Variables

3.4.1 Dependent Variable

Real GDP per capita (RGDPPC): - Real GDP per capita is the ratio of real gross domestic product to the total population of an economy. This proxy has been a widely used indicator of economic growth in most studies (see Ndlovu, 2013; Onuonga 2014; Ghildiyal et al., 2015; Paul et al., 2015; Ofori-Abebrese et al., 2017; Tsetsenzaya et al., 2019; and Paudel & Acharya, 2020). In line with these studies, the researcher uses real GDP per capita as a proxy for economic growth.

3.4.2 Independent Variables

Broad money supply (M2): - Broad money supply comprises currency that circulates outside a banking environment, demand deposits, and time deposits. Broad money as a ratio of nominal GDP is the most commonly used indicator of financial sector development (see Caporale et al., 2009; Akinci et al., 2014; Onuonga, 2014; Ghildiyal et al., 2015; Puatwoe & Piabuo, 2017; Yimiao et al., 2017; and Paudel & Acharya, 2020). However, studies of Abu-Bader & Abu-Qarn (2008) and Abubakar & Gani (2013) recommended the deduction of currency that circulates outside the banking environment from the broad money supply to signify the functions of banks. Therefore, this study uses M2 minus currency as a share of nominal GDP. An increase in this ratio implies an improvement in the financial deepening of an economy. This proxy is expected to have a positive linkage with economic growth.

Domestic credit to the private sector (DCPS): - is the total credit allocated to the private sector by financial intermediaries, excluding credit issued to the government and public enterprises. This proxy of financial development accurately measures the capital allocation role of financial intermediaries. Therefore, this study picks private sector credit as an essential measure of financial intermediaries' development, which is widely employed by numerous researchers (Simwaka et al., 2012; Ndlovu, 2013; Ali, 2013; Tahir et al., 2015; Kumar et al., 2015; Paul et al., 2015; Best et al., 2017; Puatwoe & Piabuo, 2017; Qamruzzaman & Jianguo, 2017; Ofori-Abebrese et al., 2017; and Sheefeni & Andreas, 2019). The proxy is expressed in this study as a percentage of nominal GDP. It is expected to have a positive impact on economic growth.

Interest rate spread (IRS): - is the difference between commercial banks' lending rate and deposit rate. Following studies of Caporale et al.(2009), Abubakar & Gani (2013), and Saad (2014), this paper uses interest rate spread to measure the efficiency of the Ethiopian banking sector. The coefficient of IRS is expected to be negative, implying a high IRS hinders economic growth.

Total insurance premium (TIP): - This proxy included both life and non-life insurance premiums. In line with studies of Kjosevski (2011), Yildirim (2015), and Oitsile et al. (2018), this study incorporates the ratio of aggregate insurance premium to nominal GDP in the model as an indicator of insurance sector development. This proxy measures the penetration of insurance activities in an economy. With this variable, this study expects a positive correlation with economic growth.

3.4.3 Control Variables

Gross fixed capital formation (GFCF): - refers to the physical capital stock of an economy. Gross fixed capital formation measures the level of investment in an economy. It is entered in the model as a share of nominal GDP. It is supposed to have a positive effect on economic growth.

Government Expenditure (GE): - refers to expenses made by the government on the provision goods and services to satisfy the needs of citizens of an economy. It is expected to either have a positive or negative effect on economic growth.

Labor force (LF): - refers to the economically active population which ages from 15 to 65. It includes both the employed and unemployed ones in the above age range. The coefficient of labor force is expected to be positive.

3.5 Data Sources

This study employed annual time series data from 1983 to 2019. Data for the variables are extracted from five sources: Ethiopian Insurance Corporation, National Bank of Ethiopia, Ministry of Finance and Economic Development, World Bank Database, and UNCTAD. Real GDP per capita and nominal GDP were collected from the World Bank Database, while broad money supply and private sector credit, interest rate spread, and gross fixed capital formation were obtained from the National Bank of Ethiopia. Government expenditure and labor force were sourced from the Ministry of Finance and Economic Development and UNCTAD, respectively. The insurance premium was gathered from the Ethiopian Insurance Corporation and the National Bank of Ethiopia.

3.6 Estimation Techniques

3.6.1 Unit Root Test

Even though the ARDL model doesn't require the pretesting of variables for the unit root test, it is essential to ascertain that no variable is integrated of order 2. This is because the ARDL estimation technique is only applicable when the variables are either purely I (0), purely I (1), or combination of both integration orders (Nkoro & Uko, 2016). Consequently, before estimating the ARDL model, this study employs the Augmented Dickey-Fuller (ADF) and Phillips- Perron (PP) tests to identify the variables' order of integration.

3.6.2 ARDL Bound Test for Cointegration

The ARDL bounds test is used to check the existence or non-existence of a long-run linkage between the dependent and independent variables (Nkoro & Uko, 2016). If the calculated F-statistic value is greater than the upper bound I (1), the null hypothesis is rejected, and one can conclude the existence of a long-run association. On the contrary, when the calculated F-statistic

value is smaller than the lower bound I (0), the null hypothesis is accepted. Thus, the variables are not cointegrated. If the calculated F-statistic value falls between the lower and upper bound value, then the result is inconclusive.

H₀: There is no long-run relationship.

H₁: There is a long-run relationship exists.

3.6.3 Long-run and Short-run Estimation

Once the existence of a cointegrating relationship has been ascertained, the long-run and short-run parameters can be estimated.

The long-run ARDL model is specified as follows:

$$\begin{aligned} \ln \text{RGDPPC}_t = & \alpha + \sum_{i=1}^p \delta_1 \ln \text{RGDPPC}_{t-i} + \sum_{i=0}^{q1} \delta_2 \ln \text{M2}_{t-i} + \sum_{i=0}^{q2} \delta_3 \ln \text{DCPS}_{t-i} + \\ & \sum_{i=0}^{q3} \delta_4 \text{IRS}_{t-i} + \sum_{i=0}^{q4} \delta_5 \ln \text{TIP}_{t-i} + \sum_{i=0}^{q5} \delta_6 \ln \text{GFCF}_{t-i} + \sum_{i=0}^{q6} \delta_7 \ln \text{GE}_{t-i} + \\ & \sum_{i=0}^{q7} \delta_8 \ln \text{LF}_{t-i} + \varepsilon_t \dots \dots \dots (3.5) \end{aligned}$$

The short-run parameters can be obtained by estimating the error correction model as follows:

$$\begin{aligned} \Delta \ln \text{RGDPPC}_t = & \alpha + \sum_{i=1}^p \beta_1 \Delta \ln \text{RGDPPC}_{t-i} + \sum_{i=0}^{q1} \beta_2 \Delta \ln \text{M2}_{t-i} + \sum_{i=0}^{q2} \beta_3 \Delta \ln \text{DCPS}_{t-i} + \\ & \sum_{i=0}^{q3} \beta_4 \Delta \text{IRS}_{t-i} + \sum_{i=0}^{q4} \beta_5 \Delta \ln \text{TIP}_{t-i} + \sum_{i=0}^{q5} \beta_6 \Delta \ln \text{GFCF}_{t-i} + \sum_{i=0}^{q6} \beta_7 \Delta \ln \text{GE}_{t-i} + \\ & \sum_{i=0}^{q7} \beta_8 \Delta \ln \text{LF}_{t-i} + \lambda \text{ECT}_{t-1} + \varepsilon_t \dots \dots \dots (3.6) \end{aligned}$$

Where:

λ = is a speed adjustment parameter ECM = is the error correction term

3.6.4 Granger Causality Test

The study applied the Granger causality test to determine the causality pattern between finance and economic growth.

3.6.5 Diagnostic Tests and Stability Test

The study conducted diagnostic and stability tests to check the robustness of the selected model.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter deals with the econometric analysis and its interpretation. It discusses the variables' stationarity properties, diagnostic and stability test results, short-run and long-run estimation, and causality test results.

4.2 Unit Root Test Analysis

H_0 : Variables are non-stationary.

H_1 : Variables are stationary.

Decision Rule: If the absolute value of test statistics is greater than the absolute value of test critical, the null hypothesis should be rejected.

Table 4.1 Augmented Dickey-Fuller (ADF) test result

AUGMENTED DICKEY-FULLER Test Statistics						
Variable	With Intercept			Trend & Intercept		
	At level	At First Difference	Order of []	At level	At First Difference	Order of []
LNRGDPPC	1.970206	-4.025575	I [1] at 1%	-0.901161	-5.429733	I [1] at 1%
LNM2	-2.020367	-5.011830	I [1] at 1%	-1.919764	-5.035033	I [1] at 1%
LNDCPS	-1.389486	-4.114091	I [1] at 1%	-1.067906	-4.325464	I [1] at 1%
IRS	-1.760270	-7.42778	I [1] at 1%	-2.056384	-4.957263	I [1] at 1%
LNTIP	-2.438647	-7.172848	I [1] at 1%	-3.221845	-7.138740	I [0] at 10%
LNGFCF	-1.240165	-7.819479	I [1] at 1%	-3.111897	-7.692490	I [1] at 1%
LNGE	1.704849	-5.313812	I [1] at 1%	-1.010795	-4.268120	I [1] at 1%
LNLF	2.222159	-5.168772	I [1] at 1%	-0.398674	-5.792185	I [1] at 1%
With constant, no trend				With constant and trend		

Test Critical Values:	1%	-3.632900	Test Critical Values:	1%	-4.243644
	5%	-2.948404		5%	-3.544284
	10%	-2.612874		10%	-3.204699

Source: Researcher's Computation Using E-views 10 Output

According to the above table, the ADF test result exhibits that the variables are not integrated in the same order. However, none of the variables are integrated of order two (I [2]). LNTIP (total insurance premium) is stationary in level (trend and intercept). LNRGDPPC (real GDP per capita), LNM2 (broad money supply), LNDPCPS (domestic credit to the private sector), IRS (interest rate spread), LNGFCF (gross fixed capital formation), LNGE (government expenditure), and LNLF (labor force) are stationary in first difference.

Table 4.2 Philip-Perron (PP) test result

PHILIP-PERRON Test Statistics						
Variable	With Intercept			Trend & Intercept		
	At level	At First Difference	Order of []	At level	At First Difference	Order of []
LNRGDPPC	1.680825	-3.974073	I [1] at 1%	- 0.802997	-5.676268	I [1] at 1%
LNM2	-1.994208	-4.997488	I [1] at 1%	-2.040834	-5.026401	I [1] at 1%
LNDPCPS	-1.469522	-4.195998	I [1] at 1%	-1.576901	-4.137450	I [1] at 5%
IRS	-1.642087	-7.714814	I [1] at 1%	-1.851273	-10.64222	I [1] at 1%
LNTIP	-2.438647	-9.040834	I [1] at 1%	-3.233072	-9.861688	I [0] at 10%
LNGFCF	-0.988529	-8.456695	I [1] at 1%	-3.060800	-8.301618	I [1] at 1%
LNGE	1.919078	-5.347218	I [1] at 1%	-0.959352	-6.777048	I [1] at 1%
LNLF	-3.013183	-5.168772	I [0] at 5%	-0.144877	-5.961642	I [1] at 1%
With constant, no trend				With constant and trend		
Test Critical Values:	1%	-3.632900	Test Critical Values:	1%	-4.243644	
	5%	-2.948404		5%	-3.544284	
	10%	-2.612874		10%	-3.204699	

Source: Researcher's Computation Using E-views 10 Output

According to Table 4.2, the PP test result shows that the variables have a mixed order of integration. However, no variables are integrated of order two. LNTIP (total insurance premium) and LNLF (labor force) are stationary in level with trend & intercept, and intercept, respectively. LNRGDPPC (real GDP per capita), LNM2 (broad money supply), LNDPCS (domestic credit to the private sector), IRS (interest rate spread), LNGFCF (gross fixed capital formation), and LNGE (government expenditure) are stationary in first difference.

4.3 Choice of Lag Length

Lag length is computed using various lag selection criteria. The most common criteria are the Akaike Information Criterion, Schwarz Information Criterion, Hannan-Quinn Information Criterion, and Final Prediction Error. According to Nkoro & Uko (2016), the lag length with the smallest value of the criteria should be picked as the optimal lag length. Therefore, this study selected lag two using the Akaike information criterion to estimate the short-run and long-run relationship between the dependent and independent variables. The result of the lag length selection criteria is shown in Table 4.3 as follows.

Table 4.3 Optimal lag length selection

VAR Lag Order Selection Criteria						
Lag	Log L	LR	FPE	AIC	SC	HQ
0	32.43638	NA	3.42e-11	-1.396364	-1.040856	-1.273643
1	314.0618	418.4150	1.49e-16	-13.83211	-10.63253*	-12.72761
2	408.8906	97.53816*	4.77e-17*	-15.59375*	-9.550111	-13.50749*
* 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: Researcher's Computation Using E-views 10 Output

4.4 Diagnostic Tests

4.4.1 Test for Autocorrelation

H_0 : There is no evidence of serial correlation in the model.

H_1 : There is evidence of serial correlation in the model.

Decision Rule: If the F-statistic P-value exceeds the level of significance (5%), the null hypothesis should be accepted.

Table 4.4 Breusch-Godfrey Serial Correlation LM Test Result

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	3.212530	Prob. F (2,15)	0.0690
Obs*R-squared	10.49599	Prob. Chi-Square (2)	0.0053

Source: Researcher's Computation Using E-views 10 Output

The test result signifies that the F-statistic P-value is 0.0690. Therefore, the model is free from the autocorrelation problem since the P-value (0.0690) is higher than 0.05.

4.4.2 Test for Heteroscedasticity

H_0 : The errors in the model have a constant variance.

H_1 : The errors in the model do not have a constant variance

Decision Rule: If the F-statistic P-value exceeds the level of significance (5%), the null hypothesis should be accepted.

Table 4.5 Heteroskedasticity Test: Breusch-Pagan-Godfrey Result

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.095276	Prob. F (17,17)	0.4267
Obs*R-squared	18.29575	Prob. Chi-Square (17)	0.3704
Scaled explained SS	2.910404	Prob. Chi-Square (17)	0.9999

Source: Researcher's Computation Using E-views 10 Output

Table 4.6 Heteroskedasticity Test: Harvey Result

Heteroskedasticity Test: Harvey			
F-statistic	1.454605	Prob. F (17,17)	0.2239
Obs*R-squared	20.74109	Prob. Chi-Square (17)	0.2381
Scaled explained SS	15.68479	Prob. Chi-Square (17)	0.5463

Source: Researcher's Computation Using E-views 10 Output

Table 4.7 Heteroskedasticity Test: ARCH Result

Heteroskedasticity Test: ARCH			
F-statistic	1.048248	Prob. F (2,30)	0.3630
Obs*R-squared	2.155512	Prob. Chi-Square (2)	0.3404

Source: Researcher's Computation Using E-views 10 Output

The above results indicate that the F-statistic P-value for the Breusch-Pagan-Godfrey test, Harvey test, and ARCH test is 0.4267, 0.2239, and 0.3630, respectively. As a result, there is no heteroskedasticity in the model since each test P-value is higher than 0.05.

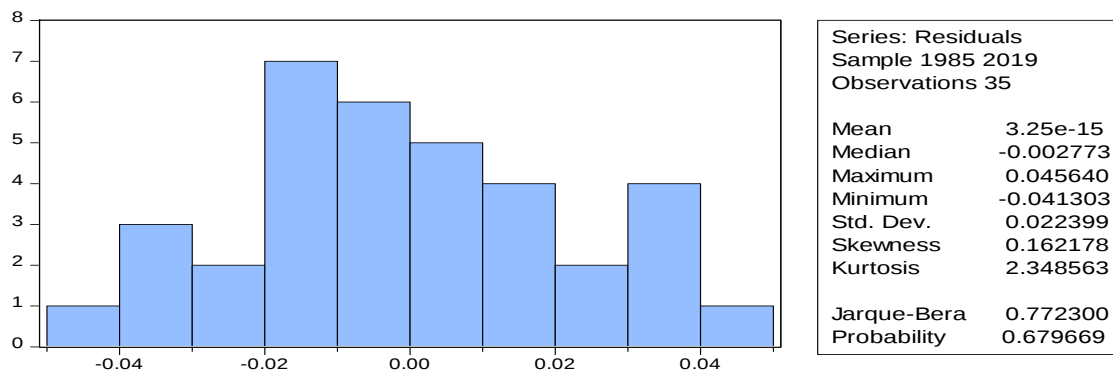
4.4.3 Test for Normality

H_0 : The error terms are normally distributed in the model.

H_1 : The error terms are not normally distributed in the model.

Decision Rule: If the Jarque-Bera test statistic P-value exceeds the level of significance (5%), the null hypothesis should be accepted.

Figure 4.1 Normality Test



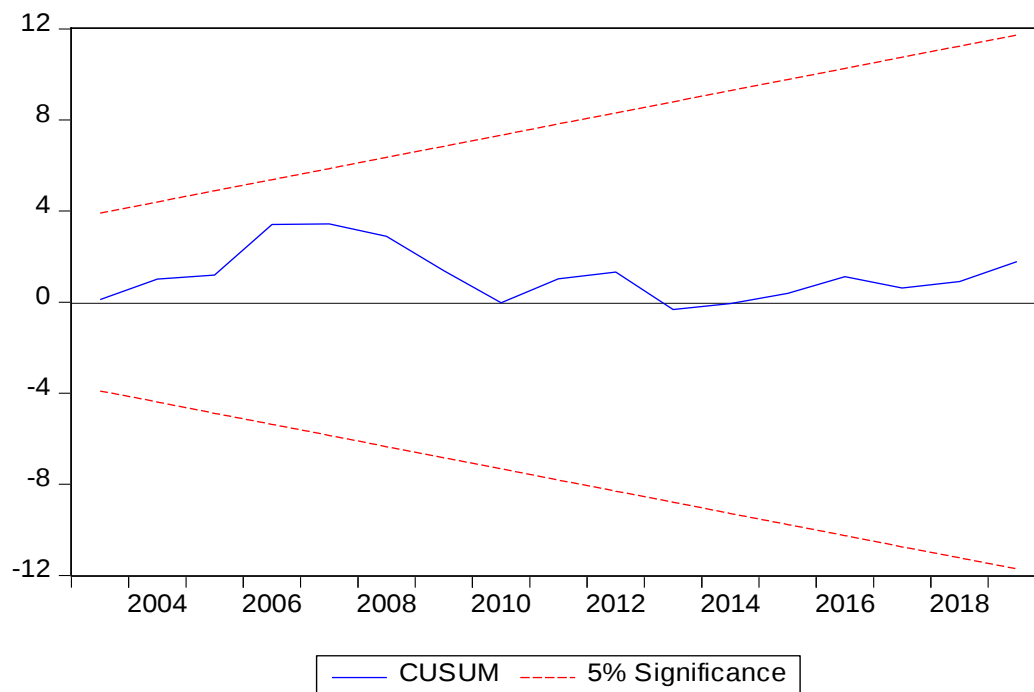
Source: Researcher's Computation Using E-views 10 Output

The above test result shows that the Jarque-Bera test statistic P-value is 0.679669. Since the P-value is higher than 0.05, the residuals are normally distributed in the model.

4.5 Model Stability Analysis

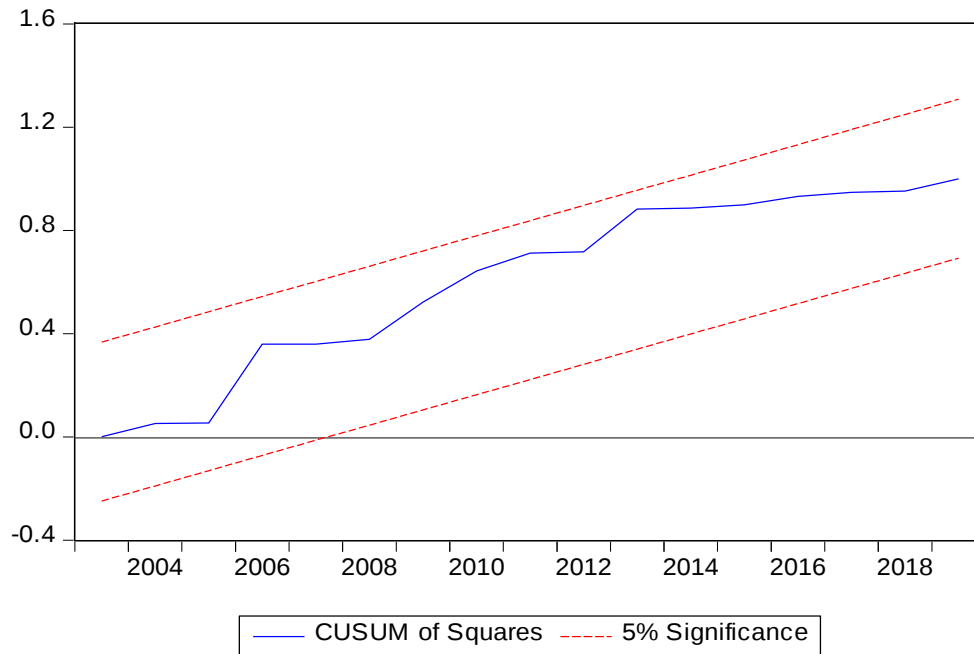
To check the stability of the model, this study used the Cumulative Sum (CUSUM) and Cumulative Sum of Squares (CUSUMQ) technique. And, the study found that the statistics of both tests lie between the critical bounds of the 5% significance level. This shows that the estimated coefficients of the model are stable during the period of the study. The graphical results for the tests are illustrated in Figure 4.2 and 4.3 as follows.

Figure 4.2 CUSUM Test Result



Source: Researcher's Computation Using E-views 10 Output

Figure 4. 3 CUSUM of Squares Test Result



Source: Researcher's Computation Using E-views 10 Output

4.6 Bound Test for Cointegration

H_0 : There is no long-run linkage among the variables.

H_1 : There is a long-run linkage among the variables.

Decision Rule: If the F-statistic exceeds the upper bound critical value, the null hypothesis should be rejected.

Table 4. 8 Bound Test Result

Test Statistic	Value	K
F-statistic	5.519737	7
Critical Value Bounds		
Significance	I (0)	I (1)
10%	1.92	2.89
5%	2.17	3.21
2.5%	2.43	3.51
1%	2.73	3.9

Source: Researcher's Computation Using E-views 10 Output

The bound test result shows that the F-statistic value is 5.519737. The F-statistic value exceeds the upper bound critical values of 2.89, 3.21, 3.51, 3.9 at 10%, 5%, 2.5%, and 1% level of significance, respectively. The result confirms the existence of a long-run linkage between finance and economic growth.

4.7 Estimation of the Short-run Relationship

With regard to short-run association, the broad money supply, interest rate spread, and government expenditure exert a negative and significant impact on the Ethiopian real GDP per capita. However, the government expenditure impact is statistically significant only at 10% level of significance. The domestic credit provided to the private sector has a negative and insignificant influence on economic growth. The gross fixed capital formation is positively and significantly associated with economic growth. The labor force and total insurance premium have a positive but insignificant relationship with economic growth in the short-run. This implies that the variables require more time to realize their influence.

The coefficient of the error correction term is -1.008619 and strongly significant at 1% level of significance. This signifies that 100% of the disequilibrium created by the previous year's shock is corrected in the current year. In other words, the full adjustment process takes only one year, implying that the adjustment speed is very high

.

Table 4.9 Estimation of short-run coefficients

ECM Regression				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNM2)	-0.652586	0.142124	-4.591675	0.0003
D(LNDCPS)	-0.055271	0.046954	-1.177128	0.2554
D(LNDCPS (-1))	-0.055196	0.031635	-1.744761	0.0991
D(IRS)	-0.032922	0.010438	-3.154118	0.0058
D(LNTIP)	0.045164	0.046210	0.977376	0.3421
D(LNGFCF)	0.319173	0.053157	6.004309	0.0000
D(LNGE)	-0.142693	0.081687	-1.746824	0.0987

D(LNGE (-1))	-0.150747	0.088664	-1.700201	0.1073
D(LNLF)	1.070060	1.183089	0.904463	0.3784
D(LNLF (-1))	-3.098202	1.393007	-2.224111	0.0400
CointEq(-1)	-1.008619	0.185228	-5.445295	0.0000

Source: Researcher's Computation Using E-views 10 Output

4.8 Estimation of the Long-run Relationship

After ascertaining the existence of a long-run linkage, the researcher estimated the long-run association between the real GDP per capita and the independent variables. And, the results are presented in Table 4.9 as follows.

Table 4.10 Estimation of long-run coefficients

Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNLM2	-1.044904	0.121414	-8.606121	0.0000
LNDCPS	0.053091	0.024181	2.195577	0.0423
IRS	-0.032640	0.010048	-3.248322	0.0047
LNTIP	0.209841	0.061820	3.394389	0.0034
LNGFCF	0.431897	0.055804	7.739588	0.0000
LNGE	0.181444	0.084078	2.158056	0.0455
LNLF	1.823459	0.550932	3.309771	0.0041
C	-26.89534	7.532795	-3.570433	0.0024
EC = LNRGDPPC - (-1.0449*LNLM2 + 0.0531*LNDCPS -0.0326*IRS + 0.2098 *LNTIP + 0.4319*LNGFCF + 0.1814*LNGE + 1.8235*LNLF - 26.8953)				

Source: Researcher's Computation Using E-views 10 Output

The broad money supply exerts a negative and significant impact on Ethiopian economic growth in the long-run. The magnitude of the coefficient indicates that a one percent increase in broad money supply leads to a reduction in real GDP per capita by 1.045 percent. This finding is far

from the prior expectation. A possible justification for this unexpected result could be the deposits are not sufficient to induce economic growth. The empirical studies of Al-Malkawi et al. (2012), Osman (2014), Ofori-Abebrese et al. (2017), and Mwangonda et al. (2018) support this result; but, Abubakar & Gani (2013), and Mugableh (2019) found a positive and significant linkage between broad money supply and economic growth.

The domestic credit provided to the private sector has a positive and significant impact on Ethiopian economic growth in the long-run. The magnitude of the coefficient indicates that a one percent increase in credit extended to the private sector leads to a 0.053 percent rise in real GDP per capita. This implies that the private sector credit has increased to appreciate investment activities, and this ignites economic growth. A similar result was found by the works of Caporale et al. (2009), Roman (2012), Murty et al. (2012), Ali (2013), Osman (2014), Dagim (2015), Paul et al. (2015), Ofori-Abebrese et al. (2017), and Puatwoe & Piabuo (2017). On the contrary, Ghildiyal et al. (2015), Kumar et al. (2015), and Tahir et al. (2015) found a negative and significant effect of private sector credit on economic growth for India, South Africa, and Pakistan, respectively.

The interest rate spread exerts a negative and significant influence on Ethiopian economic growth in the long-run. The magnitude of the coefficient indicates that a one percent increase in interest rate spread reduces real GDP per capita by 0.033 percent. This signifies that as the spread between deposit and lending rate becomes wider, less portion of the savings goes to finance borrowers' investment activities. This, in turn, reduces economic growth. A similar result was found by the works of Caporale et al. (2009), Abubakar & Gani (2013), Saad (2014), and Mamun et al. (2018).

The total insurance premium has a positive and significant influence on Ethiopian economic growth in the long-run. The magnitude of the coefficient indicates that a one percent increase in total insurance premium causes real GDP per capita to increase by 0.209 percent. This shows that the insurance companies propel economic growth via increasing the financial resources provided to investors. The positive long-run linkage between the total insurance premium and economic growth is consistent with the findings of Kjosevski (2011), Alhassan & Fiador (2014), Yildirim (2015), and Mouloudi & Benladgham (2020). Contrary to the above result, Oitsile et al. (2018) found a negative impact of total insurance premium on Botswana's economic growth.

The gross fixed capital formation is positively and significantly correlated with Ethiopian economic growth in the long-run. The magnitude of the coefficient indicates that a one percent increase in gross fixed capital formation leads to an increase in real GDP per capita by 0.432 percent. This implies that investment is made in more productive activities. The works of Abubakar & Gani (2013), Saad (2014), Yimiao et al. (2017), Mwangonda et al. (2018), Oitsile et al. (2018), and Awad & Al Karaki (2019) found a similar result. On the other hand, Ofori-Abebrese et al. (2017) reported that investment has a negative and significant impact on Ghana's economic growth.

The government expenditure exerts a positive and significant impact on Ethiopian economic growth in the long-run. The magnitude of the coefficient indicates that a one percent increase in government expenditure causes real GDP per capita to grow by 0.181 percent. This shows that most of the government expenditure is channeled to growth-inducing activities. The result is in line with the findings of Osman (2014), Saad (2014), Ofori-Abebrese et al. (2017), Puatwoe & Piabuo (2017), and Qamruzzaman & Jianguo (2017). The above outcome contrasts with the empirical works of Abubakar & Gani (2013) and Ali (2013), who found the inverse relationship.

The labor force is positively and significantly related to the Ethiopian economic growth in the long-run. The magnitude of the coefficient indicates that a one percent increase in the labor force results an increase in real GDP per capita by 1.823 percent. The finding is consistent with the empirical works of Roman (2012), Dagim (2015), Yimiao et al. (2017), and Awad & Al Karaki (2019).

4.9 Granger Causality Test

H₀: There is no causal linkage between financial development and economic growth

H₁: There is a causal linkage between financial development and economic growth.

Decision Rule: If the F-statistic P-value exceeds 5%, the null hypothesis should be accepted (cannot be rejected).

Table 4.11 Pairwise Granger causality test results

Pairwise Granger Causality Tests			
Null Hypothesis:	Obs	F-Statistic	Prob.
LNM2 does not Granger Cause LNRGDPPC	35	2.18164	0.1304
LNRGDPPC does not Granger Cause LNM2		0.30853	0.7368
LNDGPS does not Granger Cause LNRGDPPC	35	3.47020	0.0441
LNRGDPPC does not Granger Cause LNDGPS		0.92170	0.4088
IRS does not Granger Cause LNRGDPPC	35	3.96170	0.0297
LNRGDPPC does not Granger Cause IRS		0.94895	0.3985
LNTIP does not Granger Cause LNRGDPPC	35	0.92991	0.4057
LNRGDPPC does not Granger Cause LNTIP		3.41995	0.0459

Source: Researcher's Computation Using E-views 10 Output

Broad Money Supply and Economic Growth

The null hypotheses that signify no causal relationship between broad money supply and economic growth cannot be rejected since the P-values exceed 0.05. Therefore, there is no causality linkage between the broad money supply and Ethiopian real GDP per capita. This implies that the broad money supply neither causes nor follows economic growth. Mwangonda et al. (2018) and Simwaka et al. (2012) found a similar result that supports the neutrality hypothesis. However, the above outcome contrasts with the works of Ofori-Abebrese et al. (2017) and Sheefeni & Andreas (2019), who found support for the demand following hypothesis and supply leading hypothesis, respectively.

Private Sector Credit and Economic Growth

The null hypothesis that states private sector credit does not Granger cause real GDP per capita is rejected since the P-value doesn't exceed 0.05. However, the null hypothesis that states real GDP per capita does not cause private sector credit cannot be rejected since the P-value exceeds 0.05. In this regard, the study found a unidirectional causality that runs from domestic credit provided to the private sector to the Ethiopian real GDP per capita. The finding is in line with the studies of Ghildiyal et al. (2015), Ofori-Abebrese et al. (2017), Tsetsenzaya et al. (2019), and Shee feni

& Andreas (2019). On the contrary, Simwaka et al. (2012), Ndlovu (2013), and Awad & Al Karaki (2019) found the inverse result, implying that economic growth facilitates financial sector development.

Interest Rate Spread and Economic Growth

The null hypothesis that postulates interest rate spread does not Granger cause real GDP per capita is rejected since the P-value doesn't exceed 0.05. However, the null hypothesis that postulates real GDP per capita does not Granger cause interest rate spread cannot be rejected since the P-value exceeds 0.05. So, the causality test result reveals that interest rate spread causes Ethiopian real GDP per capita. A similar result was found by the works of Caporale et al. (2009) and Tsetsenzaya et al. (2019), while Luangpituska (2019) found no causal linkage between interest rate spread and real GDP per capita of Thailand.

Total Insurance Premium and Economic Growth

The null hypothesis that postulates total insurance premium does not Granger cause real GDP per capita cannot be rejected since the P-value exceeds 0.05. However, the null hypothesis that postulates real GDP per capita does not Granger cause total insurance premium is rejected since the P-value doesn't exceed 0.05. Therefore, the study concluded that the causality direction runs from real GDP per capita to total insurance premium and not in the opposite direction. The result is consistent with the works of Olayungbo (2015) and Yildirim (2015). However, Alhassan & Fiador (2014) and Mouloudi & Benladgham (2020) found evidence that supports the supply leading view.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter recaps the econometric analysis results presented in chapter four, provides recommendations on the overall findings, and forwards possible areas for further research on the subject.

5.2 Summary of Major Findings

This paper analyzed the impact of banking and insurance sector development on Ethiopian economic growth during the period between 1983-2019. The study used the ARDL estimation procedure to see the short-run and long-run relationship between financial sector development and economic growth. The researcher employed broad money supply as a ratio of nominal GDP, private sector credit as a ratio of nominal GDP, interest rate spread, and the ratio of total insurance premium to nominal GDP as proxies of financial sector development. The econometric analysis was carried out using EViews software.

Before running the ARDL model, the study applied ADF and PP unit root tests. The unit root test analysis disclosed that there is a mixed order of integration, implying that $I(0)$ and $I(1)$. This outcome allowed the application of the ARDL estimation technique to analyze the collected data. Therefore, the study performed the ARDL bounds test to ascertain whether a long-run linkage among the variables exists or not. And the result unveiled that a long-run association exists. Furthermore, the study employed diagnostic and stability tests. The diagnostic test results confirmed the non-existence of autocorrelation and heteroscedasticity problems. And the error terms were found to be normally distributed in the model. Additionally, the CUMSUM and CUSUMSQ tests revealed that the model is stable.

The empirical evidence of the study showed the short-run and long-run linkage among the variables. The broad money supply and interest rate spread negatively and significantly affected the Ethiopian economic growth in the long-run and short-run. The total insurance premium, gross fixed capital formation, and labor force are positively associated with Ethiopian economic growth in the short-run and long run. Except for gross fixed capital formation, the other variables exerted a significant impact only in the long-run. The private sector credit exerted a positive influence on Ethiopian economic growth in the long-run while the inverse relation was observed in the short-run. The impact of the variable is significant only in the long-run. The government expenditure is positively and negatively correlated with Ethiopian economic growth in the long-run and short-run, respectively. The variable exerted a significant impact both in the long-run and short-run.

The granger causality test analysis shows that all types of causality patterns exist between the selected financial development proxies and Ethiopian economic growth, except for the bidirectional causation. When private sector credit and interest rate spread are used as financial development proxies, the granger causality direction runs from the variables to Ethiopian real GDP per capita. The broad money supply and real GDP per capita are independent of each other, indicating the non-existence of causal linkage between the variables. On the other side, the study found one-way causation running from Ethiopian real GDP towards the total insurance premium.

5.3 Conclusion

This study investigated the nexus between finance and growth in Ethiopia. The study found that broad money supply exerts a negative impact on economic growth in the long-run and neither broad money supply nor real GDP causes each other. This implies that the collected deposits are not enough to propel economic growth. And an increase in interest rate spread reduces economic growth, indicating that a wider interest rate spread lowers the level of credit channeled to borrowers. This proxy of financial development causes the growth of the economy. Additionally, the private sector credit positively affects economic growth in the long-run and drives economic growth. This indicates that the supply of loanable funds appreciates investment in the economy. The total insurance premium exerts a positive impact on economic growth in the long-run and is

driven by economic growth. This indicates that the Ethiopian insurance sector is reactive to the demand generated from economic growth.

5.4 Policy Recommendations

Based on the outcomes of the empirical analysis, the researcher proposed the following policy recommendations.

The Ethiopian government should encourage the saving habit of the public. The policymakers should increase interest rates (the compensation provided to depositors) to raise the aggregate saving. Additionally, the government should give more attention to policies that increase financial access to communities that use informal finance methods.

The credit provided to the private sector was found to have a positive impact on economic growth. And it also granger causes the economy growth. Therefore, the National Bank of Ethiopia should promote new banks to join the financial environment. Such kind of favorable financial environment appreciates the supply of loanable funds to support private sector activities. This, in turn, boosts economic growth.

The Ethiopian policymakers should lower the spread between the average lending and deposit rates. And this will allow the bank industry to funnel capital to various investment opportunities at less cost. Therefore, a narrow interest rate spread will improve the banking industry's efficiency and spur economic growth.

The causality test result revealed that total insurance premium is driven by economic growth. This implies that the Ethiopian economic growth creates demand for insurance services. So, enhancing the growth of the real sector is essential to amplify the insurance sector development.

The policymakers should adopt a fiscal policy that encourages the increment of government spending on growth-inducing activities to drive economic growth. Additionally, the Ethiopian government should increase the level of gross fixed capital formation and set strategies that promote employment opportunities to propel economic growth.

5.5 Suggestions for Further Research

A further study in the same area is recommended using different financial development proxies. Additionally, the researcher gives direction to study the determinants of financial sector development in Ethiopia.

REFERENCES

- Abu-Bader, S. & Abu-Qarn, A. S., 2008. Financial Development and Economic Growth: Empirical Evidence from Six MENA Countries. *Review of Development Economics*, 12(4), pp. 803-817.
- Abubakar , A. & Gani, I. M., 2013. Impact of Banking Sector Development on Economic Growth: Another Look at the Evidence from Nigeria. *Journal of Business Management and Social Sciences Research* , 2(4), pp. 47-57.
- Akinci, Y. G., Akinci, M. & Yilmaz, O., 2014. Financial development-economic growth nexus: a panel data analysis upon OECD countries. *Hitosubashi Journal of Economics*, Volume 55, pp. 33-50.
- Alemayehu, G., 2006. The Structure and Performance of Ethiopia's Financial Sector in the Pre- and Post-Reform Period with a Special Focus on Banking. Research Paper No. 2006/112
- Alhassan, A. L. & Fiador , V., 2014. Insurance-growth nexus in Ghana: An autoregressive distributed lag bounds cointegration approach. *Review of Development Finance* , 4(2), pp. 83-96.
- Ali, S. S., 2013. Financial Intermediation and Economic Growth in Sudan : An Empirical Investigation, 1970 - 2011. *British Journal of Economics, Management and Trade*, 3(4), pp. 332-358.
- Al-Malkawi, H.-A. N., Marashdeh , H. A. & Abudullah, N., 2012. Financial Development and Economic Growth in the UAE: Empirical Assessment Using ARDL Approach to Co-integration. *International Journal of Economics and Finance*, 4(5), pp. 105-115.
- Ang, J. B., 2008. A Survey of Recent Developments in the Literature of Finance and Growth. *Journal of Economic Surveys*, 22(3), pp. 536-576.
- Awad , I. M. & Al Karaki, M. S., 2019. The Impact of Bank Lending on Palestine Economic Growth: An Econometric Analysis of the Time Series Data. *Financial Innovation* , 5(14), pp. 1-21.

- Bayar , Y., Kaya , A. & Yildirim, M., 2014. Effects of Stock Market Development on Economic Growth: Evidence from Turkey. *International Journal of Financial Research*, 5(1), pp. 93-100.
- Best , A., Francis, B. M. & Robinson , C. J., 2017. Financial Deepening and Economic Growth in Jamaica. *Global Business Review*, 18(1), pp. 1-18.
- Calderona, C. & Liub, L., 2003. The direction of causality between financial and development and economic growth. *Journal of Development Economics*, pp. 321-334.
- Caporale, G. M., Rault, C., Sova, A. D. & Robert, S., 2009. *Financial Development and Economic Growth: Evidence from 10 New European Union Members*. s.l., Discussion Papers of DIW Berlin 940, German Institute for Economic Research., pp. 48-60.
- Dagim , T., 2015. *The Impact of Financial Sector Development on Economic Growth: The Case of Ethiopia*. Addis Ababa, Addis Ababa University.
- Demetriades, P. O. & Hussein, K. A., 1996. Does Financial Development Cause Economic Growth? Time-Series Evidence from 16 Countries. *Journal of Development of Economics*, Volume 51, pp. 387-411.
- DFID, 2004. *The Importance of Financial Sector Development for Growth and Poverty Reduction*. London, s.n.
- Diamond, D. W., 1984. Financial Intermediation and Delegated Monitoring. *Review of Economic Studies* , July, 51(3), pp. 393-414.
- Fry, M. J., 1978. Money and Capital or Financial Deepening in Economic Development?. *Journal of Money, Credit and Banking*, November, 10(4), pp. 464-475.
- Ghildiyal , V., Pokhriyal, A. K. & Mohan , A., 2015. Impact of Financial Deepening on Economic Growth in India Perspective: ARDL Bound Testing Approach to Cointegration. *Asian Development Policy Review*, 3(3), pp. 49-60.
- Graff, M., 1999. *Financial Development and Economic Growth – A New Empirical Analysis*. Dresden, s.n.

- Gregorio, J. D. & Guidotti, p. E., 1995. Financial Development and Economic Growth. *World development* , 23(3), pp. 433-448.
- Gurley, J. G. & Shaw, E. S., 1967. Financial structure and Economic Development. *Economic Development and Cultural Change* , April , 15(3), pp. 257-268.
- Haller, A. P., 2012. Concepts of Economic Growth and Development. Challenges of Crisis and of Knowledge. *Economy Transdisciplinarity Cognition*, 15(1), pp. 66-71.
- Holmstrom, B. & Tirole, J., 1993. Market Liquidity and Performance Monitoring. *The Journal of Political Economy* , August, 101(4), pp. 678-709.
- Horng , M.-s., Chang, Y.-W. & Wu, T.-y., 2011. Does insurance demand or financial development promote economic growth? Evidence from Taiwan. *Applied Economics Letters*, 19(2), pp. 105-111.
- Ikikii, S. M. & Nzomoi, J. N., 2013. An Analysis of the Effects of Stock Market Development on Economic Growth in Kenya. *International Journal of Economics and Finance*, 5(11), pp. 145-151.
- King, R. G. & Levine, R., 1993a. Finance and Growth: Schumpeter Might be Right. *The Quarterly Journal of Economics*, August, 108(3), pp. 717-737.
- King, R. G. & Levine, R., 1993b. Finance and Entrepreneurship, and Growth. *Journal of Monetary Economics*, September, Volume 32, pp. 513-542.
- Kjosevski, J., 2011. The Impact of Insurance on Economic Growth: the Case of Republic of Macedonia. *European Journal of Business and Economics* , Volume 4, pp. 34-39.
- Kothari, C. R., 2004. *Research Methodology: Methods and Techniques*. Second Revised Edition ed. New Delhi: New Age International Publisher.
- Kumar, R. R., Stauvermann, P. J., Longanathan, N. & Kumar, R. D., 2015. Exploring the role of energy, trade and financial development in explaining economic growth in South Africa: A revisit. *Renewable and Sustainable Energy Reviews*, pp. 1300-1311.

- Kuznets, S., 1955. Economic Growth and Income Inequality. *The American Economic Review* , March, 45(1), pp. 1-28.
- Leland, H. E. & Pyle, D. H., 1977. Informational Aysmmetries, Financial Sturcture, and Financial Intermediation. *The Journal of Finance*, May, 32(2), pp. 371-387.
- Levine, R., 1997. Financial Development and Economic Growth: Views and Agenda. *Journal of Economic Literature*, Volume 35, pp. 688-726.
- Levine, R., 2005. Finance and growth:Theory and Evidence. In: A. Philippe & D. Steven, eds. *Handbook of Economic Growth*. 1 ed. s.l.:Elsevier B.V.
- Levine, R., Loayza, N. & Beck, T., 2000. Financial Intermediation and Growth: Causality and Causes. *Journal of Monetary Economics* , Volume 46, pp. 31-37.
- Levine, R. & Zervos, S., 1998. Stock Markets, Banks, and Economic Growth. *The American Economic Review* , June, 88(3), pp. 537-558.
- Lieberman, C., 1977. The Transactions Demand for Money and Technological Change. *The Review of Economics and Statistics* , August , 59(3), pp. 307-317.
- Luangpituska , C., 2019. Financial Efficiency and Economic Growth in Thailand. *Journal of Modern Accounting and Auditing*, 15(3), pp. 105-112.
- Lucas, R. E., 1988. On The Mechanics of Economic Development. *Journal of Monetary Economics* , Volume 22, pp. 3-42.
- Lynch, D., 1996. Measuring Financial Sector Development: A Study of Selected Asia-Pasfic Countries. *The Developing Economies*, 34(1), pp. 3-33.
- Mamun , A. et al., 2018. The Causality between Stock Market Development and Economic Growth: Econometric Evidence from Bangladesh. *International Journal of Economcis and Finance* , 10(5), pp. 212-220.
- Merton, R. C. & Bodie, Z., 1995. A Conceptual Framework for Analyzing the Financial Environment. In: D. B. Crane, et al. eds. *The Global Finanical System:A Functional Perspective*. 1st ed. Boston: Harvard Business School Press.

- Modigliani, F. & Miller, M. H., 1958. The Cost of Capital, Corporation Finance and the Theory of Investment. *The American Economic Review* , June , 48(3), pp. 261-297.
- Mouloudi , A. & Benladgham , F., 2020. The Relationship Between Insurance Sector and Economic Growth In Morocco: An ARDL Approach. *Al Bashaer Economic Journal*, 6(1), pp. 956-970.
- Mugableh , M. I., 2019. Does Monetary Policy Affect Economic Growth in Jordan? Evidence from Ordinary Least Square Models. *International Business Research* , 12(1), pp. 27-34.
- Murty , K. S., Sailaja , K. & Demissie , W. M., 2012. The Long-Run Impact of Bank Credit on Economic Growth in Ethiopia: Evidence from the Johansen's Multivariate Cointegration Approach. *European Journal of Bussiness and managemnet* , 4(14), pp. 20-33.
- Musamali, R. A., Nyamongo , E. M. & Moyi, E. D., 2014. The Relationship between Financial Development and Economic Growth in Africa. *Research in Applied Economics* , 6(2), pp. 190-208.
- Mwangonda, E. S., Mwaseba, S. L. & Ngwilizi, D. N., 2018. Impact of Finanical Sector Development on Economic Growth: Evidence from Tanzania. *International Journal of Economics and Financial Research*, 4(8), pp. 258-265.
- NBE, 2019. *National Bank of Ethiopia annual report 2018/19*, Addis Ababa : National Bank of Ethiopia .
- Ndlovu, G., 2013. Financial Sector Development and Economic Growth: Evidence from Zimbabwe. *International Journal of Economics and Financial Issues* , 3(2), pp. 435-446.
- Nkoro , E. & Uko, A. K., 2016. Autoregressive Distributed Lag (ARDL) cointegration technique: application and interpretation. *Journal of Statistical and Econometric Methods*, 5(4), pp. 63-91.
- Nyasha , S., Gwenhure , Y. & Odhiambo, N. M., 2017. The Dynamic Causal Linkage Between Finanical Development and Economic Growth : Empirical Evidence From Ethiopia. *International Economics*, 70(1), pp. 73-102.

- Nyasha, S. & Odhiambo, N. M., 2016. Financial Systems and Economic Growth: Empirical Evidence from Australia. *Contemporary Economics*, 10(2), pp. 163-174.
- Ofori-Abebrese, G., Pickson, R. B. & Diabah, B. T., 2017. Financial Development and Economic Growth: Additional Evidence from Ghana. *Modern Economy*, Volume 8, pp. 282-297.
- Oitsile, B., Galebotswe, O. & Sekwati, L., 2018. Insurance- Economic Growth Nexus: Evidence From Botswana. *Asian Economic and Financial Review* , 8(6), pp. 843-852.
- Olayungbo, D. O., 2015. Insurance and Economic Growth Nexus in Nigeria: Asymmetric Non-Linear Relationship under Heterogeneous Agents. *African Development Review* , 27(3), pp. 248-261.
- Onuonga, S. M., 2014. Financial Development and Economic Growth in Kenya: An Empirical Analysis. *Susan Moraa Onuonga*, 6(7), pp. 226-241.
- Osman, E. G. A., 2014. The Impact of Private Sector Credit on Saudi Arabia Economic Growth (GDP): An Econometrics Model Using (ARDL) Approach to Cointegration. *American International Journal of Social Science*, 3(6), pp. 109-117.
- Pagano, M., 1993. Financial Markets and Growth: An Overview. *European Economic Review* , Volume 37, pp. 613-622.
- Patrick, H. T., 1966. Financial Development and Economic Growth in Underdeveloped Countries. *Economic Development and Cultural Change*, January, 14(2), pp. 174-189.
- Paudel, R. C. & Acharya, C. P., 2020. Financial Development and Economic Growth: Evidence from Nepal. *National Institute Economic Review*, 32(1), pp. 15-35.
- Paul , O. J., Thomas , K. R. & Marcellin , K., 2015. Banking Development and Economic Growth in Rwanda. *African Journal of Business and Industry* , 1(1), pp. 50-77.
- Puatwoe, J. T. & Piabuo, S. M., 2017. Financial Sector Development and Economic Growth: Evidence from Cameroon. *Financial Innovation* , 3(25), pp. 1-18.
- Qamruzzaman, M. & Jianguo, W., 2017. Financial Innovation and Economic growth in Bangladesh. *Financial Innovation*, 3(19), pp. 1-24.

Roman, T., (2012). The Link between Financial Development and Economic Growth in Ethiopia. Unpublished Master's Thesis, Addis Ababa University

Romer, P. M., 1986. Increasing Returns and Long-Run Growth. *The Journal of Political Economy* , 94(5), pp. 1002-1037.

Saad, W., 2014. Financial Development and Economic Growth: Evidence from Lebanon. *International Journal of Economics and Finance*, 6(8), pp. 173-186.

Shan, J. Z., Morris, A. G. & Sun, F., 2001. . Financial development and economic growth: An egg and chicken problem?. *Review of International Economics*, 9(3), pp. 443-454.

Sheefeni, J. P. & Andreas, 2019. Examining the Causal Relationship between Private Sector Credit Extended and Economic Growth in Namibia. *Journal of Economics and Behavioral Studies*, 11(2), pp. 23-29.

Sibindi , A. B. & Godi , N. J., 2014. Insurance sector development and economic growth: evidence from South Africa. *Corporate Ownership and Control* , 11(4), pp. 530-538.

Simwaka , K., Munthali, T., Kabango , G. & Chiumia , A., 2012. “Financial Development and Economic Growth in Malawi: An Empirical Analysis”. *Banks and Bank System*, 7(3), pp. 85-96.

Tada, P. R., 2001. Economic Reforms and Structural Changes in Ethiopia since 1992; An Inquiry. *International Conference on African Development Archives* .

Tahir , S. H., Shehzadi , I., Ali , I. & Ullah, M. R., 2015. Impact of Bank Lending on Economics Growth in Pakistan: An Empirical Study of Lending to Private Sector. *American Journal of Industrial and Business Management*, Volume 5, pp. 565-576.

Tobin, J., 1965. Money and Economic Growth. *Econometrica* , October , 33(4), pp. 671-684.

Tsetsenzaya, T., Xiawei, Z., Zahid, H. & Shaheen, W. A., 2019. Economic Growth and Financial Development: An Empirical Analysis of Mongolian Economy. *International Journal of Advanced Research*, 7(1), pp. 150-164.

World Economic Forum, 2012. *The Financial Development Report*. Geneva : World Economic Forum .

Yildirim , I., 2015. Development and Economic Effects of the Insurance Sector in Turkey. *International Journal of Economics,Commerce and Management* , 4(4), pp. 1-16.

Yimiao, L., Zihao, W. & Brima, S., 2017. Financial Development and Economic Growth in China. *Economics, Business and Managment journal*, 1(2), pp. 35-37.

APPENDICES

Appendix 1 VAR Lag Order Selection Criteria

VAR Lag Order Selection Criteria

Endogenous variables: LNRGDPPC LNM2 LNDPCS IRS LNTIP LNGFCF LNGE LNLF

Exogenous variables: C

Sample: 1983 2019

Included observations: 35

Lag	LogL	LR	FPE	AIC	SC	HQ
0	32.43638	NA	3.42e-11	-1.396364	-1.040856	-1.273643
1	314.0618	418.4150	1.49e-16	-13.83211	-10.63253*	-12.72761
2	408.8906	97.53816*	4.77e-17*	-15.59375*	-9.550111	-13.50749*

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

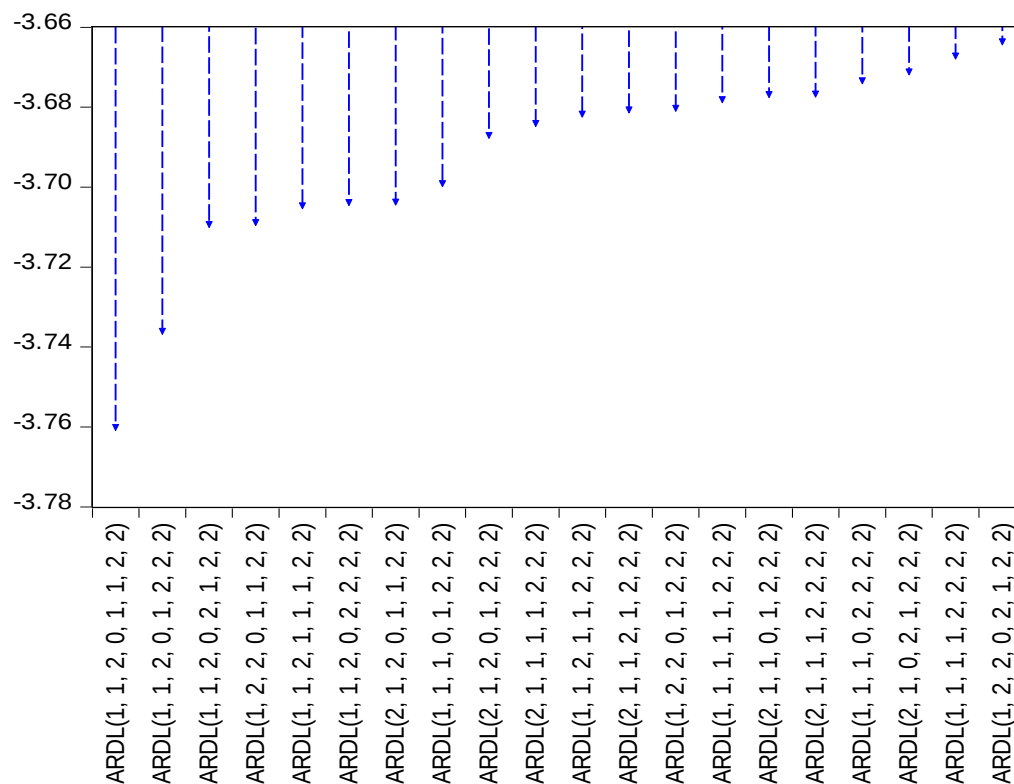
AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Appendix 2 Model Selection Summary

Akaike Information Criteria (top 20 models)



Appendix 3 Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	3.212530	Prob. F(2,15)	0.0690
Obs*R-squared	10.49599	Prob. Chi-Square(2)	0.0053

Test Equation:

Dependent Variable: RESID

Method: ARDL

Sample: 1985 2019

Included observations: 35

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNRGDPPC(-1)	-0.052729	0.171268	-0.307875	0.7624
LNM2	-0.196095	0.162213	-1.208873	0.2454
LNM2(-1)	-0.105606	0.146859	-0.719096	0.4831
LNDGPS	-0.011234	0.042726	-0.262927	0.7962
LNDGPS(-1)	0.011581	0.045404	0.255067	0.8021
LNDGPS(-2)	0.027727	0.031332	0.884950	0.3901
IRS	-0.007038	0.010455	-0.673111	0.5111
LNTIP	-0.012837	0.041476	-0.309508	0.7612
LNTIP(-1)	0.056869	0.056582	1.005061	0.3308
LNGFCF	0.094441	0.065180	1.448914	0.1679
LNGFCF(-1)	0.047628	0.051890	0.917850	0.3732
LNGE	-0.028906	0.083481	-0.346253	0.7340
LNGE(-1)	-0.078555	0.078667	-0.998579	0.3338
LNGE(-2)	0.027298	0.080183	0.340441	0.7382
LNLFF	-0.983608	1.162798	-0.845898	0.4109
LNLFF(-1)	1.776115	1.593651	1.114494	0.2826
LNLFF(-2)	0.060737	1.261909	0.048131	0.9622
C	-12.43407	8.771753	-1.417513	0.1768
RESID(-1)	-0.262962	0.338035	-0.777914	0.4487
RESID(-2)	-0.902275	0.356345	-2.532027	0.0230

R-squared	0.299885	Mean dependent var	3.25E-15
Adjusted R-squared	-0.586927	S.D. dependent var	0.022399
S.E. of regression	0.028217	Akaike info criterion	-4.002252
Sum squared resid	0.011943	Schwarz criterion	-3.113482
Log likelihood	90.03942	Hannan-Quinn criter.	-3.695449
F-statistic	0.338161	Durbin-Watson stat	2.158721
Prob(F-statistic)	0.986123		

Appendix 4 Heteroscedasticity Tests

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.095276	Prob. F(17,17)	0.4267
Obs*R-squared	18.29575	Prob. Chi-Square(17)	0.3704
Scaled explained SS	2.910404	Prob. Chi-Square(17)	0.9999

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Sample: 1985 2019

Included observations: 35

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.323855	0.131782	-2.457510	0.0250
LNRGDPPC(-1)	8.07E-05	0.003281	0.024590	0.9807
LNM2	-0.001837	0.002517	-0.729843	0.4754
LNM2(-1)	-0.002645	0.002734	-0.967286	0.3470
LNDCPS	-0.000720	0.000832	-0.865902	0.3986
LNDCPS(-1)	-0.000492	0.000895	-0.549581	0.5898
LNDCPS(-2)	0.001804	0.000560	3.220320	0.0050
IRS	-0.000345	0.000185	-1.865179	0.0795
LNTIP	-0.000307	0.000818	-0.374748	0.7125
LNTIP(-1)	0.000628	0.001008	0.622673	0.5418
LNGFCF	0.002248	0.000941	2.388144	0.0288
LNGFCF(-1)	-0.000107	0.000944	-0.113103	0.9113
LNGE	-0.001898	0.001447	-1.312151	0.2069
LNGE(-1)	-0.001649	0.001410	-1.169351	0.2584
LNGE(-2)	-0.000198	0.001570	-0.126147	0.9011
LNLFF	0.031221	0.020954	1.489980	0.1545
LNLFF(-1)	-0.002576	0.028316	-0.090973	0.9286
LNLFF(-2)	-0.004935	0.024672	-0.200022	0.8438
R-squared	0.522736	Mean dependent var		0.000487
Adjusted R-squared	0.045472	S.D. dependent var		0.000574
S.E. of regression	0.000561	Akaike info criterion		-11.82715
Sum squared resid	5.35E-06	Schwarz criterion		-11.02725
Log likelihood	224.9751	Hannan-Quinn criter.		-11.55103
F-statistic	1.095276	Durbin-Watson stat		2.723223
Prob(F-statistic)	0.426675			

Heteroskedasticity Test: Harvey

F-statistic	1.454605	Prob. F(17,17)	0.2239
Obs*R-squared	20.74109	Prob. Chi-Square(17)	0.2381
Scaled explained SS	15.68479	Prob. Chi-Square(17)	0.5463

Test Equation:

Dependent Variable: LRESID2

Method: Least Squares

Sample: 1985 2019

Included observations: 35

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1128.727	415.5704	-2.716092	0.0147
LNRGDPPC(-1)	3.826836	10.34527	0.369912	0.7160
LNLM2	-0.804379	7.937843	-0.101335	0.9205
LNLM2(-1)	-11.37913	8.622304	-1.319731	0.2044
LNDCPS	-1.286568	2.622480	-0.490592	0.6300
LNDCPS(-1)	-3.364167	2.821733	-1.192234	0.2495
LNDCPS(-2)	5.339617	1.766874	3.022070	0.0077
IRS	-0.718705	0.582962	-1.232850	0.2344
LNTIP	-1.894924	2.580888	-0.734214	0.4728
LNTIP(-1)	2.940796	3.178905	0.925097	0.3679
LNGFCF	5.442151	2.968924	1.833038	0.0844
LNGFCF(-1)	1.388594	2.975863	0.466619	0.6467
LNGE	-11.61641	4.562346	-2.546147	0.0209
LNGE(-1)	1.904264	4.445652	0.428343	0.6738
LNGE(-2)	-4.475298	4.952026	-0.903731	0.3788
LNLFF	179.4594	66.07741	2.715897	0.0147
LNLFF(-1)	-86.19022	89.29437	-0.965237	0.3480
LNLFF(-2)	-11.78688	77.80169	-0.151499	0.8814
R-squared	0.592603	Mean dependent var	-8.738297	
Adjusted R-squared	0.185205	S.D. dependent var	1.959986	
S.E. of regression	1.769201	Akaike info criterion	4.285370	
Sum squared resid	53.21124	Schwarz criterion	5.085263	
Log likelihood	-56.99398	Hannan-Quinn criter.	4.561493	
F-statistic	1.454605	Durbin-Watson stat	2.462554	
Prob(F-statistic)	0.223900			

Heteroskedasticity Test: ARCH

F-statistic	1.048248	Prob. F(2,30)	0.3630
Obs*R-squared	2.155512	Prob. Chi-Square(2)	0.3404

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Sample (adjusted): 1987 2019

Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000366	0.000158	2.309939	0.0280
RESID^2(-1)	0.034366	0.175131	0.196227	0.8458
RESID^2(-2)	0.250590	0.176208	1.422122	0.1653
R-squared	0.065319	Mean dependent var	0.000510	
Adjusted R-squared	0.003006	S.D. dependent var	0.000584	
S.E. of regression	0.000583	Akaike info criterion	-11.97146	
Sum squared resid	1.02E-05	Schwarz criterion	-11.83542	
Log likelihood	200.5291	Hannan-Quinn criter.	-11.92569	
F-statistic	1.048248	Durbin-Watson stat	1.588931	
Prob(F-statistic)	0.363040			

Appendix 5 Bound Test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic: n=1000				
F-statistic	5.519737	10%	1.92	2.89
K	7	5%	2.17	3.21
		2.5%	2.43	3.51
		1%	2.73	3.9
Finite Sample: n=35				
Actual Sample Size	35	10%	2.196	3.37
		5%	2.597	3.907
		1%	3.599	5.23

Appendix 6 ARDL Long-run and Error Correction Regression Results

ARDL Long Run Form and ARDL Error Correction Regression

Dependent Variable: D(LNRGDPPC)

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

Case 2: Restricted Constant and No Trend

Sample: 1983 2019

Included observations: 35

Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNM2	-1.044904	0.121414	-8.606121	0.0000
LNDCPS	0.053091	0.024181	2.195577	0.0423
IRS	-0.032640	0.010048	-3.248322	0.0047
LNTIP	0.209841	0.061820	3.394389	0.0034
LNGFCF	0.431897	0.055804	7.739588	0.0000
LNGE	0.181444	0.084078	2.158056	0.0455
LNLF	1.823459	0.550932	3.309771	0.0041
C	-26.89534	7.532795	-3.570433	0.0024
EC = LNRGDPPC - (-1.0449*LNM2 + 0.0531*LNDCPS -0.0326*IRS + 0.2098				
*LNTIP + 0.4319*LNGFCF + 0.1814*LNGE + 1.8235*LNLF -26.8953)				

ECM Regression				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNM2)	-0.652586	0.142124	-4.591675	0.0003
D(LNDCPS)	-0.055271	0.046954	-1.177128	0.2554
D(LNDCPS(-1))	-0.055196	0.031635	-1.744761	0.0991
D(LNTIP)	0.045164	0.046210	0.977376	0.3421
D(IRS)	-0.032922	0.010438	-3.154118	0.0058
D(LNGFCF)	0.319173	0.053157	6.004309	0.0000
D(LNGE)	-0.142693	0.081687	-1.746824	0.0987
D(LNGE(-1))	-0.150747	0.088664	-1.700201	0.1073
D(LNLF)	1.070060	1.183089	0.904463	0.3784
D(LNLF(-1))	-3.098202	1.393007	-2.224111	0.0400
CointEq(-1)	-1.008619	0.185228	-5.445295	0.0000
R-squared	0.889055	Mean dependent var		0.025257
Adjusted R-squared	0.849115	S.D. dependent var		0.067247
S.E. of regression	0.026121	Akaike info criterion		-4.217170
Sum squared resid	0.017058	Schwarz criterion		-3.772785
Log likelihood	83.80047	Hannan-Quinn criter.		-4.063768
Durbin-Watson stat	1.934197			

Appendix 7 Granger Causality Test Results

Pairwise Granger Causality Tests

Sample: 1983 2019

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
LNDGPS does not Granger Cause LNRGDPPC	35	3.47020	0.0441
LNRGDPPC does not Granger Cause LNDGPS		0.92170	0.4088
LNM2 does not Granger Cause LNRGDPPC	35	2.18164	0.1304
LNRGDPPC does not Granger Cause LNM2		0.30853	0.7368
IRS does not Granger Cause LNRGDPPC	35	3.96170	0.0297
LNRGDPPC does not Granger Cause IRS		0.94895	0.3985
LNTIP does not Granger Cause LNRGDPPC	35	0.92991	0.4057
LNRGDPPC does not Granger Cause LNTIP		3.41995	0.0459