Effect of Banking sector development on Ethiopian Economic Growth

A Thesis Submitted to the School of Post Graduate Studies of Jimma University in Partial Fulfillment for Masters of Science in economic (MSc)

(Economics Policy Analysis)

JIMMA UNIVERSITY

MSc PROGRAM

JULY, 2023

JIMMA, ETHIOPIA

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BY

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Under the Guidance of

Fikadu Gutu (Ass. professor)

and

Negese Tamirat (Ass. Professor)

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Declaration

I Taju Abazinab declare that this research thesis: entitled; "*Effect of Banking sector development on Ethiopian Economic Growth*" is the outcome of my effort that all sources of materials used have been duly acknowledged.

To the best of my knowledge this research has not been submitted for any degree at this university or any other university.it is offered the partial fulfillment of the degree of master science in economics (MSC) (economic policy analysis).

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Signature_____

Date_____

JIMMA UNIVERSITY

COLLEGE OF BUSSINESS AND ECONOMICS

DEPARTMENT OF ECONOMICS

Effect of Banking sector development on Ethiopian Economic Growth

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Board of thesis Examination

We member of thesis examination board, hereby approved the originality of this thesis entitled ***"Effect of Banking sector development on Economic Growth in Ethiopia"*** *thereby critically examining it evaluating the final open defiance by undersigned researcher. Therefore, we certify that this paper meets the required standard with respect quality and originality.*

External Examiner	***Date***	***signature***
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Internal examiner	*Date*	*Signature*
Dr.Ismael Mohammed (PhD)		***18/08/2023***
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SGS Approval	*Date*	*Signature*
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Acronym

ADF Augmented dickey fuller

ATM Automated teller machine

BBN Bank Branch network

BLINT Bank Lending Interest rate

CBE Central Bank of Ethiopia

CBB Construction and Business Bank

DBE Development of Bank

NBE National Bank of Ethiopia

INVCAP Investment Capital

MOFD Ministry of Finance and Development

PSC Private Sector Credit

SSA Sab Saharan Africa

GDP Growth Domestic Product

GNP Growth National Product

GMM General methods of momentum

WB World Bank

VECM Vector Error Correction Model

ECM Error Correction Model

LAB Labore force

VECR Vector error correction rank

Table of Contents

List of tables

List of Figure

Abstract

Financial development and economic growth go hand in hand. For instance, banking industry has expanded along with the economy, providing more chances for deposit and loan services. As banking industry has expanded, more people now have access to credit and financial services. But there were problems with providing timely, inexpensive, and accessible credit to the private sectors that generate jobs in Ethiopia's banking industry. The objective of the study was examining the link between Ethiopia's financial development and economic growth. The study was conducted using a method that combined quantitative and descriptive research. Secondary long-term data from 1984 to 2021 was used. The examination of time series data was combined with a multivariate regression analysis and Vector error correction model estimation. stationary tests and co-integration tests were conducted. The results showed a positive correlation between financial development indicators, such as bank branch network, credit, and investment capital, and economic growth, and a negative correlation with bank lending interest rates. Additionally, there was little correlation between financial development and economic growth in the short term, but there was a significant correlation in the long term. These indicated access to credit and increased investment capital were possible by the expansion of bank branch networks for long-term job possibilities. The findings of the study suggested that policy intervention should be kept to a minimum while financial liberalization is permitted through joint ventures between domestic and foreign banks, financial intermediary services to be improved, inclusive credit policy to be maintained, financing for investments that generate more jobs is made more accessible.

Keywords; *Financial development, Economic growth, Ethiopia, Co integration, Vector error correction, Granger causality.*

CHAPTER ONE

Introduction

1.1Background of the study

Financial development is a broad improved access, and effectiveness of financial intermediary services (Imoagwu and Ezeanyeji, 2019). Financial intermediation is the process of transfer surplus units of cash deposited with financial institutions to deficit unit in the form of lending during financial market gap (Horbaczewska, 2019). Economic growth is characterized as an increase in real national output according to Fisher's (1930) definition of real income.). the expansion of financial sector is essential for investment promotion, through enhancing saving, availing enough credit with positive real deposit and lending interest rate to increase capital accumulation and production (Abdu, 2022). The key things that financial institutions and development actors should do to boost capital and production to ensure economic growth through an efficient financial intermediary service. Therefore, improving financial intermediary service quality, increasing capital accumulation, and increasing productivity show a beneficial relationship between financial development and economic growth (Gao et al, 2022).

In Ethiopia, the main financial institutions are banks, insurance and micro finance with low level of financial intermediary service quality. In previous regimes, there were irregular trends of banking sector development in Ethiopia with steady change of financial development and economic growth. There was transition from market-oriented financial intermediary service to functional line of government that made to constrained economic growth in Ethiopia. For instance, as (Bezabeh and Desta, 2014); Abyssinia bank was established in 1905 and managed under British owned with the right to issue notice and coins for 50 years. In 1931 bank of Abyssinia was replaced by bank of Ethiopia and controlled by Ethiopian government and becoming hundred percent African owned bank on the continent. It was authorized to issue notice and coins to as Government banks. But, by Italian invasion of 1937 GC, Government Banks were closed and several Italian Bank brunches were opened in Ethiopia. After the liberation of 1942, the state commercial banks were established and becoming operational in1943 with 43 employs and 2 branches. In 1951 the first development bank was founded by world Bank fund $2million. Moreover, a few private commercial banks were established and becoming operational at the same time. Therefore, there were market oriented financial

intermediary services. On the other hand, the 1974 Ethiopia military government had declared to be socialist state and controlled over wholly economy and banking sectors (Bezabeh and Desta, 2014). Hence, it had reformed Addis Ababa bank to Commercial bank of Ethiopia (CBE) with 26 bank branch networks. Agricultural industrialized development bank reformed in to state owned development bank with 8 bank branch networks. Housing and saving bank reformed in to Construction and business bank up to 1994. The banks customers became public enterprise and were instructed on functional line of Government plan. Hence, money supply grew steadily in real terms as proportion of GDP. As a result; bad debt, extensive fraud, in solvency problems had happened due to lack of finance liberation policy (Mauri, 1971). From EPRDF regime up to now, the banking policy problems have continued and impacted economic growth of Ethiopia. Nowadays, the total banks in Ethiopia are 30, with 8944 bank branch networks to 11516 banked people (NBE,2022). Even if there were an increment expansion of private banks under control of national bank of Ethiopia, it couldn't access enough credit to 80 percent of un banked rural people. This has made idle of resources, raising of un employment and diminishing of economic growth.

.1.2 Statement of the problems

The expansion of the financial sector is essential for economic growth through enhancing financial institutions and development actors so as to boost capital and production that encourage saving and make enough credit available for investment return, positive real interest on deposit lending with improved financial infrastructure and technology (Abdu, 2022). Moreover, entrance of international banks with significant capital accumulation to access private sectors enough credit which promote investment (Rashid, 2020).

In Ethiopia the 1963 banking low allowed local and foreign banks to operate by 51 percent and 49 percent right of Governance respectively (Mauri, 1971). Thuse, there was market oriented financial institution that access enough loan services to private sectors to promote investment. In contrary, in 1974, the Ethiopian Military Government had declared to socialist state and controlled the wholly economy and banking sectors. Hence, the bank customers became public enterprise that instructed on functional line of Governance. As a result, money supply grows steadily in real terms of proportion of GDP (Bezabhi and Desta, 2014). On the other hand, since 1991, there was expansion of private banks under controlled of National Banks of Ethiopia with celling of consistence interest rate, rigid credit policy and high reserve requirements. Moreover, the expansion of private banks was reached 20 percent only from 80 percent of rural people. Thus, the un banked rural people has been excluded to access and use to financial product and services (NBE,2021). these made constrained to use land and water resource combined with technology as desired. Meanwhile, absence of financial liberalization and poor quality financial intermediary service has created ignoring credit to high number of depositors and provide credit to selected private sectors with consistence bank lending interest rate. This resulted reduction of investment capital and aggravating of un employment in Ethiopia. World Bank (2022) report ensured that in Ethiopian Banking sectors broad money supply to credit to GDP was 30 percent below to that of 42 percent of Sub-Saharan African countries in the same year. Hence, the capacity of saving local and foreign resources decreased to assign returns of investments that foster economic growth. Moreover, the 14.25 percent actual interest rate on bank lending interest yielded 34 percent of inflation raise (NBE,2022). Therefore, inefficiency in terms of minimizing transaction cost to investors hinders investment and economic growth (Bist, 2018). As a result, financial institutions and development actors have been eroded with diminishing capital

accumulation and production of goods and services (Isayas, 2022). As indicated above, there were structural influence in previous system of Government on banking sector development and economic growth. therefore, what was the influence trend and relationship of each financial development indicators namely; financial (depth, access, efficiency and stability) on economic growth to be studied in Ethiopian context.

On the other hand, Mathumo (2021) investigated the relationship between financial development and economic growth of LDC revealed supply response hypothesis (finance derived economic growth) when broad money supply to direct credit to GDP induced by finance. Whereas, demand response hypothesis (Growth lead finance) when broad money supply to direct credit induced by economy. But there is a controversial idea to decide the long run or short run relationship and causality direction in Ethiopian context (Birru et al, 2019). Thus, the study has focused on investigating the short run and long run relationship and causality direction of financial development and economic growth of Ethiopia.

To sum up, the research gap of the study was inaccessible enough credit with timely and affordable price from financial institution to development actors made high rise of un employment and diminishing economic growth. Because, the empirical study stated that lack of enough capital accumulation, digital technology adoption in all financial institutions, and the promotion of excellence customer service in financial system are the main constraints to be solved in Ethiopian Banking sectors (Bezabeh and Desta , 2014)

The Goal of the research was to find the means to minimize the gap between financial scarcity and growth demand in Ethiopia. the key idea was to determine how Effects of Banking sector development indicators affected Ethiopians economic growth.

Research question

- What are the trends and relationships between financial development indicators namely financial (depth, access, efficiency, stability) and economic growth?
- Is there economic growth response to financial development in short run?
- Is there a significant long run relationship between financial development and economic growth?

- What does the causality direction indicate between financial development and economic growth in Ethiopia?

1.3 General objective

The general objective of the study is to examine effect of banking development on economic growth in Ethiopia.

1.3.1 Specific objectives

1. To investigate the trend and relationship between financial development indicators and economic growth in Ethiopia.
2. To analyses the short run relationship between financial development and economic growth in Ethiopia.
3. To investigate the long run effect of financial development and economic growth in Ethiopia.
4. To determine the direction of causality between financial development and economic growth.

1.4 Significance of the Study

Several stakeholders expected to get benefit from the outcomes of this study: For Starters, the findings used to future finance academics and academicians, particularly in the areas of financial development and economic growth. This research would identify topics for future research where future academics and researchers can expand their knowledge while also serving as a source of reference information. The outcomes of this study used to Ethiopian policymakers as they formulate macroeconomic strategies. In addition, the result of study was particularly useful to the staff of Ethiopian Treasury and Central Bank in evaluating policies impacting financial development in Ethiopia.

Managers of financial institutions benefited from this study by understanding the elements that drive financial development and allowing them to expand their market share and financial success. Meanwhile, Managers could grasp what tactics they need to implement to achieve financial development and hence increase their market share if they understand the financial development matrix.

1.5 Scope of the Study

Financial development was enabling the delivery of financial institution accessible credit with affordable coast to customers so as to change economic growth. The study was addressed the way to access and use to finance to eligible groups by banking sectors of Ethiopia. Thus, the study was concentrated on examining the impact of financial development on GDP growth of Ethiopian banking sector. The policy makers and managers expected to use the finding of the study**.**

1.6 Limitation of the Study

Limitation to get direct literature review, access to data and information as well as budget and plan was expected. The limitation was solved by referring related literature from research done before throughout the country, neighboring countries in sub–Saharan Africa and around the world. In addition, limitation of timely access to data and information was solved through obtaining secondary data from report of National bank of Ethiopia, ministry of finance and economic development of Ethiopia and world bank with efficient use of time and existed budget from Jimma University.

1.7 Organization of the Study

The first chapter included back ground of the study, Objectives, Significance of the study, Scope of the study and Limitation of the study. In the second chapter; Theoretical, Empirical and Conceptual Literature reviews were elaborated. In the third chapter, Research methodology that included Research design, Data collection and Analysis. In chapter four, Description of analysis, Stationary test, Co-integration test, Vector error correction model estimation and Granger Causality test was under taken. Chapter five included Summary, Conclusion and Policy implications.

CHAPTER TWO

THEORITICAL AND EMPERICAL LITRATURE REVIEW

2.1. 1 Theoretical literature review

2.1.2. Financial development and Economic Growth

According to (Philippon, 2015), financial development refers to an increase in quantity, quality, and efficiency of financial intermediary services. Economic growth is characterized as an increase in real national output according to Fisher's (1930) definition of real income. Moreover, category of national income revealed, low-income countries are those with growth national income (GNI) per capita of less than or equal to $1045; lower middle-income countries are those with GNI per capita of between $1046 and $4095; and high-income countries are those with GNI per capita of $12696 or more (Costa et al., 2021), Improving financial intermediary service quality, increasing capital accumulation, and increasing productivity show a beneficial relationship between financial development and economic growth (Gao et al,2022).

Moreover, the expansion of the financial sector is essential for economic growth through effective investment stimulation (Abdu, 2022). Transparency created by financial sector reform encourages investors to make larger investments (Ray, 2015). Numerous studies have demonstrated the strong and important link between financial development and economic expansion. It was discovered that a country has a better probability of developing if its financial system is strong. Banking sectors with sufficient local and foreign currency, cutting-edge technology, and first-rate customer support promote economic growth (Caporale, et al, 2015). Hence, it was important to make funding loans and non-fund-based advances for economic activities of the general people and other development groups (ALEMU, 2021). However, (SK SINGH, 2021) showed that bad debt was negatively affecting banking sectors' ability to lend money and their level of efficiency.

Raising the interest rate on savings which causes deposits in financial institutions to rise and makes it possible to have enough deposits to lend against in the form of loans (Alemu and Aweke, 2017). Reserve requirements are reduced while increasing financial institution deposits

providing ample loans for exporters, and facilitating currency for big importers. Thus, ensuring enough capital accumulation and efficient customer service is essential for effective financial development and economic growth(A Bezabeh, A Desta , 2014).

In Ethiopia, the main financial institutions are banks, insurance and micro finance with low level of financial intermediary service quality. As (Bezabeh and Desta, 2014); Abyssinia bank was established in 1905 and managed under British owned with the right to issue notice and coins for 50 years. In 1931 bank of Abyssinia was replaced by bank of Ethiopia and controlled by Ethiopian government and becoming hundred percent African owned bank on the continent. It was authorized to issue notice and coins to as Government banks. But, by Italian invasion of 1937 GC, Government Banks were closed and several Italian Bank brunches were opened in Ethiopia. After the liberation of 1942, the state commercial banks were established and becoming operational in1943 with 43 employs and 2 branches. In 1951 the first development bank was founded by world Bank fund $2million.

The 1963 banking law allowed for other foreign commercial banks to operate by 51% owned by Ethiopians **(**Mauri, 1971**).** Hence, British owned Addis Ababa bank had 26 branches and Italian owned commercial banks: Banco di Roma and banco Napoli which had 8 and 1 branches respectively in 1975. the Government established Agricultural and Industrial development banks by taking over earlier established banks in 1963 and provided loans to Agricultural and industrial sectors. In addition, the housing and saving bank was established by imperial the government in 1975.

The new Ethiopia military government had declared to be socialist state and controlled over wholly economy and banking sectors (Bezabeh and Desta, 2014). Hence, it had reformed Addis Ababa bank to Commercial bank of Ethiopia (CBE) with 26 bank branch networks. Agricultural industrialized development bank reformed in to state owned development bank with 8 bank branch networks. Housing and saving bank reformed in to Construction and business bank up to 1994. The banks customers became public enterprise and were instructed on functional line of Government plan. Hence, money supply grew steadily in real terms as proportion of GDP. As a result; bad debt, extensive fraud, in solvency problems had happened due to lack of finance liberation policy. From EPRDF regime up to now, the banking policy problems have continued

and impacted economic growth of Ethiopia. Nowadays, the total banks in Ethiopia are 30, with 8944 bank branch networks to 11516 banked people.

2.1.3 Financial Intermediation Theory

Financial intermediation is the process of lending to deficit units in order to transfer surplus units of cash deposited with financial institutions. Four characteristics are used to characterize financial intermediaries, according to (Horbaczewska, 2019): 1) The specified deposit amount shouldn't have been based on their performance portfolio. 2) The deposit should have significantly shorter periods than the asset's short term. 3) A sizable chunk of the deposit may be drowned at request. 4) The majority of their obligations and assets cannot be transferred. The continuous flow of money from units with surpluses to those with deficits is the intermediaries' most significant contribution. According to (Zeng, 2018), a financial intermediary's job is to create specialized financial commodities and sell them at prices that are anticipated to pay all production costs, including direct expenses and opportunity costs. Due to flaws in the market, financial intermediaries are necessary. Financial intermediaries would therefore not be necessary in a perfect "market condition" with no transaction or information expenses. Informational gaps between buyers and sellers characterize numerous markets. Information asymmetries are particularly noticeable in the financial markets.

Typically, borrowers are more familiar with their assets, work ethics, and moral character than are lenders. Entrepreneurs, on the other hand, have inside knowledge of the projects they are working on and are looking to finance (Dorfleitner et al, 2021). Evidence already in existence indicates that giving the private sector a larger share of the financial resources available to it at any given time can contribute to economic growth (Musa, A. M. and Horst, C, 2019). In contrast, Ethiopia has very little financial intermediation as a factor in economic development (Yakubu et al, 2021). The ratio of private sector credit to GDP decreased (Appiah, M., Frowne, D. I., and Tetteh, D, 2020). However, it increased in sub-Saharan African nations during the same time period. Therefore, diminishing financial intermediation trends increased inflation, which resulted in negative reflection on Ethiopia's actual deposit rate.

2.1.4 Importance of Financial development and economic growth

Financial development has a significant impact on economic growth through providing credit and financial service to promote investment and consumption (Helhel Y. , 2018). Hence, access to finance reduces the sensitivity of the poor to shocks and increases investment and productivity, which in turn generates income (Helhel, 2018).) there are five channels through which financial institutions influence saving and investment decisions to facilitate financial market and faster economic expansion. this includes: 1) Facilitating the exchange of goods and services by making payment available. 2) gathering and combining a lot of investors' savings. 3) gathering and analyzing information about the company and potential investment projects in order to put savings to the best possible use. 4) keeping an eye on investments and performing corporate governance. 5) boosting liquidity, diversifying investments, and lowering intertemporal risk (Kumari, 2020). Additionally, financial development spurs economic expansion in developing nations by encouraging the mobilization of savings, effective resource allocation, and risk management (Eigen mode and Samsurijan, 2021).

2.1.5 Financial development categories and indicators

Four financial metrics, namely financial depth (market size and liquidity), access (ability to acquire financial services at a cheap cost with sustained revenue), efficiency (net interest margin of deposit and lending rate) and stability. financial metrics are used to classify financial development into components of financial institutions and financial markets (deep and liquid of financial system with diverse tools) ((TESQA)., 2018). there is market based and bank-based financial structures that influence growth dependent on a country's level of development. Bank-based systems are a preferred transmission method for underdeveloped nations. Market-based economies, however, are crucial for advanced economies. (Chu, 2020). Because of this, sub-Saharan African nations are less developed, and they are only concerned with private credit by bank ratio of GDP or (Financial institution depth). Thus, the quality of institutions has an effect on how financial development affects economic growth. Reduced production and transaction costs are achieved through the use of institutions and financial indicators. Both institutional and financial aspects can be substituted for one another (Compton et al, 2020).

2.1.6 Linking institutions, financial development and economic growth

Institutions are a set of laws and social norms that control an economy's market-based incentives and growth-promoting activities, ensuring an optimal response to informational and technological restrictions and serve as the primary host of channels for financial development and economic progress (Lloyd and Lee 2018). The accumulation and allocation of capital are impacted by the imperfections in the financial market brought on by asymmetric knowledge and transaction costs. As a result, institutions can fix the problems by enforcing contracts and protecting property rights (Liao et al, 2020). Institutions can also shield borrowers from asymmetric information and lenders from monopolistic power (Beatriz et al, 2022).

2.1.7 Banking and Financial Sectors in Transition economy

In a centrally planned economy, money served a restricted function as a medium of trade (Cardell, 2022). As a result, the central bank performed the usual tasks assigned to monetary authorities and specializes in several areas, including agriculture and the food sector, financing long-term investments, and export trade operations. State saving and non-transactional household deposits served as the foundation for banking activities. As a result, the transition from a functional line banking system to a market-oriented financial institution was carried out by avoiding the mono bank system, allowing private banks to grow, and establishing foreign financial institutions through joint ventures of domestic banking. The new central bank continued to be in control of monetary policy, as well as the management of newly established banking sectors and currency rate policy (Caporale et al, 2015). It has been observed in the majority of transitional nations that the introduction of new (foreign) banks causes a loss in state ownership and causes macroeconomic problems, making bank lending extremely risky. Consequently, the stock of nonperforming loans causes banking crises, while poor lending practices cause the stock of subprime loans in state-owned banks (Thomas et al, 2020). The state-owned privatization development based of financial system is improved by banks and the involvement of foreign strategic investors by boosting credit availability, technology transfer, and competition. Because they create new products, and oversee the regulation of local banks through market competition and banking system efficiency as well as, improving access to foreign cash and promoting economic expansion (Caporale, 2015)

2.2 Empirical review of literature

2.2.1 The relationship between financial development and economic growth.

According to (Usman M et al, 2022) there is a contentious relationship between financial development and economic progress. the banking industry is a major driver of economic expansion (Ozturk and Ullah ,2022). in contrast, finance is a modest development element and that plays an overstressed role (De Haan, 2020). The empirical research of (Yang, L., & Ni, M. , 2022), revealed a beneficial association between financial development and economic growth. As (Slijepčević et al, 2022) assessed the size and relative importance of banking and institutions discovered a substantial and positive correlation between the growth of the GDP per capita and a number of financial development indices. Moreover, (Bist, 2018), investigated the risk of financial deepening and vulnerability, and he proposed that there is no assurance of financial stability with the admission of international banks. Instead, financial intermediaries' efficiency has a big impact on the expansion of the economy. Therefore, improving financial intermediary service quality, increasing capital accumulation, and increasing productivity show a beneficial relationship between financial development and economic growth (Gao, C., Yao, D., Fang, J. and He, Z., 2022). On the other hand, cross-national reliance may be seen in 16 low-income countries' long-term relationship with financial development and economic progress (Yusuf and Mohd ,2021) used panel data unit root and panel co integration analysis together with fully modified dynamic OLS approaches, and the data ranged from 1995 to 2014. As a result, the panel data co integration study supports the notion that financial development and economic growth are linked across time short term or long term. Additionally, financial development has a positive and significant impact on economic growth according to long run panel estimation (Biringanine and MUZEE, 2021).

Mathumo (2021), investigated the relationship between financial development and economic growth in ten SADC member countries. he used a vector auto regression (VAR) model and conducted a Granger causality test based on three theories: the supply leading hypothesis (financial development derives economic growth or positive causality), no judge causality between the two hypothesis and the demand following hypothesis, with the response-demand hypothesis (economic growth causes financial development or reverse causality). His empirical

results showed that there is evidence 50 percent and 60 percent of demand-following response when broad money supply (BM) and direct credit (DC) are used as indices of financial development. Supply following hypothesis (positive causality) revealed that 20 percent and 30 percent response ensured economic growth is induced by financial development when broad money supply (BM) and direct credit (DC) are used in the quantity of financial development. However, there was no proof of a causal relationship when the broad money supply (BM) and direct credit (DC) were used to measure financial development

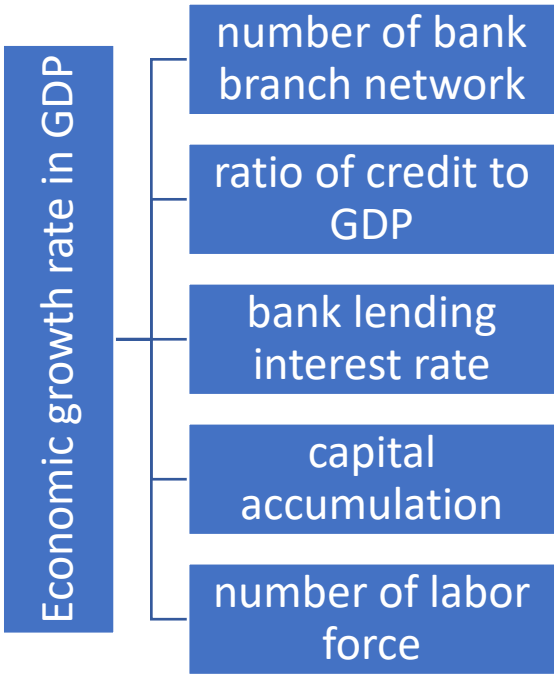
According to (Sachs, 2022), there is only a tenuous (weak) connection between the ratio of domestic credit to GDP in the short term. In contrast, Gbenga et al,(2019), studied that credit to the private sector has been one of the forces behind long-term growth. Moreover, Credit and per capita income in the private sector therefore have a positive link in transition economies (Djalili, K., and Piesse, J., 2019). The amount of liquid liabilities divided by GDP, the ratio of credit given by banks to the private sector to total domestic credit, the ratio of credit to the private sector to GDP, and other factors remain constant, were the four indicators used to measure the development of the financial sector (Melecky and Podpiera, 2020). They discovered a strong positive correlation between each financial development indicator and economic growth. (Birru et al , 2019). On the other hand, (Ezeibekwe, 2020), claimed that factors such as national income, trade openness, political stability, and polity 2 (democracy score), perception of corruption, predominate religious beliefs, and geographic factors with different levels of legal and accounting systems have been examined as determinants of financial development on economic growth using data from the years 1980 to 2018 of 69 sub-Saharan African countries. He came to the conclusion that nations with high levels of perceived corruption have less advanced economies. While those nations with low levels of perceived corruption have advanced economies.

2.2.2. Summary of the literature

Financial development has a significant impact on economic growth through providing credit and financial service (Helhel Y, 2018). the expansion of financial sector is essential for investment promotion, through enhancing saving, availing enough credit with positive real deposit and lending interest rate to increase capital accumulation and production (Abdu, 2022). Hence, access to finance reduces the sensitivity of the poor to shocks and increases investment and productivity, which in turn generates income (Helhel, 2018). In Ethiopia, Banks, insurance companies, and microfinance organizations are the principal financial institutions (Abdu,2022). a number of studies have investigated the role banking sector in driving economic growth in Ethiopia. the development of banking sector has had a positive impact on economic growth. But, the development of banking sector in Ethiopia has been hindered by a number of factors, including a lack of access to finance, weak governance and regulation, and lack of competition in customer service delivery. There was structural influence in banking sector development and economic growth in previous system of Governments. For instance, there was market oriented financial institution that access enough loan services to private sectors to promote investment in the imperial regime. But the bank customers became public enterprise that instructed on functional line of Governance in military regime. Since 1991, there was expansion of private banks under controlled of National Banks of Ethiopia with celling of consistence interest rate, rigid credit policy and high reserve requirements. Hence, inaccessible enough credit with timely and affordable price from financial institution to development actors made high rise of un employment and diminishing economic growth. As Mathumo (2021), the relationship between financial development and economic growth of LDC revealed supply response hypothesis (finance derived economic growth) when broad money supply to direct credit to GDP induced by finance. Whereas, demand response hypothesis (Growth lead finance) when broad money supply to direct credit induced by economy. But there was a controversial idea to decide the long run or short run relationship and causality direction in Ethiopian context. The key idea was to examine the trend and relationship of Banking sector development and Ethiopian economic growth. this was done through investigating the independent variables of financial development indicators namely: financial depth (market size and liquidity), access (ability to acquire financial services at a cheap cost with sustained revenue), efficiency (net interest margin of deposit and lending rate)

and stability of capital. Thus, the study has selected the independent variables as financial depth (Bank branch network or BBN relative to un banked people), access(credit), efficiency (bank lending interest rate or BLINT), stability (investment capital or INVCAP), labor force (LAB) and the dependent variable GDP. The labor force was included the total productive force in Ethiopia from the age greater than 14 and less than 64 as per world bank standard. the empirical literature above supported that the banking sector expected to play an important role in driving economic growth in Ethiopia by availing access to credit with a good financial service. Hence, the hypothesis to be done for this analysis;

1. Figure of hypothesis with independent and dependent variables.



CHAPTER THRE

3.Research Methodology

3.1. Introduction

The steps required to complete the research was described in this chapter. It detailed the procedures for conducting the study as well as the methods for gathering and analyzing the data. This section covers the research strategy, target audience, and data collection method.

3.2 Research Design

In this study, a Quantitative and descriptive research design was employed. Quantitative research design was based on quantitative design framework that the researcher has direct control on the in dependent variables. Descriptive study was more suited to building a profile of an events. It was better to use quantitative and descriptive research design to build controlled process and findings of the study on how financial development affected GDP growth. Significant effects were expected on Ethiopia's financial development characteristics and GDP growth

3.3 Data Collection

The analysis drew on secondary types of data on both financial development and economic growth from Sources of Ethiopian National Bank, Ethiopian ministry of finance and economic development as well as world Bank. The data covered the year from 1984 to 2022 was collected, edited, tested and estimated with annual GDP.

3.4 Data Analysis

STATA Version 14 was used to assist with data analysis for this data. The stationary test, co integration test and vector error correction model (VECM) estimation was undertaken. 90 percent confidence interval and 10 percent significant level was set. Because, it was recommended in "Jeffery M. 2nd edition Book" to set 1%, 5% or 10% significant level.

3.4.1 Analytical Model

The purpose of the research was to examine the relationship between banking sector development and economic growth in Ethiopian banking sector. The study was covered Ethiopian banking sector including state and private banks throughout the country. To analyze impact of financial development indicators namely: bank branch network, credit, bank deposit and lending interest rate, investment capital and labor force with economic growth, Secondary data covered the year 1984 to 2022 from relevant sources like National bank of Ethiopia (NBE), Ministry of finance and Economic development (MOFED) and world Bank (WB) was used. Methodically, the study was used quantitative and descriptive research design. Quantitative research design focus on methodological frame work of controllable independent variables. descriptive research design focused on describing the process and findings of the research. Time series analysis and a multivariate regression analysis with Vector error correction model (VECM) estimation were undertaken. Because, there were serial correlation (lag correlation between different series) of 35 years long term data. But, ARDL model used when the data used was a few with autocorrelation(lag correlation between same sireies). The steps of analysis first done was stationary test to ensure weather the variables were free from time dependent. The second step was undertaking co-integration test to ensure that the series has linearity, stability, and long run relationship between variables. If there are n variables all are unit roots, there are at most n-1 co integrating vectors and the combination would have an order of integration equal to the largest. Hence, a set of variables were defined as co integrated if a linear combination of them were stationary. The 3rd step was undertaking Vector error correction model estimation to analyze the trend of the series in the short term and long-term relationship of financial development indicators and Ethiopian economic growth. In the 5th step causality test was done to decide the direction of financial development indicators and Ethiopian economic growth. The research was examined the significance value to be examined at 90% confidence level and at 10% significant level. Because, it was recommended in "Jeffery M.2nd edition Book" to set 1%, 5% or 10% significant level. A study of Olumuyiwa, (2022) revealed that financial development and GDP growth in African countries served as the basis for the model's development. Research on commercial banks, financial development, and African economic expansion was also done (Batuoet al , 2018). Research on financial inclusion was done in the context of inclusive growth

by (Ozturk and Ullah ., 2022). The plan for researching the impact of financial development on GDP growth in the Ethiopian banking sector was employed with the same model.

$lnyt = \beta_0+\beta_1X_{1t}+\beta_2X_{2t}+\beta_3X3t+\beta_4X_{4t}+B5X5t + €$

Where:

$lnyt$ = Growth rate in GDP (GDP)

X_1 = bank branch Network (BBN).

X_2 = the ratio of credit to GDP growth (Credit)

X3=. Bank Lending Interest Rate (BLINT).

X4 = the amount of investment capital in million (INVCAP)

X5= number of labor force (LAB)

To specify the vector error correction model (VECM:)

$$\nabla \mathbf{lnGDP} = \partial + \sum_{i=1}^{k-1} \beta i \, \nabla \boldsymbol{gdp} + \sum_{i=bbn}^{k-1} \psi j \, \nabla \mathbf{ln}\boldsymbol{bbn} - \boldsymbol{bbn} + \sum_{i=c}^{k-1} \psi jln \, \nabla \mathbf{ln}\boldsymbol{credit} - \boldsymbol{c} + \sum_{i=blint}^{k-1} \psi jln \, \nabla \mathbf{lnblintt} - \boldsymbol{blint} + \sum_{i=invcap}^{k-1} \psi jln \, \nabla \boldsymbol{lninvcapt} - \boldsymbol{invcap} + \sum_{i=lab}^{k-1} \psi jln \, \nabla \boldsymbol{lnlabt} - \boldsymbol{lab} + \boldsymbol{\lambda 1 ECMt} - \mathbf{1} + \boldsymbol{U1t}$$

$$\nabla \mathbf{lnbbn} = \partial + \sum_{i=1}^{k-1} \beta i \, \nabla \boldsymbol{bbn} + \sum_{i=bbn}^{k-1} \psi j \, \nabla \mathbf{ln}\boldsymbol{gdp} - \boldsymbol{gdp} + \sum_{i=c}^{k-1} \psi jln \, \nabla \boldsymbol{CREDIT} - \boldsymbol{c} + \sum_{i=blint}^{k-1} \psi jln \, \nabla \mathbf{lnblintt} - \boldsymbol{blint} + \sum_{i=invcap}^{k-1} \psi jln \, \nabla \boldsymbol{lninvcapt} - \boldsymbol{invcap} + \sum_{i=lab}^{k-1} \psi jln \, \nabla \boldsymbol{lnlabt} - \boldsymbol{lab} + \boldsymbol{\lambda 2 ECMt} - \mathbf{1} + \boldsymbol{U2t}$$

$$\nabla \mathbf{lncredit} = \partial + \sum_{i=1}^{k-1} \beta i \, \nabla \boldsymbol{lncredit} + \sum_{i=bbn}^{k-1} \psi j \, \nabla \mathbf{ln}\boldsymbol{BBN} - \boldsymbol{BBN} + \sum_{i=c}^{k-1} \psi jln \, \nabla \mathbf{ln}\boldsymbol{gdp} - \boldsymbol{gdp} + \sum_{i=blint}^{k-1} \psi jln \, \nabla \mathbf{lnblintt} - \boldsymbol{blint} + \sum_{i=invcap}^{k-1} \psi jln \, \nabla \boldsymbol{lninvcapt} - \boldsymbol{invcap} + \sum_{i=lab}^{k-1} \psi jln \, \nabla \boldsymbol{lnlabt} - \boldsymbol{lab} + \boldsymbol{\lambda 3 ECMt} - \mathbf{1} + \boldsymbol{U3t}$$

$$\nabla \mathbf{lnblint} = \partial + \sum_{i=1}^{k-1} \beta i \, \nabla \boldsymbol{blint} + \sum_{i=bbn}^{k-1} \psi j \, \nabla \mathbf{ln}\boldsymbol{bbn} - \boldsymbol{bbn} + \sum_{i=c}^{k-1} \psi jln \, \nabla \mathbf{ln}\boldsymbol{credit} - \boldsymbol{c} + \sum_{i=gdp}^{k-1} \psi jln \, \nabla \mathbf{ln}\boldsymbol{gdp} - \boldsymbol{gdp} + \sum_{i=invcap}^{k-1} \psi jln \, \nabla \boldsymbol{lninvcapt} - \boldsymbol{invcap} + \sum_{i=lab}^{k-1} \psi jln \, \nabla \boldsymbol{lnlabt} - \boldsymbol{lab} + \boldsymbol{\lambda 4 ECMt} - \mathbf{1} + \boldsymbol{U4t}$$

$$\nabla \mathbf{lninvcap} = \partial + \sum_{i=1}^{k-1} \beta i \, \nabla \mathbf{invcapt} + \sum_{i=bbn}^{k-1} \psi j \, \nabla \mathbf{ln}\boldsymbol{bbnt} - \boldsymbol{bbn} + \sum_{i=c}^{k-1} \psi jln \, \nabla \boldsymbol{creditt} - \boldsymbol{c} + \sum_{i=blint}^{k-1} \psi jln \, \nabla \mathbf{lnblintt} - \boldsymbol{blint} + \sum_{i=invcap}^{k-1} \psi jln \, \nabla \boldsymbol{lngdpt} - \boldsymbol{gdp} + \sum_{i=lab}^{k-1} \psi jln \, \nabla \boldsymbol{lnlabt} - \boldsymbol{lab} + \boldsymbol{\lambda 5 ECMt} - \mathbf{1} + \boldsymbol{U5t}$$

$$\nabla \mathbf{lnlab} = \partial + \sum_{i=1}^{k-1} \beta i \, \nabla \boldsymbol{lab} + \sum_{i=bbn}^{k-1} \psi j \, \nabla \mathbf{ln}\boldsymbol{bbn} - \boldsymbol{bbn} + \sum_{i=c}^{k-1} \psi jln \, \nabla \boldsymbol{credit} - \boldsymbol{c} + \sum_{i=blint}^{k-1} \psi jln \, \nabla \mathbf{lnblintt} - \boldsymbol{blint} + \sum_{i=invcap}^{k-1} \psi jln \, \nabla \boldsymbol{lninvcapt} - \boldsymbol{invcap} + \sum_{i=lab}^{k-1} \psi jln \, \nabla \boldsymbol{lngdpt} - \boldsymbol{gdp} + \boldsymbol{\lambda 6 ECMt} - \mathbf{1} + \boldsymbol{U6t}$$

The equation was specified as: $\boldsymbol{lnyt} = \boldsymbol{\partial} + \boldsymbol{\beta xt} + \mathbf{Ut}$

CHAPTER FOUR

4.1 Description of Data analysis

In social science, the accuracy and relevancy of data may be reduced due to observational error either omission or commission of non-experimental data and constraints of disclosed information. Hence, undertaking tasting to realize the fitness of the sample data collected for the study is the essential activity.

In time series analysis the secondary data collected for the study has been tested through stationary and co integration test. Vector error correction rank (VEC rank) and vector error correction model (VECM) estimating was done to ensure co integration in the long run and to examine the relationship between financial development and economic growth.

4.2 Stationary test

A stationary series is a series with a constant mean, a constant variance and a constant covariance for each a given lag. A stationary series can strongly influence of one behavior and properties through gradual minimization of shocks. A stationary play an important role when estimating time series analysis. Testing for stationary of secondary time series data enables to estimate proper time series model. In contrast, conducting time series analysis on non-stationary data leads to "spurious" regression results that looks like high and significance relationship among variables but not really exist. Hence, stationary test has been undertaken using Augmented Dickey Fuller (ADF) to check whether the data at hand get stationary as illustrated in the table below.

Table 1 stationary test

Variable	Test statistics			Conclusion
	W/o drift	Drift	Trend	
GDP	4.754	-1.191	1.619	nonstationary
d.GDP	-1.743 at 10%	-5.260 at 1%	-3.882 at 1%	Stationary at 1%
bbn	3.752	-1.646	1.598	Non stationary
d.bbn	-1.976 5%	-4.150 at10%	-3.475 at 1%	Stationary at 1%
bm3	3.533	-0.299	2.762	Non stationary
d.bm3	-0.208	-3.044	-1.688 at10%	Stationary at 10%
credit	2.633	-2.025	0.327	Non stationary
d.credit	-4.930 at 1%	-6.368 at 1%	-6.228 at1%	Stationary at 1%
blint	0.293	-2.990	-2.526 at 1%	Stationary at level
d.blint	-4.222 at 1%	-4.125 at 5%	-4.192 at 1%	More stationary at difference
Invcap	2,528	-1.976	0.906	Non stationary
d.invcap	-3.033 at 1%	-3.884 at 5%	-3.997 at 1%	Stationary
lab	3.870	-0.385	-3.795 at 1% at level	Stationary at level
d.lab	-0.753	-4.671 at 1%	-2.436 at 5%	More stationary at deference

Source: own computation using Stata 14 software

As indicated in the table above, the stationary test was done by unit root checking tools namely; without drift (nonconstant), trend and drift (constant) at 1% ,5%, and 10% critical value. The t statistics should be smaller and more negative than the critical value. As a result, at difference level the variables GDP and Credit are stationary at 1% of critical value at drift. The variables Bank lending interest rate and Labor force(lab) are stationary at 1% of critical value of drift at

level. But bank lending interest rate is more stationary at difference level of 5% critical value at trend and 1% critical value at drift; as well as; labor force is more stationary at difference 1% critical value of trend and 5% critical value of drift. Therefore, stationary test at difference level has been more chosen. Because, stationary tests at level have no clear tendency to return a constant value or linear trends. In addition, the variable bank branch network was stationary at difference level of 5% critical value of drift and the variable investment capital is stationary at difference 1% critical value. To sum up, stationary test for the indicated variables has been done to make compatible linear trends to the study.

4.3 Co- integration test

After completion of the stationary test the second step is testing for Co- integration. Variables are cointegrated, if there are existed as a linear, stable and long run relationship among variables, such that the disequilibrium error tend to fluctuate around zero mean. This means, if two variables that are integrated I (1) are linearly combined, the combination will also be integrated I (1) or if variables with differencing order of integration are combined, the combination will have an order of integration equal to the largest. The study used Johansen technique in order to establish how many co integration equations are existed between variables. The research can consider multivariate generalization of Augmented- Dicky- Fuller test as Johansen test. Because, the generalization is the examination of linear combination of variables for unit roots. Moreover, Johansen used the maximum likelihood as estimation strategy to estimate all co integration vectors when there are more than two variables. Generally, if there are n variables all are unit roots, there are at most n-1 co integrating vectors. Accordingly, the trace and maximum eigen value test statistics have rejected the null of no co integration among the series while confirming the existence of long run relationship among variables. In this context, a set of variables is defined as co integrated if a linear combination of them is stationary. Thus, the statistics of both tests have been illustrated in the tables below.

Table 2 Johansen test for co integration

Maximum Rank	Parms	LL	Eigenvalue	Trace statistics	5% Critical value	1% critical value
0	56	460.86886		141.2058	124.24	133.57
1	69	484.36406	0.73883	94.2154*1	94.15	103.18
2	80	501.25697	0.61913	60.4296*5	68.52	76.07
3	89	512.38826	0.47063	38.1671	47.21	54.46
4	96	521.96924	0.42160	19.0051	29.68	35.65
5	101	528.21034	0.29997	6.5229	15.41	20.04
6	104	530.69068	0.13215	1.5622	3.76	6.65
7	105	531.47178	0.04365			

Source: own computation using Stata 14 software

Table 3 Eigen value test for co integration

Maximum Rank	Parms	LL	Eigenvalue	Maximum statistics	5% critical value	1% critical value
0	56	460.86886		46.9904	45.28	51.57
1	69	484.36406	0.73883	33.7858	39.37	45.10
2	80	501.25697	0.61913	22.2626	33.46	38.77
3	89	512.38826	0.47063	19.1620	27.07	32.24
4	96	521.96924	0.42160	12.4822	20.97	25.52
5	101	528.21034	0.29997	4.9607	14.04	18.63
6	104	530.69068	0.13215	1.5622	3.76	6.65
7	105	531.47178	0.04365			

Source: own computation using Stata 14 software

As shown in the above table, Johansen taste for co integration rule revealed a maximum rank represents a number of co integration equation in the system. At maximum rank zero, the null hypothesis says no co integration among the variables. Whereas, the alternative hypothesis says there is at least a co integration among them. To determine the presence of co integration, the

trace statistics must be compared with critical value at 5% and 1% significance level. As the result, Johansen test for co integration revealed that there is no co integration at integrated maximum rank zero I (0). Because, the trace value is greater than the critical value at integrated maximum zero. Moreover, there are co integration equations at integrated maximum one on I (1) and I (2) at 1% and 5% critical value. because, the trace value is less than the critical value. At the same time, we accept the eigen value of integrated equation at integrated maximum one I (1) at 5% critical value and rejected at integrated maximum zero I (0).

4.4 Vector error correction model (VECM) estimating

After the approval of co integration among the variables, the next step is estimating the vector error correction model (VECM) using one less lag length (p-1). Where p is the optimal lag length determined with vector error correction (VEC). Hence, the optimal lag length of the model 3, therefore, vector error correction model (VECM) requires 2 lag length to run a regression.

4.4.1 The speed of adjustment and short run parameters error correction model.

The coefficient of error correction model indicates the speed by which any deviation in the short run from equilibrium is restored to its equilibrium in the dynamic model in the long run. The coefficient of error correction model (ECM) term thus, indicates how quickly variables converge to their equilibrium. The short run relationship between variables bank branch network, credit, bank lending interest rate, investment capital, and labor force can be illustrated by vector error correction model (VECM). To ensure this function there should be a negative sign speed of adjustment and statistically significant at standard of probability value (p-value) of less than 10% significant level.

Table 4 speed of adjustment equation and short-term parameters

	coef.	Standard error	Z	p>|z|	90% conf. interval	
-Ce1 **GDP**	1					
-Ce1L1	-.226345*	.1263245	-1.79	0.073*	-.4341304	-.0185598
gdpLD2	-.23955	.1979483	-1.21	0.226	-.5651459-	.0860459
bbnLD2	-.1137153	.0691208	-1.65	0.100*	-.22774089	-.0000218
creditLD2	-.0102874	.0144508	-0.71	0.477	-.0340569	.013482
BlintLD2	.0864389	.0549977	1.57	0.116	-0040242	.01769021
InvcapLD2	-.0740947	.027153	-2.73	0.006*	-.1187574	-.0294319
LabLD2	.052515	.6649461	0.08	0.937	-1.041224	1.146254
-cons	.0003565	.0037588	0.09	0.924	-.0058261	.0065391

Source: own computation using Stata 14 software

As indicated in the above table, the speed of adjustment to the equilibrium (-Ce1) shows the equation to be equilibrium in the long run. The error correction of estimated result -.226345 which is statistically significant and has negative sign implies a high speed of adjustment in which the system restored to its long run equilibrium. The coefficient of the speed of adjustment is negative and statistically significant would be corrected any shocks in the short run by the speed of 22.63 percent per year in the long run. This means, shocks of financial development variables on economic growth rate move towards to equilibrium by 22.63 percent per year in the long run. The significant and correct negative error correction term indicates the stable adjustment coefficient that moves back to equilibrium and it lies within the relevant range of -1 and 0 as required. The equation is significance at 0.073 and 90% of confidence interval. The coefficient of parameters in the speed of adjustment shows, when independent variable increases by 1%, the dependent variable increases by 22.63% per year in the long run. On the other hand, in short run, the variables GDP, credit, bank lending interest rate and labor force are insignificance for the study. In contrast, the variables bank branch network and investment capital are significance at 0.1 and 0.006 of p value respectively. Hence, change of in increase by

1% in bank branch network enable to change of 11.37% of GDP in the short run. In addition, when investment capital increase by 1%, GDP increase by 7.4%in short run.

4.4.2 Long run parameters

The finding of Johansen co-integration test revealed that the variables GDP, Bank Branch network, Credit, Bank lending interest rate, Investment capital and Labor force are co integrated at 1 maximum rank in the long run. We used co integrating vector to form the vector error correction model (VECM).in the long run. Elasticity have been exactly identified and the Johansen normalization restriction imposed too.

Table 5. Johansen normalization restriction imposed

beta	Coef.	Standard error	Z	p>|z|	[90% conf. Interval]	
-Ce1						
gdpD1	1					
bbnD1	-.20571	.1055167	-1.95	0.051*	-.3792695	-.0321505
creitD1	-.1798957	.0324758	-5.54	0.000*	-.2333136	-.1264778
BlintD1	.223565	.1140468	1.96	0.050*	.0359747	.4111553
invcapD1	-.1956557	.0740186	-2.64	0,008*	-3174356	-.0739359
labD1	-1.132571	1.068895	-1.06	0.289	-2.890747	.6256059
-cons	.0173805					

Source: own computation using Stata 14 software

As shown in the table above in Johanson normalization Restriction impose the variables are adjusted by the speed of adjustment at equilibrium equation for the long run. The independent variables namely; bank branch network, credit, bank lending interest rate and investment capital have significance at p value. Hence, the bank branch network and credit have a strong relationship with GDP in the long run. Specifically, bank lending interest rate and investment capital have a strong link with GDP in short run than more in long run. One long run time period is 5 years but the data used for VECM estimation was 35 years data with lagged 3. Thus, the VECM estimation result elaborated the trend of financial indicators influence on GDP for 7 consecutive long run time period or 35 years data based. There for, the result of VECM

estimation trend for each of financial indicators based on total 7 long run time period would be calculated and interpreted. For instance, 1% consecutive increase for 7 long term time period in bank branch networks, increases by 20.57% in GDP, 1% consecutive increase for 7 long term time period in credit enable to increase by 17.99 in GDP and 1% consecutive increase for 7 long term time period in investment capital, increases by 19.57% in GDP. On the other hand, 1% consecutive increase for 7 long terms in bank lending interest rate enable to decrease by 22.36% in GDP. To show the result of long run trend for each financial indicators based each long run VECM estimation, 1% increase in bank branch network increases by 2.9% in GDP, 1% increase in credit increases by 2.57% in GDP, 1% increase in investment capital increases by 2.8% in GDP, 1% increase in bank lending interest rate decreases by 3.2 % in GDP for consecutive 5 *7 long run years. In general, the independent variables of financial development namely: bank branch network, credit and investment capital have positive impact on GDP growth rate in the long run. On the other hand, the independent variable bank lending interest rate has negative impact on GDP growth rate in the long run.

4.5 Granger causality test

Granger causality test is a hypothesis test used to determine the usefulness of one time series in forecasting another time series. It is used to measure the ability to predict the future value of time series on the bases of the previous values of another time series. Granger causality in a VEC model reveals the relationship of the current value of one variable and the past values of the other variable. The existence of co integration between variables does not indicate the direction of causal relationship among variables. Hence; economic theory suggests that there is always Granger causality in at least one direction. To specify the direction of granger causality between variables, the researcher used chi square statistics and probability.

Hence: the hypothesis testing is;

H0: There is no granger causality from financial development to economic growth.

H1: There is granger causality from financial development to economic growth.

There are Unidirectional causality and multidirectional causality. Statistically, the significant probability value indicates the rejection of null hypothesis at 10 percent. because, the VECM was estimated at 10 percent significant level and at 90 percent confidence interval.

Table 6 Vector error correction model for granger causality test

Equation	Parms	RMSE	R-sq	Chi2	p>chi2
D2-gdp	8	.022167	0.3529	14.72171	0.0648*
D2bbn	8	.07358	0.3325	13.45096	0.0972*
D2credit	8	.253474	0.7228	70.38848	0.0000*
D2-blint	8	.071146	0.5604	34.42161	0.0000*
D2invcap	8	.090614	0.6932	61.017	0.0000*
D2-lab	8	.004834	0.5493	32.90067	0.0001*

Source: own computation using Stata 14 software

As indicated above there is granger causality from financial development variables (bank branch network, credit, bank lending interest rate, investment capital, labor force) to GDP growth rate by large. Even if the probability value is at 10 percent the most financial developments 'Variables probability values are less than 5 percent. At the same time, there is granger causality from GDP growth rate to financial development since the probability value is less than 10 percent of significant level. hence, there is multidirectional granger causality at 0.0648 probability value of GDP to 0.0000 of probability value of credit and finance lead growth at 0.0000 probability value of finance to 0.0648 probability value of GDP growth. As a result, the causality test showed that there is growth lead financial development in the short run and finance lead growth in the long run.

CHAPTER FIVE

5. Summary, Conclusion and Policy Implications

5.1 Summary

The summary of the study shown there is growth lead finance in the short run and finance lead growth in the long run. There is a weak connection between financial development and economic growth rate in short run. Whereas. Strong connection of financial development and economic growth rate was observed in the long run. Hence, 1 percent increase in bank branch network enable to increase by 2.9% percent in GDP growth rate for consecutive 7 long run time period. This indicate expansion of bank branch network to unbanked people is important to expand financial lone and services. At the expense's, it enhances access to credit to private sectors to mobilize an idle resources like unemployed citizens, land and water. Moreover, 1 percent increase in credit accessible enable to increase by 2.57% percent in GDP for consecutive 7 long run time period. this shows access to credit to development actors increases investment and employment opportunities that changes economic growth. Inaddition,1 percent increase in investment capital enable to increase by 2.8% in GDP for consecutive 7 long run time period. This facilitates expansions for investment to increase production and job opportunities. On the other hand, 1 percent increase in bank lending interest rate makes to decrease by 3.2% in GDP for consecutive 7 long run time period. Increasing the amount of bank lending interest rate increases the amount of saving at bank and decreases the amount of investment.

The main factors of financial development and economic growth in Ethiopian banking sectors are focused on coverage bank branch network, ratio of access to credit to GDP, bank lending interest rate, investment capital adequacy and the existence of excess opportunity for labor force. On the other hand, absence of financial liberalization and lack of service quality in financial intermediary can reduce capital and production growth. As revealed in empirical review, growth lead finance occurs when domestic direct credit is used as induced in short run. On the other hand, finance lead growth is happened when direct private credit is used as quantity for a long run. There is a weak connection between the ratios of domestic credit to GDP in short run But, driving force of growth in the long run of private credit to GDP.

As observed in Ethiopian banking sector there are lack of accessible bank branch network due to low level of private banks expansion relative to their number in the cities throughout the country. There was lack of access enough credit to depositors; in contrast, providing credit to selected private sectors created reduction of ratio of credit to GDP. Moreover, the consistency of bank deposit lending interest rate by national bank of Ethiopia made banks non profitable and in competent.

To examine the above problems time series sample data from 1984 to 2021/22 has been collected and tested by stationary and co integration test. As a result, the detected variables were stationary at difference level. There was one co integration equation at maximum rank integrated one I (1).

In VECM estimation, the speed of adjustment to equilibrium (-Ce1) is negative and statistically significant to show high speed of adjustment that restore the shocks in the long run. The shocks of financial development variables on economic growth rate moves towards to equilibrium by 22.63 percent per year in the long run. In the short run the variables GDP, Credit, Bank lending interest rate, and Labore force are statistically in significant. On the other hand, Bank branch network and Investment capital are statistically significant and as 1 percent increase in Bank branch network enable to increase by 11.37 percent GDP growth rate in short run. Whereas, 1 percent increase in investment capital enable to increase by 7.4 percent GDP growth rate in short run.

In the long run, Johansen normalization restriction impose adjusted the variables by the speed of adjustment equilibrium equation. The independent variables namely: bank branch network, credit, investment capital have significant and positive impact on GDP growth rate. On the other hand, the variable bank lending interest rate has significant but negative impact on GDP growth rate. According to VECEM result;

A) 1 percent increase in bank branch network enable to increase by 20.57 percent in GDP growth rate for total 7*5 long run time period. As NBE (2021/2022) report; In Ethiopia, the number of banks reached 30 out of these 2 banks were state owned, the rest 28 banks were private banks. All are governed under national bank of Ethiopia. the number of bank branches reached from 7344 to 8944 with 17.89 percent increment a year ago. The share of private bank in total branch network 76.1 percent with low level of expansion relative to their size. Moreover, 32.7 percent of the total branches were located in Addis Ababa.

The rest 67.3 percent were located at Reginal cities by large and zonal cities at medium and low level at local cities. Hence, low level prevalence rate of bank branch network to un banked people can affect GDP growth rate.

B) 1 percent increase in credit enable to increase by 17.99 percent in GDP growth rate in 35 years of VECM estimation. According to NBE (2021/2022) report, banks disbursed birr 427.9 billion in fresh loan which was 29.9 percent higher than a year ago. Out of this, about 31.9 percent of credit went to finance international trade followed by domestic trad (14.3%), Industry (12.2%), mine, power and water (9.5%), personal (8.4%), housing and construction (7.9), transport and construction (6.7%) and agriculture (5%) and the remaining (4.1%) for other activities. As stated in the report, 51.3 percent of credit dispersed for international and domestic trade and the remaining 49.7 loan dispersed for economic activities that promote job opportunities. Even though there is loan increment by 29.9 percent, the estimation shows that there is 5.379 percent increment in GDP growth rate by a year. lack of accessible enough credit for unemployment reduction as desired and lack of financial liberalization hinders economic growth. thus, it is better to allow competitive banks to access enough credit that promote enough job opportunities and economic growth.

C) VECEM estimation indicates 1 percent increase in investment capital enable to increase by 19.57 percent in GDP growth rate. But, as Ethiopia investment agency (2020/21) report, 112 investment projects were licensed with capital 2.2 billion birr which decline by 85.7% percent and 93.6 percent respectively compared to preceding years. All the investment project were private and out of these 67 projects with birr 862 million were domestic, whereas 45 projects were foreign having the total capital of birr 1.3 billion. The average capital project for domestic investment 12.9 million while foreign investment was birr 29.4 million implying that foreign investment was more capital intensive than domestic investment project. Thus, the investment projects created new job opportunities for 12914 permanent and 3452 causal workers. As we understand from the report, there is no attractive performance of investment capital that has changed significantly GDP growth rate.

D) VECM estimation illustrated that 1 percent increase in bank lending interest rate enable to decrease by 22.36 percent in GDP growth rate. As NBE interest rate policy, the

maximum and the minimum saving deposit interest rate are 7 and 9 percent respectively. Simple average lending interest rate is 14.25 percent. both deposit and lending interest rate remained negative given 34 percent head line inflation at the end of 2021/22. Banks transactions depend on interest rate. when the amount of deposit and lending interest rate increase the amount of money stored at bank increase and demand for credit decrease respectively. Hence, investment capital deteriorated and reduced GDP growth rate. Moreover, profitability of banks are decreases due to double digit inflation raise.

5.2 Conclusion

Based on the summary, the study concluded that there is a significant and positive impact of financial development variables namely: bank branch network, credit and investment capital on economic growth and negative impact of bank lending interest rate and economic growth. In realty, low expansion of bank branch network to un banked people hinders to make accessible and timely affordable finance to rural households and investors to avail theme with agricultural input and skill that improve productivity on time. Moreover, lack of accessible enough credit for abundant investors who are investing on un employment reduction firms as desired and lack of quality financial intermediary service and financial liberalization is the main constraints to economic growth. So, it is better to allow foreign banks that have huge capital and smart technology as well as, improve quality of financial intermediary service to avail enough credit to promote job opportunities. In addition, ensuring capital adequacy is very important to promote investment. But there is decline of investment and no attractive performance of investment capital that has significant change on GDP growth rate. On the other hand, bank lending interest rate is inversely proportional to GDP growth rate. But, the average lending interest rate 14.25 is yield negative due to 34 percent headline inflation. Thus, banks are not profitable at this level. Hence, Growth lead finance in the short run as induces and Finance lead growth in the long run as a quantity is essential for economic growth.

5.3 Policy Implication

Based on conclusion, the study suggested the policy implication to be taken on constraints identified of financial development and economic growth in case Ethiopian banking sectors:

1) Allowing financial liberalization through joint venture of local and foreign banks to share skill, technology, market and enough foreign and local capital of each other. Establishing the joint venture of foreign and local banks can help to protect the sovereignty of local banks and fills financial and technology gap.
2) Enhancing the quality of financial intermediary service, with enough bank infrastructure, enough capital and smart technology with increasing Saving and Investment culture.
3) Ensuring feasible credit policy that makes profitable both financial sectors (banks, micro finance and insurance) and development actors (households, innovators, investors).
4) Initiating public private partnership to undertake inclusive financial system of activities.

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Appendix

Stationary test appendix

```
. tsset year, yearly
        time variable:  year, 1984 to 2021
                delta:  1 year

. dfuller gdp, noconstant lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        36

                                 ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)              4.754           -2.642            -1.950           -1.604
------------------------------------------------------------------------------

. dfuller gdp, trend lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        36

                                 ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -1.191           -4.279            -3.556           -3.214
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9124

. dfuller gdp, drift lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        36

                                 ---------- Z(t) has t-distribution ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)              1.619           -2.445            -1.692           -1.308
------------------------------------------------------------------------------
p-value for Z(t) = 0.9426

. dfuller d.gdp, noconstant lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        35

                                 ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -1.743           -2.644            -1.950           -1.604
------------------------------------------------------------------------------

. dfuller d.gdp, trend lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        35

                                 ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -5.260           -4.288            -3.560           -3.216
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0001

. dfuller d.gdp, drift lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        35

                                 ---------- Z(t) has t-distribution ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -3.882           -2.449            -1.694           -1.309
------------------------------------------------------------------------------
p-value for Z(t) = 0.0002
```

```
. dfuller bbn, noconstant lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        36

                                 ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              3.752           -2.642            -1.950            -1.604
------------------------------------------------------------------------------

. dfuller bbn, trend lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        36

                                 ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.646           -4.279            -3.556            -3.214
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.7737

. dfuller bbn, drift lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        36

                                 ---------- Z(t) has t-distribution ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              1.598           -2.445            -1.692            -1.308
------------------------------------------------------------------------------
p-value for Z(t) = 0.9402

. dfuller d.bbn, noconstant lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        35

                                 ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.976           -2.644            -1.950            -1.604
------------------------------------------------------------------------------

. dfuller d.bbn, trend lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        35

                                 ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -4.150           -4.288            -3.560            -3.216
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0053

. dfuller d.bbn, drift lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        35

                                 ---------- Z(t) has t-distribution ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -3.475           -2.449            -1.694            -1.309
------------------------------------------------------------------------------
p-value for Z(t) = 0.0007

.
```

```
. dfuller bm3, noconstant lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        36

                                 ------------ Interpolated Dickey-Fuller -----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)              3.533           -2.642            -1.950           -1.604
------------------------------------------------------------------------------

. dfuller bm3, trend lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        36

                                 ------------ Interpolated Dickey-Fuller -----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -0.299           -4.279            -3.556           -3.214
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9895

. dfuller bm3, drift lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        36

                                 ------------ Z(t) has t-distribution ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)              2.762           -2.445            -1.692           -1.308
------------------------------------------------------------------------------
p-value for Z(t) = 0.9953

. dfuller d.bm3, noconstant lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        35

                                 ------------ Interpolated Dickey-Fuller -----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -0.208           -2.644            -1.950           -1.604
------------------------------------------------------------------------------

. dfuller d.bm3, trend lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        35

                                 ------------ Interpolated Dickey-Fuller -----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -3.044           -4.288            -3.560           -3.216
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1201

. dfuller d.bm3, drift lags(1)

Augmented Dickey-Fuller test for unit root         Number of obs   =        35

                                 ------------ Z(t) has t-distribution ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -1.688           -2.449            -1.694           -1.309
------------------------------------------------------------------------------
p-value for Z(t) = 0.0506
```

```
. dfuller invcap, noconstant lags(1)

Augmented Dickey-Fuller test for unit root          Number of obs   =         36

                                 ------------ Interpolated Dickey-Fuller -----------
                    Test         1% Critical        5% Critical      10% Critical
                Statistic             Value              Value             Value
------------------------------------------------------------------------------
 Z(t)               2.528            -2.642             -1.950            -1.604
------------------------------------------------------------------------------

. dfuller invcap, trend lags(1)

Augmented Dickey-Fuller test for unit root          Number of obs   =         36

                                 ------------ Interpolated Dickey-Fuller -----------
                    Test         1% Critical        5% Critical      10% Critical
                Statistic             Value              Value             Value
------------------------------------------------------------------------------
 Z(t)              -1.976            -4.279             -3.556            -3.214
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6146

. dfuller invcap, drift lags(1)

Augmented Dickey-Fuller test for unit root          Number of obs   =         36

                                 ------------ Z(t) has t-distribution ------------
                    Test         1% Critical        5% Critical      10% Critical
                Statistic             Value              Value             Value
------------------------------------------------------------------------------
 Z(t)               0.906            -2.445             -1.692            -1.308
------------------------------------------------------------------------------
p-value for Z(t) = 0.8143

. dfuller d.invcap, noconstant lags(1)

Augmented Dickey-Fuller test for unit root          Number of obs   =         35

                                 ------------ Interpolated Dickey-Fuller -----------
                    Test         1% Critical        5% Critical      10% Critical
                Statistic             Value              Value             Value
------------------------------------------------------------------------------
 Z(t)              -3.033            -2.644             -1.950            -1.604
------------------------------------------------------------------------------

. dfuller d.invcap, trend lags(1)

Augmented Dickey-Fuller test for unit root          Number of obs   =         35

                                 ------------ Interpolated Dickey-Fuller -----------
                    Test         1% Critical        5% Critical      10% Critical
                Statistic             Value              Value             Value
------------------------------------------------------------------------------
 Z(t)              -3.884            -4.288             -3.560            -3.216
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0128

. dfuller d.invcap, drift lags(1)

Augmented Dickey-Fuller test for unit root          Number of obs   =         35

                                 ------------ Z(t) has t-distribution ------------
                    Test         1% Critical        5% Critical      10% Critical
                Statistic             Value              Value             Value
------------------------------------------------------------------------------
 Z(t)              -3.997            -2.449             -1.694            -1.309
------------------------------------------------------------------------------
p-value for Z(t) = 0.0002

.
```

```
. dfuller credit, noconstant lags(1)

Augmented Dickey-Fuller test for unit root          Number of obs   =         36

                                 ------------ Interpolated Dickey-Fuller ------------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic             Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              2.633            -2.642            -1.950            -1.604
------------------------------------------------------------------------------

. dfuller credit, trend lags(1)

Augmented Dickey-Fuller test for unit root          Number of obs   =         36

                                 ------------ Interpolated Dickey-Fuller ------------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic             Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.025            -4.279            -3.556            -3.214
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5877

. dfuller credit, drift lags(1)

Augmented Dickey-Fuller test for unit root          Number of obs   =         36

                                 ------------ Z(t) has t-distribution ------------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic             Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              0.327            -2.445            -1.692            -1.308
------------------------------------------------------------------------------
p-value for Z(t) = 0.6273

. dfuller d.credit, noconstant lags(1)

Augmented Dickey-Fuller test for unit root          Number of obs   =         35

                                 ------------ Interpolated Dickey-Fuller ------------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic             Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -4.930            -2.644            -1.950            -1.604
------------------------------------------------------------------------------

. dfuller d.credit, trend lags(1)

Augmented Dickey-Fuller test for unit root          Number of obs   =         35

                                 ------------ Interpolated Dickey-Fuller ------------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic             Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -6.368            -4.288            -3.560            -3.216
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

. dfuller d.credit, drift lags(1)

Augmented Dickey-Fuller test for unit root          Number of obs   =         35

                                 ------------ Z(t) has t-distribution ------------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic             Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -6.228            -2.449            -1.694            -1.309
------------------------------------------------------------------------------
p-value for Z(t) = 0.0000

.
```

```
. dfuller blint, noconstant lags(1)

Augmented Dickey-Fuller test for unit root           Number of obs   =         36

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test            1% Critical       5% Critical      10% Critical
               Statistic             Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             0.293            -2.642            -1.950           -1.604
------------------------------------------------------------------------------

. dfuller blint, trend lags(1)

Augmented Dickey-Fuller test for unit root           Number of obs   =         36

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test            1% Critical       5% Critical      10% Critical
               Statistic             Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -2.990            -4.279            -3.556           -3.214
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1348

. dfuller blint, drift lags(1)

Augmented Dickey-Fuller test for unit root           Number of obs   =         36

                                 ------------ Z(t) has t-distribution ------------
                 Test            1% Critical       5% Critical      10% Critical
               Statistic             Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -2.526            -2.445            -1.692           -1.308
------------------------------------------------------------------------------
p-value for Z(t) = 0.0083

. dfuller d.blint, noconstant lags(1)

Augmented Dickey-Fuller test for unit root           Number of obs   =         35

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test            1% Critical       5% Critical      10% Critical
               Statistic             Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -4.222            -2.644            -1.950           -1.604
------------------------------------------------------------------------------

. dfuller d.blint, trend lags(1)

Augmented Dickey-Fuller test for unit root           Number of obs   =         35

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test            1% Critical       5% Critical      10% Critical
               Statistic             Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -4.125            -4.288            -3.560           -3.216
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0058

. dfuller d.blint, drift lags(1)

Augmented Dickey-Fuller test for unit root           Number of obs   =         35

                                 ------------ Z(t) has t-distribution ------------
                 Test            1% Critical       5% Critical      10% Critical
               Statistic             Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -4.192            -2.449            -1.694           -1.309
------------------------------------------------------------------------------
p-value for Z(t) = 0.0001

.
```

```
. dfuller lab, noconstant lags(1)

Augmented Dickey-Fuller test for unit root          Number of obs   =         36

                                 ------------ Interpolated Dickey-Fuller ------------
                    Test         1% Critical       5% Critical      10% Critical
                  Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)                3.870          -2.642            -1.950           -1.604
------------------------------------------------------------------------------

. dfuller lab, trend lags(1)

Augmented Dickey-Fuller test for unit root          Number of obs   =         36

                                 ------------ Interpolated Dickey-Fuller ------------
                    Test         1% Critical       5% Critical      10% Critical
                  Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)               -0.385          -4.279            -3.556           -3.214
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9873

. dfuller lab, drift lags(1)

Augmented Dickey-Fuller test for unit root          Number of obs   =         36

                                 ------------ Z(t) has t-distribution ------------
                    Test         1% Critical       5% Critical      10% Critical
                  Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)               -3.795          -2.445            -1.692           -1.308
------------------------------------------------------------------------------
p-value for Z(t) = 0.0003

. dfuller d.lab, noconstant lags(1)

Augmented Dickey-Fuller test for unit root          Number of obs   =         35

                                 ------------ Interpolated Dickey-Fuller ------------
                    Test         1% Critical       5% Critical      10% Critical
                  Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)               -0.753          -2.644            -1.950           -1.604
------------------------------------------------------------------------------

. dfuller d.lab, trend lags(1)

Augmented Dickey-Fuller test for unit root          Number of obs   =         35

                                 ------------ Interpolated Dickey-Fuller ------------
                    Test         1% Critical       5% Critical      10% Critical
                  Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)               -4.671          -4.288            -3.560           -3.216
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0008

. dfuller d.lab, drift lags(1)

Augmented Dickey-Fuller test for unit root          Number of obs   =         35

                                 ------------ Z(t) has t-distribution ------------
                    Test         1% Critical       5% Critical      10% Critical
                  Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)               -2.436          -2.449            -1.694           -1.309
------------------------------------------------------------------------------
p-value for Z(t) = 0.0103
```

Johansen tests for cointegration

Trend: constant — Number of obs = 35

Sample: 1987 - 2021 — Lags = 2

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value	1% critical value
0	56	460.86886		141.2058	124.24	133.57
1	69	484.36406	0.73883	94.2154*1	94.15	103.18
2	80	501.25697	0.61913	60.4296*5	68.52	76.07
3	89	512.38826	0.47063	38.1671	47.21	54.46
4	96	521.96924	0.42160	19.0051	29.68	35.65
5	101	528.21034	0.29997	6.5229	15.41	20.04
6	104	530.69068	0.13215	1.5622	3.76	6.65
7	105	531.47178	0.04365			

maximum rank	parms	LL	eigenvalue	max statistic	5% critical value	1% critical value
0	56	460.86886		46.9904	45.28	51.57
1	69	484.36406	0.73883	33.7858	39.37	45.10
2	80	501.25697	0.61913	22.2626	33.46	38.77
3	89	512.38826	0.47063	19.1620	27.07	32.24
4	96	521.96924	0.42160	12.4822	20.97	25.52
5	101	528.21034	0.29997	4.9607	14.07	18.63
6	104	530.69068	0.13215	1.5622	3.76	6.65
7	105	531.47178	0.04365			

	Coef.	Std. Err.	z	P>|z|	[90% Conf.	Interval]
D2_gdp						
_ce1						
L1.	-.226345	.1263245	-1.79	0.073	-.4341304	-.0185597
gdp						
LD2.	-.23955	.1979483	-1.21	0.226	-.5651459	.0860459
bbn						
LD2.	-.1137153	.0691208	-1.65	0.100	-.2274089	-.0000218
credit						
LD2.	-.0102874	.0144508	-0.71	0.477	-.0340569	.013482
blint						
LD2.	.0864389	.0549977	1.57	0.116	-.0040242	.1769021
invcap						
LD2.	-.0740947	.027153	-2.73	0.006	-.1187574	-.0294319
lab						
LD2.	.052515	.6649461	0.08	0.937	-1.041224	1.146254
_cons	.0003565	.0037588	0.09	0.924	-.0058261	.0065391

Johansen normalization restriction imposed

beta	Coef.	Std. Err.	z	P>|z|	[90% Conf.	Interval]
_ce1						
gdp						
D1.	1	.	.	.	.	.
bbn						
D1.	-.20571	.1055167	-1.95	0.051	-.3792695	-.0321505
credit						
D1.	-.1798957	.0324758	-5.54	0.000	-.2333136	-.1264778
blint						
D1.	.223565	.1140468	1.96	0.050	.0359747	.4111553
invcap						
D1.	-.1956857	.0740186	-2.64	0.008	-.3174356	-.0739359
lab						
D1.	-1.132571	1.068895	-1.06	0.289	-2.890747	.6256059
_cons	.0173805	.	.	.	.	.

Vector error-correction model

Sample: 1987 - 2021		Number of obs	= 35
		AIC	= -18.9459
Log likelihood = 384.5532		HQIC	= -18.13287
Det(Sigma_ml) = 1.15e-17		SBIC	= -16.59065

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D2_gdp	8	.022167	0.3529	14.72171	0.0648
D2_bbn	8	.07358	0.3325	13.45096	0.0972
D2_credit	8	.253474	0.7228	70.38848	0.0000
D2_blint	8	.071146	0.5604	34.42161	0.0000
D2_invcap	8	.090614	0.6932	61.017	0.0000
D2_lab	8	.004834	0.5493	32.90067	0.0001