THE IMPACT OF BANK LENDING ON ECONOMIC GROWTH IN ETHIOPIA

A Thesis Presented to Department of Economics By

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DECLARATION

I, Fikremarkos Yigrem, hereby declare that this thesis entitled: THE IMPACT OF BANK LENDING ON ECONOMIC GROWTH IN ETHIOPIA is entirely my own original work and has not been presented for higher degree at any other University or institute anywhere for the award of any academic degree, diploma or certificate. All references made to works of other persons have been duly acknowledged.

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ACRONYMOUS

PSC---------Credit to private sector

CDR--------Credit to deposit ratio

RGDP------Real Gross Domestic Product

NBE--------National Bank of Ethiopia

WB---------World Bank

IMF-------- International Monetary Fund

SSA---------Sub Saharan Africa

TO----------Trade Openness

ARDL------Autoregressive Distributed Lag Model

Lend Rate--Bank Lending Rate

PCons-------Private Consumption

Abstract

In Ethiopia, the banking sector is an important part of the financial system. However, studies on the relationship between bank lending and economic growth has not been conclusive. The purpose of this thesis is to investigate the impact of bank lending on economic growth in Ethiopia. By using Autoregressive distributed lag model, the relationship between bank lending and economic growth is investigated. Results from level ARDL model confirms that in the presence of other macroeconomic control variables, the PSC is positively and statistically significantly determining economic growth after some periods (lags) only. On the contrary, bank lending rate is found to be statistically significant in determining economic growth in the current period only. In addition, the granger causality test shows that there is bidirectional causality between bank lending and economic growth; on the contrary, no causal relationship is seen between lending rate and other variables in Ethiopia. The overall findings shows that, although the impact is to some extent depends on the bank lending indicator, the overall evidence suggested that, bank lending is contributing positively to Ethiopian economic growth. Hence, policies to encourage further development in bank lending and the integration of finance sector with other governmental institutions should be designed in improving Ethiopian economy.

Key words: ARDL, bank lending, economic growth, Data standardization and Ethiopi

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

In the process of economic development, it is thought that financial system has its own vital role through by adopting sound and stable macroeconomic policies as well as by establishing financial markets and arranging sensible directives of the financial system (Todaro et al, 2015). Of the many major functions of the financial sector, the two important functions at firm level and at the level of the economy as a whole are;

- Matching savers and investors: It is improbable that an investor saved exactly as much as was needed to finance a project. Hence, for filling this gap, it is necessary to some extent that savers and investors should agree on terms for loans or other forms of finance. For such facilitation, the presences of banks and later venture capital or stock markets are greatly needed.
- Allocating credit efficiently: so as to achieve the optimal rate of return, channeling investment funds to users is advisable (Todaro et al, 2015).

According to Okuda (1990), the financial sector mainly through mobilization of domestic savings and efficient allocation of capital could play a vital role in bringing about economic growth. Hence, in hastening the transformation of savings in to capital accumulation, the banking system plays a crucial role. And in turn, brings about economic growth. For the overall productive investment, banks through their lending activity play an important role in providing a major source of capital for financing projects in Malaysia (Vaithilingam et al, 2008).

In a modern economy, credit fuels economic activities in case the demands of the investor for finance is beyond their cash holding on hand which is the most common phenomenon in business and for the government to smooth out their investment on infrastructure projects (Karaki M., 2015). However, bank credit does not always bring about economic growth as it is affected by inflation by reducing the overall amount of credit that is available to business. Especially credit

market frictions such as government ceiling on interest rate are harsher in developing countries than the developed one. Hence, without considering the status of inflation of the country, encouraging and facilitating the access for bank credit could not be taken for granted to achieve economic growth of the country. In addition, inflation is inversely related with the profitability of banking industry (Boyd and Champ, 2006).

For economic growth and poverty reduction, providing loan at low lending rate is preferable at most. So as to improve the individuals' productivity and income, in parallel to enabling them to engage in micro-enterprises and net techniques with adequate information and knowledge, loan provision should be also facilitated at the same time. Loan is the primary channel y which the public savings are transferred in to investments. Bank lending or access to financial credits for the excluded population remains very restricted in Nigeria (Ojeaga and Omosefe 2014).

A history of modern banking started in Ethiopia on contractual basis with Anglo-Egyptian National Bank in 1905 with the establishment of Abyssinian Bank. And having gone through several reforms over almost for a century; which was highly regulated sector prior to the onset of structural reforms in 1992; especially after the fall of the derg regime in 1991; following the liberalization policy, many private commercial banks have been established (Alemayehu, 2006).Nowadays, the Ethiopian banking industry is consisting of 18 banks of which two are state owned and sixteen are private commercial banks. And as the banking sector accounts for over 80 percent of the total assets of the financial sector, it is a highly dominant one (Getinet, 2014).

In the process of economic growth, the role of bank lending plays a great role (Khan and Senhadji, 2000). Bank lending affects real GDP per worker through its role of domestic capital accumulation and efficient resource allocation (efficiency) and hence, in total factor productivity in the long run in Ethiopia (Demessie, 2012). According to Abdi (2017), on his looking over the sectorial allocation of credit on the economic growth of Ethiopia; in the long run; the bank lending affects real GDP positively and significantly. And the researcher pointed out that in the major economic sectors, the efficiency of bank lending facility play a vital role in the Ethiopian economic growth. Hence, he recommended that there is a need to enhance the role of financial sector for different economic sectors by adopting more appropriate macroeconomic policies.

However, the banking industry is still underdeveloped, and in turn, restricts economic growth as it reduces the capability of the banking industry to provide different saving products. This results in the hindrance of better bank lending to businesses and entrepreneurial development. And he found out that access to finance is a major developmental constraint for small and medium sized businesses (Keatinge, 2014). In this regard, this research will investigate the effects of bank lending on economic growth of Ethiopia and the causalities between them empirically for the ultimate objective of giving an important insight to different policy makers of the country.

1.2 Statement of the problem

So as to accelerate economic growth and promote economic development, it is vital to encourage efficient investment and widespread entrepreneurship (Todaro and Smith, 2015). As to Schumpeter (1934), who is one of the pioneers in the theory of financial development and economic growth, it is due to the innovation of new products and improving or replacing the old ones that leads to economic growth. For the ongoing of such activities, an entrepreneur requires technical knowledge and banking credit to purchase goods that enables him to conduct experiments, research and development and in return innovation and ultimately achieving economic growth.

In line with Schumpeter (1934), other researches like Korkmaz (2015), Hashim and Mamman (2015), Vaithilingam, Guru, Shanmugam (2015) and (Desta,2018), have also emphasized the non-availability of adequate finance is the reason for not achieving economic growth at the expected level, by recognizing that the banking sector is the major contributor for economic growth. In this regard, according to Okuda (1990), financial sector has two main roles in the growth of an economy, namely, efficient allocation of capital and in the mobilization of local savings. Thus, in facilitating the transformation of savings in to capital accumulation, banking system plays a vital role which is one of the key drivers of economic growth. In the same token, monetary economists also stress that banks play a critical role in the growth of an economy being a means for source of fund for productive investment through its bank lending (Vaithilingam, Guru, Shanmugam, 2003).

On the contrary, other studies like Al Karaki (2015), Mulu (2012), Mekonnen, (2018), shows that bank lending has no significant contribution for the growth of the economy rather it is derived

by the growth of the economy which is supporting the demand following hypothesis. In other words, it is the growth of the economy that drives the finance sector to its level.

The other boiling issue regarding the correlation between growth of the economy and financial sector development is the ambiguity of the direction of causation. Although there is a positive a relationship between financial sector development and the growth of the economy, it is impossible to determine the direction of causation among them as a standard (Patrick, 1966). Also McKinnon (1988) questioned which the cause is and which is the effect though he believed that real growth is associated with a higher rate of financial growth. In other words, does finance follows growth in the real sector which is generated elsewhere, or is it a leading factor in economic development? Thus, the causality between the growth of the economy and financial development is, too much non-conclusive issue unless it is resolved by using empirical evidence.

The studies yet not demonstrate precise relationship between economic growth and bank lending. Specially, the researches which are done very recently in the same graduating year such as (Mekonnen, 2018) and (Desta, 2018) are showing contradicting findings, their relationship is context and data period-covered dependent and even depend on the nature of variables used in the assessment. In our country-Ethiopia, a few but inconsistent conclusions has been found; some are concluding that bank lending has no any contribution to economic growth and the direction of their causality runs from the growth of GDP to bank lending and on the contrary, others are concluding on the reverse. And in turn, the policy makers would face challenges in policy initiating and implementing regarding economic growth and bank lending. Thus, this study will further investigate the relationship between bank lending and economic growth having taking the lending rates (interest rate) in to consideration.

1.3 Objective of the Study

The general objective of this study is:

- To investigate the contribution of bank loan to economic growth in Ethiopia.

The Specific objectives are:-

- To examine the impact of bank lending rate (interest rate) offered by Commercial banks on economic growth in Ethiopia.
- To examine the impact of bank lending (Bank Credit) offered by Commercial banks on economic growth in Ethiopia.
- To examine the causality relationship between bank lending and economic growth in Ethiopia.

1.4 Research Hypothesis

Up on the overall objectives of the study, the researcher developed the following 3 testable hypothesis:

- Ho: Commercial banks loan has no a relationship with economic growth in Ethiopia
- Ho: Bank lending rate of Commercial bank has no an impact on economic growth in Ethiopia
- Ho: There is no causality relationship between bank lending and economic growth in Ethiopia

1.5 The scope and limitation of the study

This research has covered all commercial banks in Ethiopia licensed by NBE as at June, 2020 for the period covering from 1990 up to 2019.The limitation of the study is considering its lending amount only without considering its correlation with the productive sectors.

1.6 Significance of the study

As one of the main intermediation role of banking system, it facilitates channeling of funds from non-productive players to productive activities of the economy.However, though many studies have been done on the relationship and causality of direction between bank lending and economic growth, yet the findings are different and could not be conclusive with regard to whether economic growth drives bank lending or vice versa. Thus, this study will contribute its part in clarifying some ambiguities on the issue and give additional insights to policy makers and different stake holders which part to get due emphasis first and then the subsequent. By doing so, the study will put some conclusive and relevant policy recommendations to facilitate and foster sustainable growth of the financial sector in case it is a precondition for spurring economic growth.

1.7 Organization of the Study

The paper is structured as follows: The first chapter presents an introduction to the study. The second chapter reviews the theoretical and empirical literature review. The third chapter provides the empirical model, and discusses how various hypotheses are tested. The fourth chapter discusses and analyses the models. The fifth chapter concludes and recommend the paper. Having provided an organization for this article, we proceed to the literature review.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter focus on reviewing the theoretical and empirical literature on key concepts, theories and empirical analysis of bank lending rate and bank lending to private sector. The nature of lending rate and bank lending to private sectors is an issue as various conflicting theories have been developed by different schools of thought over the years to provide explanation for the relationship. Some of the theories important to this study are the Wicksellian theory of economic growth, Endogenous growth theory, Loanable fund view and Economic growth theory.

2.2 Theoretical Literature Review

Since a much earlier time, the issue of the direction of causality between financial development and the growth of economy is still inconclusive as some scholars believed that the development of the financial system is the means for the growth of a country's economy. On the contrary, others believed that economic growth leads to financial development.

According to Schumpeter (1911) as cited in Awdeh (2012), for the growth of a country's economy, there should be an efficient financial system. As one of the financial sector, banks by providing finance to entrepreneurs who implement innovative products and production process successfully, would ultimately contribute to a large extent for technological innovation and as a result stimulating the economy to grow in the future. However, as to Robinson (1952), it is the growth of the economy that brings about financial development by creating a demand for financial instruments.

2.2.1 Endogenous Growth Theory

In the late 1980s, this theory suggested the relationship between financial sector developments and economic growth which explained their nexus in such a way that economic growth is influenced by the financial development through increasing the productivity of investments, by reducing transaction costs and thus by increasing the share of savings channelled as well as by promoting or declining savings (Pagano, 1993).

A country's economic growth could reach to its peak through a more efficient financial sector by channeling a country's scarce resources to their most productive use. In other words, it could be enhanced by channeling funds to the most profitable investments they identify and by an advanced financial system which could increase the efficiency of financing decisions and favoring a better allocation of resources. Hence, banks as one of the financial sector, through its intermediation role would play a crucial role in bridging savings and investments (Levine, 2000).

2.2.2 Direction of causality between finance and economic growth

The potential directions of causality between financial sector development and economic growth are known as supply leading, demand following and feedback hypothesis. The supply leading hypothesis assumes that the direction of causality relationship run from financial sector development to economic growth. In other words, the supply of financial services could be raised by instituting financial institutions and markets and all these lead to the growth of the economy. Banks through their intermediation role, by transferring scarce resources from surplus units to deficit one, an efficient allocation of resources could be implemented and directs other economic sectors in to growth process also (Awdeh, 2012).

In contrast to the above hypothesis, demand following hypothesis suggests that the direction of causality believed to be in the opposite direction to the supply-leading one i.e from economic growth to financial development. It states that high economic growth creates demand for financial instruments and arrangements and in turn, the financial markets respond to these demands. This

view is almost similar to that of Robinson's view which states that enterprises lead and finance follows.

The last but not the least, the 3rd hypothesis in this regard is that of Patrick (1966) feedback hypothesis which proposes a two-way causal relationship between economic growth and financial development. A well-developed financial system would bring about high economic growth through technological changes, product and service innovations. This in turn, creates high demand for financial arrangements and instruments. As financial intermediaries respond to these demands, these changes will stimulate a higher economic growth. Therefore, both financial development and economic growth are positively interdependent (Luintel and Khan, 1999).

2.2.3 Wicksellian Theory of Economic Growth

In the Wicksellian model, the natural rate of interest is the reference point for the central bank's interest rate policy: when the interest rate is set below the natural rate, output and inflation rise and vice versa. Maintenance of a stable inflation equilibrium requires the central bank to adjust interest rate towards its natural level overtime.

For an entrepreneur to be profitable and purchase capital goods if the rate of interest of borrowing money is below the natural rate of return on capital. This would lead to increased demand for all types of resources and in turn, their prices. Conversely, if the rate of interest of borrowing money was above the natural rate of return on capital, entrepreneurs would not be profitable rather would sell capital goods and hold money.

This would lead to a higher demand for money and in turn the rise of cost of borrowing. Wicksell connected interest rate with the production gap. This production gap represented the variance between ought to be produced and what is produced.

This theory is important to this study since it gives an insight on a direct connection between the demand for and the cost of money and output in a country. It shows how interest rate affects borrowing, which in turn affect the purchase of capital goods and how production is affected. If interest rate is higher than the natural rate of return, borrowing will reduce. Therefore, the low

investment would ultimately influence the growth of the economy. On the contrary, if the rate of interest is lower than the natural rate of return, then more borrowing will take place and this will spur economic growth through more investment (Weise, 2007).

Wicksell regarded a well-functioning credit system as a precondition for the smooth functioning of an economy. The primary task of the credit system is to mediate exchange. The increase in reserves in the banking sector due to the rise in the quantity of money would compel banks to increase the disbursement of loans by lowering the interest rate. As a consequence of this, the market interest rate becomes lower than the level of natural (real) interest rate which is determined by the marginal productivity of capital. This encourages businessmen/women to borrow more, at the same time the demand for investment goods rises. Therefore, the increase in bank credit would facilitate the growth of the overall demand.

2.2.4 The impact of bank credit on economic growth

Since the 19th century, for the mobilization of savings, identifying good investment opportunities and applying solid corporate control, among the financial sectors, banking system plays a vital role especially during early stages of development and in weak institutional environment. That is why I am interested in this research as our country's situation almost featured like this. Among many theoretical insights about the comparative advantages of different financial systems by economists, banks contribute a vital role for the economy in i) acquiring information about firms and managers and thereby improving capital allocation and corporate governance. ii) Managing cross-sectional, inter temporal and liquidity risk and thereby enhancing investment efficiency and economic growth and iii) mobilizing capital to exploit economies of scale.

However, on the contrary, others give due attention for the advantages of markets in allocating capital, providing risk management tools and mitigating the problems associated with excessively powerful banks. Market-based view stands against the bank-based view which stressed that it's a well-functioning market which enhance the growth of the economy through fostering greater incentives to research firms since it is easier to profit from this information by trading in big, liquid

markets, enhanced corporate governance by easing takeovers and making it easier to tie managerial compensation to firm performance and facilitating risk management (Levine, 2000).

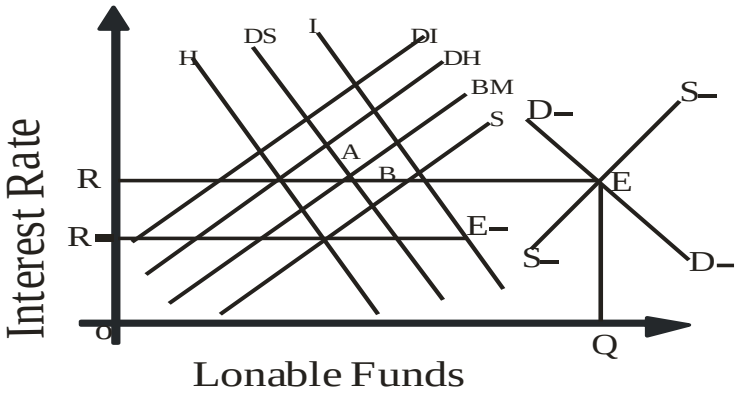
The proponents of this view argue that; large banks tend to encourage firms to undertake very conservative projects and extract large rents from firms leaving them with low profits and negligible incentive to engage in new and innovative products and shareholders have little oversight over bank managers who control not only banks but also, indirectly through financing the firms (Khan and Semlali, 2000). By the same taken, Adams (1819) hypothesized that banks harm the morality, tranquility and even wealth of nations.

2.2.5 Loanable fund view

Loanable fund is simply defined as a financial asset that is provided by financial institutions such as banks for lending to finance either productive or consumptive investment. According to loanable fund view, it is by equating the demand and supply of loanable fund or lending that enable to determine interest rate. In other words, interest is defined as the price of credit determined by the supply and demand of loanable fund. However, interest rate is not only determined by thriftiness, waiting, time preference and productiveness of capital but also by the monetary force such as hoarding and dishoarding of money, money created by banks play a crucial role in the determination of interest rate.

The tendency of borrowers and savers to borrow and save seems to contradictory up on the status of the rate of interest rate. That is when the rate of interest is low, borrowers motivated to borrow and vice versa. Thus, the intersection of the supply and demand for loanable fund curve determines the interest rate as illustrated in the graph below. From the above figure, the combination of DI, DH, BM and S curves result in S2 (Supply of loanable funds) with upward sloping to the right and these curves represents factors which determine the supply of loanable funds as explained earlier. And H1, DS and I are results in DL(demand for loanable fund) and they are factors that determine the demand for loanable fund with downward sloping to the right.

To show in a simplified way, the equilibrium interest rate can be equated by considering their net saving(Saving-Dissaving), net hoarding (hoarding-dishoarding) and net investment (investment-disinvestment).



S+DH+DI+BM=DS+H+I

(S-DS)+BM= (H-DH)+(I-DI)

Net saving + BM= Net investment + Net hoarding

As shown from the above equation, the supply of net saving and bank money would be equal to the demand for net investment and net hoarding.

2.2.6 Profitability and GDP

It is through banks and other financial institutions that financial market could work efficiently by channeling funds from people who save to people who have productive investment opportunities. Thus, they also have an important effect on the performance of the economy as a whole. Their involvement in the huge mobilization of funds in turn affects business profit, production of goods and services (S.Mishkin, 7thEd, 2004). It is this profit subject to internal and external influences of a business entity that motivates them for doing business.

Profitable banks are able to attract capital investment easily and at a lower cost, whereas less profitable banks find it difficult to attract capital investment; and when they do, it is a prohibitive cost. Therefore, certainly has significant effect on the ease and cost of raising capital (Rumler and Wasahiczek, 2010).

The importance of having a profitable banking system can't be overemphasized. One important role that banks play is in transforming savings in to investment for sustainable economic growth and development. Therefore, developments in the banking sector are not only of concern to the banks alone but to the whole economy. Efficient and profitable banks are able to catalyze economic activities and development better than non-profitable ones. Also, banks serve as financial intermediaries by taking deposits from the surplus side of the economy and transforming them in to credits for the deficit side (African Research Review)

2.3 Empirical Literature Review

A research had been conducted to investigate the correlation among economic growth, external and domestic debt in Nigeria by Umaru, Hamidu and Musa (2006). They used Ordinary Least Square analysis to establish correlation among variables having taken time series data for the period covering from 1970 to 2010. In addition, for data analysis different techniques had been applied such as Augmented Dickey Fuller technique in testing the unit root property of the series and Granger causality test to know the direction of causality between GDP, external and domestic debt.

Thus, the finding showed that there was bidirectional causality between domestic debt and GDP. On the contrary, the OLS analysis revealed a negative relationship between external debt and economic growth and a positive relationship between domestic debt and economic growth. Finally, the study concluded that economic growth could not be achieved either by domestic or external debt.

With the objective of examining the impact of the development in public domestic debt on the economy of Kenya; a research had been conducted by Maana, Owino and Mutai (2008) by taking the time series data for the period covering from 1996 to 2007. This study scrutinized the correlation between macroeconomic variables and economic growth by using the King and Levine's (1993) version of the Barro growth regression model.

In this research, the macroeconomic variables are lagged real GDP growth, ratio to GDP of government expenditure, private sector credit, broad money supply, secondary school enrolment and trade. The ratio of GDP to credit to private sector and broad money supply were used as a measure of financial development. The finding stated that domestic debt expansion had a positive but insignificant impact on economic growth during the above stated periods. Thus, the study had concluded that economic growth of the country was not stimulated by domestic debt.

Almost in the same scenario, a research had been conducted to investigate the correlation between financial intermediation by banks and economic growth by (Marijana, 2009) for the period covering from 1989 to 2009. This empirical research paid special attention to the issues such as the direction of causality, non-linearity, time perspective, financial intermediation proxies and interaction terms. As per the review, the correlation between economic growth and financial intermediation could not be taken for granted.

With the objective of investigating the correlation between economic growth and financial development in China, a research had been conducted by (Zhang and Wang, 2012)for the period covering from 2001 to 2006.The research used both traditional cross sectional regression and first differenced and GMM estimators for dynamic panel data. The findings of this study proposed that most traditional indicators of financial development like deposit, savings, credit, the share of fixed asset investment financed by domestic loans relative to that financed by state budgetary appropriation positively related to economic growth. On the contrary, economic growth was negatively affected by the ratio of corporate deposit to total deposit. The overall finding of the research showed that economic growth had a positive correlation with credit.

A research had been conducted to investigate the contribution of commercial banking sector for economic growth of Pakistan by (Aurang, 2012) having taken a sample of 10 banks for the period covering from 1981 to 2010. For data analysis purpose; Augmented Dickey Fuller (ADF) test, Philip Perron Unit root test, OLS and Granger causality test had been applied.

Being regressed; the result showed that economic growth of the country was significantly and positively affected by deposit, investment, advances, profitability and interest earnings. At the same time, the direction of causality tested showed bidirectional causality between profitability,

deposit, advances and economic growth. The overall finding of the research concluded that the activities of commercial banks affected economic growth of the country.

A research which was focused on the investigation of the relationship between financial development, economic growth and poverty in Kenya had been conducted by (Waiyaki, 2013) for the period covering from 1997 to 2010. For the purpose of data analysis; different testing techniques such as Granger causality test, unit root test and co-integration test had been. In one hand; money supply and bank deposit had affected economic growth of the country significantly. On the other hand, economic growth was not affected by financial indicators like stock volume. The overall result showed that economic growth of the country had been affected by money supply and bank deposits positively.

With the objective of examining the long run relationship between financial development indicators and economic growth; a research was conducted by (Abubakar and Gani, 2013) for the period covering from 1970 to 2010. Some of the financial development indicators used by the researcher were credit to private sector, government expenditure, interest rate and liquid liabilities of commercial banks. They also applied different testing techniques such as Co integration test (Johansen and Juselius, 1990) approach, vector error correlation modeling (VECM).

The overall finding showed that in the long run, economic growth of the country was highly and positively affected by liquid liabilities of commercial banks. On the contrary, it was negatively but significantly affected by interest rate, credit to private sector and government expenditure.

A research which had focused on examining the long run impact of bank credit on economic growth of Ethiopia had been conducted by (Murty, Sailaja, and Demessie, 2012) by using time series data for the period covering from 1971/72 to 2010/11. The two financial indicators used by the researcher were bank credit to the private sector and deposit liabilities of banks to GDP ratio. For the purpose of data analysis, unit root test for stationarity test, co integration test for stationarity among non-stationarity variables, trace test statistics and maximum Eigen value test had been applied. Thus, the study concluded that economic growth of Ethiopia was affected by bank credit to private sector through its role in efficient allocation of resources and domestic capital accumulation.

With the objective of examining the effect of the role of banking sector on capital accumulation and economic growth of Ethiopia, a research had been conducted by Mekonnen (2018) by using time series data for the period covering from 1981 to 2016. For the purpose of data analysis, the researcher applied different testing techniques such as Augmneted Dickey-Fuller test (ADF) and Phillips and Perron (PP) test for assuring either stationarity or non-stationarity of the data, Engle-Granger approach and Johansen's co-integration procedure for co-integration analysis and Granger causality test to identify the direction of causality between the role of banking sector, capital accumulation and economic growth.

The findings of the research showed that, in the short run, both economic growth and capital accumulation was affected by deposit significantly and positively; whereas credit has only significant effect on short-run capital accumulation. On the contrary, either in the short run or long run banking sector credit had no significant impact on economic growth. At the same time, the analysis made to determine the direction of causality showed the existence of bidirectional causality between deposit and economic growth, while there was a unidirectional causality running from economic growth to banking credit.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Design

This chapter set out the method of analysis to be employed in the course of this study by applying econometric model and regression analysis as a method and technical tool to test relationship between two or more variables. A quantitative approach found to be best fit and competent for this study as it is a way a researcher capable of developing knowledge such as cause and effect thinking, reduction to specific variables and use of measurements and test of theories, applies strategies of inquiry like experiments and collect data on predetermined instruments that yield statistical data (Creswell, 2002).Hence, for such reasons quantitative data will be collected for the period covering from 1992 to 2020.

3.2 Data Types, Sources and Methods of Collection

In this chapter, the researcher identified the techniques and procedures that would be applied in the collection, processing and analysis of the data. An econometric model will be applied to examine the relationship among economic growth, bank lending rate and bank lending. The researcher will use quarterly time series data for the period of thirty years covering from 1990Q1 to 2019Q4 in Ethiopia.

This time series datasets was collected from National Bank of Ethiopia (NBE). These dataset contain the information on prices, monetary variables, fiscal variables, external economic variables and other variables that cover over the period of 1990Q1 to 2019Q4. The main advantage of these datasets is on their abilities to make generalization because of the long periods of temporal ordering and inclusion of the numbers of variables. In this study, only important variables were used. There is no missing observation and again, the total observation used in this study for all variables is 120.

3.3 Method of Data Analysis

The aim of this study is to investigate the effect of banking loan development on economic growth in Ethiopia. We focused on RGDP as an outcome. A natural starting point would be to estimate a model in which the outcome of interest is assumed to depend on expected factors (banking loan development indicators such as CDR, PSC, or Lend rate after controlling for other variables such as PCons, and TO using Autoregressive distributed lag model. One of the key problem in interpreting such estimates, ignoring the time series nature of data is that, the data on most macroeconomic variables are unstable (non-stationary), and observation may be correlated over time. The order of integration may not be the same as well. Such problems may create serial correlation which leads to spurious or inconsistent estimate (Greene, W. H. 2000). To take into account such effects, the statistical properties of time series data should be examined first and then appropriate model should be used. For this reason, we examined possible indication of non-stationarity of variables using Augmented Dickey Fuller (ADF) test.

Another key problem is comparing observation with different units. Comparing observation of different units may overestimate or underestimate the parameters. Data standardization removes any units from the data (e.g. litters or tones). To ensure that internal data is consistent; each data type needs to have the same content, the same format which we call data standardization. This makes the data easier to track and analyse and to compare. Data is standardized by subtracting mean from each observation and dividing by their standard deviations. The mean of standardized data is 0 and the standard deviation is 1 (Michal and Daniel, 2019). Hence, in this study all variables were standardized and used in the ARDL model estimation.

Another key problem is that the variables such as CDR, PSC, and Lend rate may take some years to affect the economy. Their effect may not immediate and distributed over some years (Mankiw, 2007). A dynamic single model such as ARDL model is recommended to overcome such problem (Nkoro and Kelvin, 2016). The level ARDL model is estimated using maximum likelihood function as specified in equation 1 above after Peseran, Shin, and Smith(2001) bound test confirmed the long run co-integration.

3.3.1 Stationarity Test

Stationarity of a time series is an important phenomenon because it can influence the behavior of the series unless it is detected with standard tests (unit root tests) and properly handled. In nonstationary series, the effect of a shock never dies away and it leads to spurious regressions (That is one can regress completely unrelated series then find inflated t-ratio which suggests whether a coefficient of one variable is significant or not to explain the other and high R2 which indicates how good one term is at predicting another) and forged results of standard tests. In order to ensure the condition of stationarity, a series must to be integrated of order of zero (I (0)).

3.3.1.1 Visual Inspection

The opening step in the analysis of time series is usually to plot the data and obtain simple descriptive measures of the main property of the series via a visual inspection of the time series plot. This may reveal one or more of the following characteristics: seasonality, trends either in the mean level or the variance of the series, long- term cycles, and so on. If any such patterns are present, then these are signs of non-stationarity.

3.3.1.2 Unit-Root Test

The development of unit root theory, initially proposed by Dickey and Fuller (1979, 1981), has spawned a generation of unit root research. Unit root theory is the cornerstone to the methodology used for testing the stationarity or non-stationarity of a time series. Nowadays, many of the procedures are standard offerings in econometric software packages like Eviews 7, and they have become routine tools for time series analysts. This study applied the most commonly used and unarguably powerful unit root tests: Augmented Dickey- Fuller (ADF) test due to Dickey and Fuller (1979, 1981), and the Phillip-Perron (PP) test due to Phillips (1986) and Phillips and Perron (1988). The hypothesis used to test unit root for these tests stated as follows.

H_0 = there is unit root (non-stationary)
H_1 = there is no unit root (stationary)

The null hypothesis is rejected if the p-values of the respective test statistics is less than or equals to 5 percent. If the time series data is not stationary at level the researcher makes it stationary by

differencing up to second order, but if it is not stationary up to second order, the time series data is not economically reasonable it is better to revise the data. However, if the non-stationarity is due to the existence of trend, it can be stationary by trending (including time) the time series data (Gujarati, 2004).

3.3.1.3 ARDL Bounds Testing Approach

Once the issue of unit root test has been accomplished, the cointegration test would be applied subsequently with the aim of ensuring whether or not there exists a long run relationship among the variables (Guajarati, 2004). In this regard, the null hypothesis postulates that there is no level relationship; on the contrary, the alternative hypothesis postulates that there exists a level relationship among the variables in the long run.

By comparing the calculated F-test statistic with the lower and upper bounds, the relationship among the variables would be decided. For example, when the calculated F-test value found to be less than the lower critical bound, it infers that the null hypothesis of no relationship would not be rejected. On the contrary, the calculated F-test value found to be above the upper critical bound, it deduces that the alternative hypothesis of there exists a level relationship would not be rejected. In case, whenever the calculated F-test values found in between the lower and upper critical bounds, it infers that the test is found to be inconclusive (Pesaran, Shin & Smith,2001).

3.3.1.4 Granger Causality Test

In econometric analysis, usually the Granger causality test is applied with the objective of knowing the directional relationship among variables which has significant impact in policy analysis. Here, in this case, in order to determine the causal relationship, if any, between bank lending and economic growth, the above stated test would be applied. This test would result in three different possibilities namely; unidirectional, bidirectional and lastly but not the least, there might not be any relationship among two variables (Shanmugam et al, 2008).

3.3.4 ARDL Model Estimation

Following the general approach in the literature, this study applies econometric techniques to examine the relationship between Bank lending and economic growth. In this paper , the researcher has used an autoregressive distributed lag (ARDL) bound testing approach attributed to Pesaran (2001) in order to test the existence of long run relationship between the dependent variable, RGDP Growth and the set of independent variables. It has several advantages in comparison with other cointegration methods such as Engle and Granger (1987) and Johansen and Juselius (1990) procedures. The ARDL test is relatively more efficient in the case of small and finite sample data sizes while the Johansen cointegration techniques require large data samples for validity.The major advantage of this approach lies in its identification of the co-integrating vectors where there are multiple co-integrating vectors.

The ARDL methodology yields estimates and valid t-statistics, even in the presence of autocorrelation and endogeneity (Harris and Sollis, 2003). Moreover, the Error Correction Model (ECM) can be derived from ARDL model through a simple linear transformation, which integrates short run adjustments with long run equilibrium without losing long run information.

Considering above advantage of ARDL approaches to co integration, the ARDL was formulated in such general form as follows to test the long run co integration between RGDP and selected independent variables.

$$\Delta RGDP_t = \alpha_0 + \sum_{i=1}^{p} \beta_i (RGDP)_{t-i} + \sum_{i=1}^{p} \delta_i (PSC)_{t-i} + \sum_{i=1}^{p} \theta_i (Lendrate)_{t-i} + \sum_{i=1}^{p} \gamma_i (CDR)_{t-i}$$
$$+ \sum_{i=1}^{p} \vartheta_i (Pcons)_{t-i} + \sum_{i=1}^{p} \varphi_i (TO)_{t-i} + \lambda_1 RGDP_{t-1} + \lambda_2 PSC_{t-1}$$
$$+ \lambda_3 Lendrate_{t-1} + \lambda_4 CRD_{t-1} + \lambda_5 Pcons_{t-1} + \lambda_6 TO_{t-1} + v_t$$

Where $\beta, \delta, \theta, \vartheta, \gamma$ and φ characterize the coefficient of the short run dynamics of the model whereas $\lambda_1, \lambda_2, \lambda_3, \lambda_4, \lambda_5$ and λ_6, coefficients show the long run relationship. In order to test the presence of long run relationship between the underlying variables, the above equations is

estimated using the familiar F or Wald test. The null hypothesis for test of long run co integration is stated as follows

Ho: $\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_4 = \lambda_5 = \lambda_6 = 0$

H_1: $\lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_4 = \lambda_5 = \lambda_6 \neq 0$

The null hypothesis indicates to nonexistence of long-run relationship while the alternative indicates to existence of long-run relationship. The calculated F-statistics value is compared with two sets of critical values given by Narayan (2004) or Pesaran et al (2001) for the given level of significance, for small samples size from 30-80. One set assumes that all the variables are I(0) referred to as lower bound and other set assumes that they are all I(1) referred to as upper bound. If the calculated F-statistics exceeds the upper critical value, then null hypothesis of no co-integration would be rejected irrespectively of whether the variable is I (0) or I (1) which implies that there exists the co-integration.

If the F-statistic lies below the lower critical bounds values, then null hypothesis of no cointegration cannot be rejected irrespectively of whether the variable is I(0) or I(1), it means no co-integration. If the F-statistic falls in between the two critical bounds, the test becomes inconclusive. At this stage of estimation process, the researchers may have to carry out the unit root tests on variables entered into the model (Pesaran and Pesaran 1993). To check the performance as well as the true dynamics of the estimated model, I used Akaike Information Criteria (AIC) because of its advantage for small sample size for an optimal lag length of variables.

3.5 Description of Study Variables

3.5.1. The Dependent/Outcome Variable

i. Real Gross Domestic Product (GDP)

The real gross domestic product (RGDP) measure of domestic economy adjusted to inflation. The Real Gross Domestic Product (GDP), which is a measure of a national economic performance or economic growth in this instance measured as the percentage change in real GDP per quarter, is used as a dependent variable.

3.5.2. The Independent Variable

In the study the indicators of banking loan development variables such as PSC, Lend rate and CDR are used as core independent variables, where as PCons and TO are used as other control variables.

i. Ratio of Credit To Private Sector (PSC) to GDP

The ratio of bank credit to private sector (PSC) to GDP refers the financial resources provided to the private sector by bank, through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment and in this case, it's measured by taking the growth rate of the ratio of Bank credit (Bank lending) to private sector to RGDP. This measure isolates the impact of the banking loan and represents the financial depth (Saci et al., 2009; Adusei, 2013). It is expected to affect the economic growth positively.

ii. Total Credit To Deposit Ratio (CDR)

Total credit to deposit ratio (CDR), measure the financial health or bank's liquidity, indicates how much of banks core funds are being used for lending which is the main banking activity. A higher CDR indicates that the loans disbursed are more than the deposits. This variable is also expected to have moderately positive effect after some threshold on economic growth.

iii. Bank Lending Rate (Lend Rate)

The lending rate is another banking loan development indicator which is measured by taking the average of the minimum and maximum market lending rate of commercial banks. Bank lending rates offered by Commercial Banks has an impact on the availability of affordable funding for investment and consumption and as a result determining the overall rate of the growth of the economy. It is believed that as the lending rates are going up, the interest of the people for borrowing would go down. Hence, increase in lending rate could deter investment and then deter

the income and it is expected to affect economic growth negatively. These three indicators are commonly referred and used in the literature (Levine, 1997; Biplab and Inder, 2018).

iv. Trade Openness(TO):

Trade openness is the sum of import and export divided by GDP. This measures the level of country's openness to international trade and expected to affect economic growth either positively or negatively (Sabina S and Eldin M, 2018).

i. Private Consumption (PCons):

Private consumption, which measures consumer spending on goods and services, is another important control variable in determining economic growth (Kimberly A, 2020).

CHAPTER FOUR

RESULT AND DISCUSSION

4.1 Descriptive Statistics Result

Under this section, we present results and discussions. First, data were explored using summary, trends and ADF test statistics and, then ARDL models were estimated using likelihood estimation techniques, and finally the estimated coefficients were discussed.

4.1.1 Summary and Trends of Variables

Table 1: Summary of Variable Used:

Variable	Obs (in quarter of years)	Mean	Std. Dev.	Min	Max
RGDP	116	7.3%	4.8%	-3.0%	13.2%
PSC	116	24.6%	20.1%	-14.4%	93.8%
Lend Rate	116	12.0%	2.0%	6.8%	15.5%
CDR	116	3.3%	13.6%	-21.0%	54.9%
P cons	116	22.0%	24.2%	-28.9%	96.6%
TO	116	3.0%	2.5%	0.2%	7.5%

Note: * The Variables RGDP indicates the growth rates of Real Gross Domestic Product, PSC indicates the growth rates of bank credit to private sector, Lend Rate indicates bank lending rate, CDR indicates percentage of credit to deposit ratio, P cons indicates Private consumption, TO indicates trade openness.

Figures 1 depicts the recent trends of some of the variables such as RGDP, PSC, Lend Rate, and CDR starting from 2008Q1 to 2019Q4. It shows the percentage growth rates of RGDP, percentage growth rates of PSC, percentage rates of Lend Rate, and percentage growth rates of CDR. GDP is growing by 7.3 over the period of 1990 to 2019 with a minimum of -3% and a maximum of 13.2. There is positive trends in PSC as well, its average growth rates over the period 1990 to 2019 is 24% with a minimum of -14% and a maximum of 94%. Another variable is CDR. The slight

decreases in the CDR shows the improvements in deposit compared to credit and the on the other hand the slight increase in CDR shows the improvement in credit compared to deposit. On average the CDR growth over the period 1991 to 2019 is 3.3% (Table 1). This positive average value indicates the existence of positive improvement in CDR which may have positive impact on RGDP. The trends of Lending rate seems not much varying over the study period (Figure 2), while its average over the period of 1990 to 2019 is 12%, its minimum is 6.8% and maximum is 15.5%. In general, there is less clear visualization of the importance of the above mentioned variables for the growth of RGDP from both figure and summary description which can be further tested and found out in econometric model.

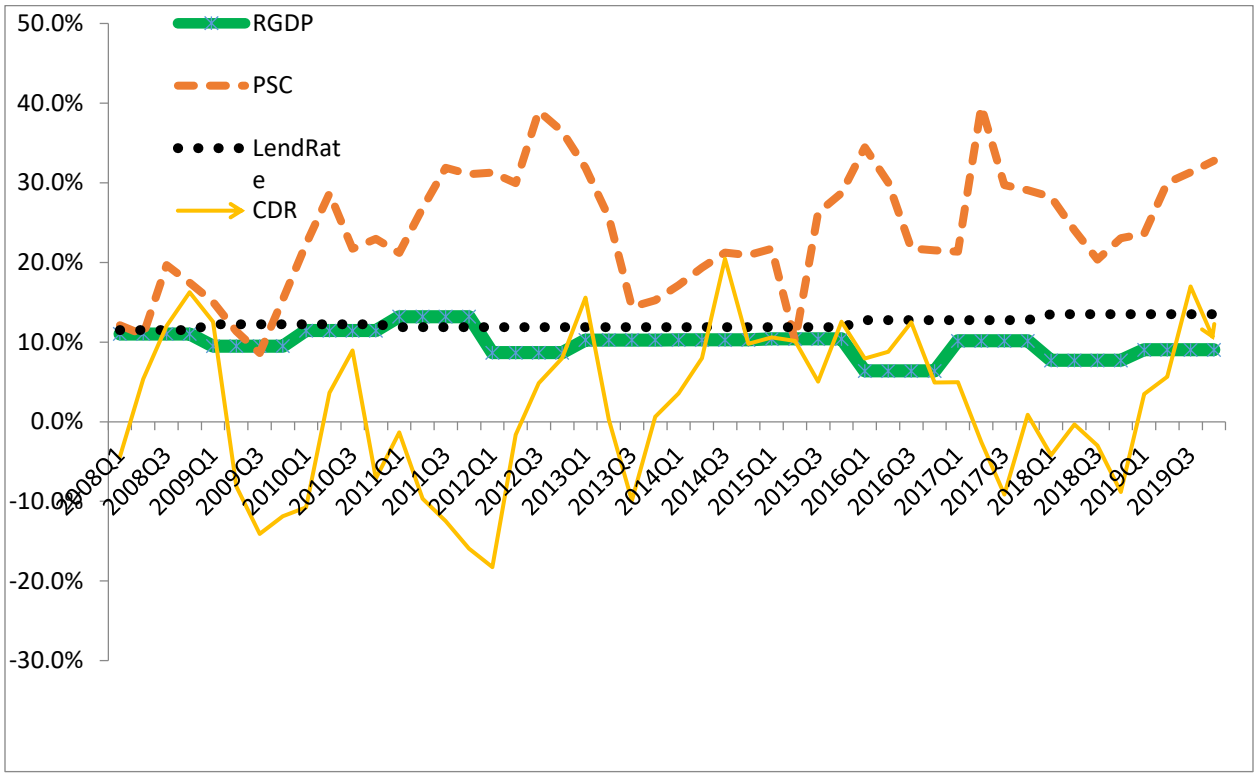


Figure 1: Trends of Some Important Variables

4.2 Econometrics Model Result

4.2.1 Results of stationarity tests

4.2.1.1 Visual Inspection

Regardless of which technique is used, the first step in any time series analysis is to plot the observed values against time on the graph. A number of qualitative aspects are noticeable as you visually inspect the graph. The pattern of the time series plot in below figure does not show any systematic upward and downward change about the mean. This indicates that the series are generally stationary. However it should be strongly noticed that only graph inspections are not enough to certainly conclude the series are seasonal and patterned. In addition to visual inspection the standard tests for stationarity was also used for the testing stationarity.

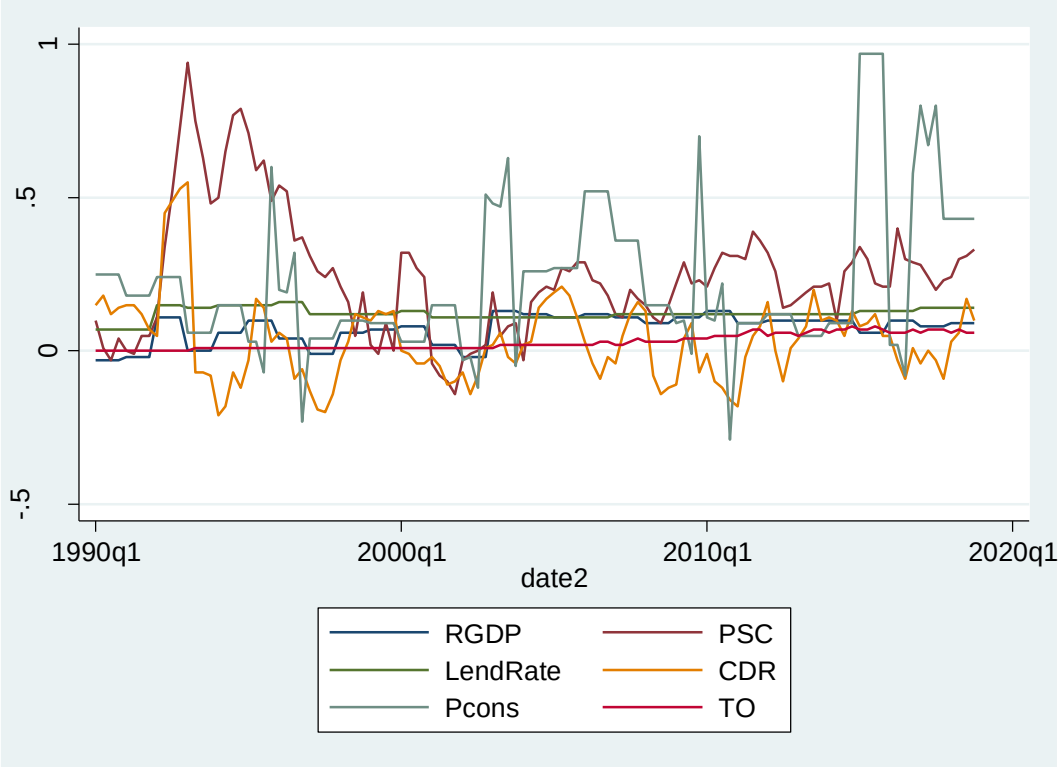


Figure 2: Trends of the variables visualized graphically

4.2.1.2 Unit Root Test Result

Table 2 explores the first steps to identify and to describe the underlying characteristics of observations over time; and whether the means are constant and variances are only dependent on the time lag. We used ADF and PP test at level with intercept and again differenced variables with intercept to show whether such principles hold. The test shows that some variables are stationary at level or in other words some variables are integrating of order 0 or I(0). It means that, these variables have constant mean, and the variances only depend on the time lag without making any transformation only for some variables. The CDR was stationary without differencing at 5 percent significance level. Other variables are found to be stationary after first difference is applied with intercept, hence, I (1). Therefore, according to this test result, the order of integration is a mixture of I(0) and I (1).

Hence, we can use these variables in ARDL regression model by selecting optimum lag length for the econometric model. After stationarity of the variables were tested, some variables were found non-stationary as mentioned above. To find out whether none stationary series have long run common trend, Pesaran, Shin, and Smith (2001) bounds test were applied in each models. The result shows that, based on F-test, there is level relationship among non-stationary variables (Table 4) which provided us a confidence to make about long run inference.

Table 2: Augmented Dickey-Fuller tests for unit roots

Variables	t-ADF	Lags	Variable	t-ADF	Lags
RGDP	3.05	0	ΔRGDP	-12.67***	0
PSC	3.5	0	ΔPSC	-10.9***	0
Lend rate	-2.81*	0	ΔLend rate	-10.8***	0
CDR	-3.28*	0	ΔCDR	-10.9***	0
TO	-0.67	0	ΔTO	-14.73***	0
PCons	7.4	0	ΔPCons	-7.76***	0

Note: * indicates significance at 10%, ** indicates significance at 5% and *** at 1%
Source: Model result based on secondary data.

Table 3: Phillip-Perron (PP) tests for unit roots

Variables	t-ADF	Lags	Variable	t-ADF	Lags
RGDP	-3.539**	0	ΔRGDP		
PSC	-2.675*	0	ΔPSC		
Lend rate	-3.176**	0	ΔLend rate		
CDR	-4.374**	0	ΔCDR		
TO	-0.713	0	ΔTO	-14.855	0
PCons	7.4**	0	ΔPCons		

Note: * indicates significance at 10%, ** indicates significance at 5% and *** at 1%
Source: Model result based on secondary data.

4.2.2 Cointegration Test Result

The ADF test has shown that the order of integration is a mixture of I (0) and I(1). These indicates that those variables with I (1) should have common trends to run ARDL model. To find out whether the none-stationary series, I (1), have long run common trend, Pesaran, Shin, and Smith (2001) bounds test were applied in each models. The result shows that, based on F-test, there is level relationship among non-stationary variables (Table 4) which provided us a confidence to make about long run inference using level ARDL model of Table 5.

Table 4: Peseran, Shin and Smith (2001) bound test

Model	**F-test**	**Critical Values**				**P-value**
		1%		**5%**		
		I(0)	I(1)	I(0)	I(1)	
RGDP using PSC	38.78	4.42	5.81	3.25	4.46	0.00
RGDP using Lendrate	21.38	4.89	6.58	3.45	4.8	0.00
RGDP using CDR	59.39	4.42	5.8	3.25	4.45	0.00
RGDP using PSC,Lendrate and CDR	22.67	4.08	6.14	2.88	4.48	0.00

Note: Ho: No level relationship

4.2.3 ARDL Model Estimation Result

For the outcomes, we present a set of estimates following the strategy outlined under the methods. In the Table 4, we reported the effect of banking loan development indicators and other control variables on economic growth. The optimum lags length used to estimate the models have been automatically selected and reported under the table 4 foot notes. Moreover, the estimated models were tested for robustness such as misspecification, serial correlation, and Heteroscedastic and model stability as shown at the end parts of Table 4. For simplicity of interpretation, we present results based on level ARDL model estimation which provides practically significant results.

To explore our results, first we begin with the model (1) in Table 4. This model includes only credit to private sector (PSC) as an indicator for banking development, the other control variables and the lags of PSC and the lags of other control variables. The findings shows that, the first, the fourth and fifth lags of RGDP, the level PSC and first lag of PSC, and the level PCons and second lag of private consumption were significantly determining economic growth. Second, the model (2) includes only bank lending rate (Lend rate) among banking loan development indicators, other control variables and their lags. The findings show that bank lending rate is significantly determining economic growth. Among the lag variables, the first, fourth and fifth lag of RGDP, the level PCons and the second lag of private consumption were significantly determining economic growth. Third, the model (3) includes bank credit to deposit ratio (CDR) among banking development indicators, other control variables and their lags. The result indicates CDR is insignificantly determining economic growth. Others variables such as the first, fourth and fifth lag of RGDP are significantly impacting the level RGDP. Whereas, the first lag of trade openness were insignificantly determining economic growth.

Finally, model (4) includes all indicators of banking development and their lags, other control variables and the lags of other control variables. The findings of this model concludes all results found by each model, model(1), model(2), and model(3). Although, the amount of the effect in model (4) were slightly differs from each individual model, the direction and significance levels were on average the same. Hence, model (4) is more or less the final model to be discussed.

Table 5: Results for Estimated ARDL Model

	(1) RGDP	(2) RGDP	(3) RGDP	(4) RGDP
L.RGDP	0.871***	0.842***	0.828***	0.819***
	(0.0642)	(0.0622)	(0.0672)	(0.0684)
L2.RGDP	0.0196	0.00844	0.00872	0.125*
	(0.0394)	(0.0378)	(0.0398)	(0.0626)
L3.RGDP	-0.0835	-0.0386	-0.0372	-0.101*
	(0.0426)	(0.0382)	(0.0401)	(0.0406)
L4.RGDP	0.909***	1.021***	1.024***	0.855***
	(0.0554)	(0.0416)	(0.0438)	(0.0591)
L5.RGDP	-0.681***	-0.798***	-0.789***	-0.672***
	(0.0750)	(0.0670)	(0.0708)	(0.0732)
PSC	-0.104**			-0.117***
	(0.0329)			(0.0324)
L.PSC	0.0957**			0.0430
	(0.0329)			(0.0393)
L2.PSC				0.0764*
				(0.0341)
Pcons	-0.0582**	-0.0749***	-0.0702***	-0.0741***
	(0.0185)	(0.0180)	(0.0189)	(0.0181)
L.Pcons	-0.00223	0.0123	0.00814	0.0113
	(0.0249)	(0.0245)	(0.0258)	(0.0239)
L2.Pcons	0.0756***	0.0697***	0.0692**	0.0787***
	(0.0197)	(0.0194)	(0.0205)	(0.0187)
TO	-0.00611	-0.0108	-0.00971	-0.00467
	(0.0129)	(0.0124)	(0.0132)	(0.0127)
Lendrate		0.0168**		0.0171***
		(0.00505)		(0.00488)

L.Lendrate		-0.0167***		-0.0163**
		(0.00492)		(0.00491)
CDR			0.0000497	0.00163
			(0.00304)	(0.00343)
Constant	0.0366***	0.0313***	0.0329***	0.0383***
	(0.00735)	(0.00715)	(0.00758)	(0.00727)
N	115	115	115	115
r2	0.99	0.99	0.99	0.99
dwatson	2.1	2.1	2.05	1.99
Bgodfrey test	0.51(0.47)	0.58(0.45)	0.16(0.69)	0.001(0.976)
imtest	71.4(0.46)	87.18(0.06)	65.5(0.26)	114.67(0.413)
sbcusum				
LikelihoodRatio Test	286.1	287.1	280.8	295.3
AIC	-548.3	-550.2	-539.6	-558.6

Note: Standard errors were in the parentheses and * indicates significant variables at 5 percent level or when $p < 0.05$, ** indicates significant variables at 1 percent $p < 0.01$, *** indicates significant variables at 0.1 percent $p< 0.001$. Table 4 reports estimates of the variable used and the model diagnosis tests. The first part shows the estimates and the second part of the table shows diagnosis tests. The response variables for the models is RGDP. These were indicated by column (1), (2), (3) and (4) respectively. The appropriate lag order is ARDL (5 1 2 0) for model (1), ARDL (5 1 2 0) for model (2), ARDL (5 0 2 0) for model (3) and ARDL (5 2 1 0 2 0) for model (4). The second part of a Table shows the diagnostic tests. These are Durbin Watson, Breusch Godfrey LM test for serial correlation, Cameron and Trivedi's decomposition of IM test for Heteroscedastic. Others tests such as Likelihood ratio and Akaike Information criteria were also reported. Cumulative sum test for structural break or parameter stability were also performed for each models and reported graphically in the annex.

4.2.4 Error Correction Model

The next step that follows from the estimation of the ARDIL Model coefficients is the estimation of error correction model which is the error correction representation of the long run model. This representation Theoretically, the ECM term indicate the speed of adjustment to restore equilibrium in the dynamic model and the coefficient of the ECM which should be both negative and statistically significant, shows how quickly the dependent variable converge to equilibrium shows the short run dynamics of the model along with the equilibrium of the model.

Table -6 Result of Error Correction Model

```
ardl RGDP PSC Lendrate CDR Pcons TO , lags ( 5 2 1 0 2 0 )ec

ARDL(5,2,1,0,2,0) regression

Sample: 1991q2 - 2018q4                         Number of obs     =        111
                                                R-squared         =     0.4819
Adj R-squared     =     0.4000
Log likelihood =  280.55168                     Root MSE          =     0.0209

------------------------------------------------------------------------------
      D.RGDP |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
ADJ          |
        RGDP |
         L1. |  -.1576891   .0657662    -2.40   0.018    -.2882516   -.0271267
-------------+----------------------------------------------------------------
LR           |
         PSC |   -.0116768   .1031819    -0.11   0.910    -.2165188    .1931653
Lendrate|        -.4013552   1.184413    -0.34   0.735    -2.752712    1.950002
         CDR |   -.080703    .120323    -0.67   0.504    -.3195744    .1581684
Pcons |          .03708      .0709929     0.52   0.603    -.1038587    .1780188
          TO |   .3720715   .5966918     0.62   0.534    -.8125114    1.556654
-------------+----------------------------------------------------------------
SR           |
        RGDP |
         LD. |   .0842847   .0836025     1.01   0.316    -.0816873    .2502568
        L2D. |   .0783334   .0837926     0.93   0.352    -.0880159    .2446826
        L3D. |   .0723966   .0830434     0.87   0.386    -.0924654    .2372586
        L4D. |  -.3106479   .0837679    -3.71   0.000    -.4769482   -.1443476
             |
         PSC |
         D1. |  -.0073871   .0249933    -0.30   0.768     -.057005    .0422308
         LD. |    .022035   .0243958     0.90   0.369    -.0263968    .0704668
             |
Lendrate |
         D1. |   1.519663   .2464793     6.17   0.000      1.03034    2.008986
             |
Pcons |
         D1. |  -.0123789   .0113216    -1.09   0.277     -.034855    .0100973
         LD. |   .0027764   .0101271     0.27   0.785    -.0173284    .0228813
             |
       _cons |   .0176978   .0199513     0.89   0.377    -.0219105    .0573062
------------------------------------------------------------------------------
```

From the above table-5 the coefficient of the Error Correction Model (ECM) of the selected ARDL (5,2,1,0,2,0) is negative and significant at 5 percent level. This indicates that a high speed of adjustment of convergence to the long run equilibrium every quarter after a short run shock. The coefficient of the ECM is negative 0.15 and this implies that a deviation from the long-run equilibrium subsequent to a short-run shock is corrected by about 15 % at the end of each quarter.

4.3 Discussion

For the interpretation of the estimated coefficients we relayed on the results in Table 4. In the Table 4, the model (4) fitted the results of RGDP. Since all variables were standardized the coefficients can be interpreted as a one unit change in the predictor variable, the RGDP is expected to change by the value of the regression coefficients. For every one unit increase in units of the significant variables, the RGDP is expected to increase or decrease by approximately the corresponding coefficients. The variables whose p-value $<$ 0.05 are considered statistically significant as noted under the Table. The discussion of the findings are summarized in the following three findings.

First, the lags of RGDP. Estimate using level ARDL for RGDP show that the first, second, third, fourth and fifth lag of the RGDP is statistically significantly (Coefficient= 0.82, 0.13, -0.10, 0.86 and -0.67 respectively) determining economic growth at 5% and at 0.1%percent significance level. The magnitude of the effect is large in the first and fourth lags. This generally indicates that the past economic growth performance influences the current economic status in Ethiopia. A unit change in the lags of RGDP will likely to result in from -0.672 to 0.855 point increase in the RGDP, ceteris paribus. This finding is consistent to the result of a study in Ethiopia by Ayalew et al. (2010), where it was shown that the lags of economic growth is the main determinants of economic growth. Although the third lag of RGDP is negatively significantly determining the economic growth, its magnitude is not significantly strong.

Second, the banking loan development. the banking loan development is indicated by variables such as PSC, Lend rate and CDR. The bank lending to private sector (PSC) measures the bank lending amount (financial depth). This variable is found to have negatively and significantly determining the economic growth. This is expected because it takes time until the disbursed credit is used for the purpose of it is approved for to the production stage. This argument is confirmed by the coefficients on first lag of PSC (coefficient= -.117) which is negatively and significantly determining economic growth. A unit change in PSC will likely to result in from a -0.117 to 0.076 point increase in the RGDP, ceteris paribus. This finding is also supported by Biplab K and Inder S (2018) and (Obamuyi, Edun and Keyode, 2010).

The other indicator of banking loan development is Lending rate (lend rate). This variables is found to have positive effect in its current year; which seems contrary to the theory that the increase in interest rate will hinder economic growth; however, it is negatively affecting economic growth after one year (first lag) as indicated by the coefficient -0.016.This finding is also supported by Wicksell(1901). Thus, such inconsistency needs further deliberation on the issue. The final indicator used for banking loan development is credit to deposit ratio (CDR). The CDR, (coefficient=0.002), measures the banking health, which is found to have positively and statistically insignificantly determining economic growth at 5 percent significance level when entered in to the model either along with PSC and Lend rate or without them.

Finally, the other control variables. The trade openness (TO) and private consumption (Pcons) are entered into the model to control for the effects other than the lags of RGDP and banking loan indicators. The trade openness (TO= -0.005) is negatively and statistically insignificantly determining economic growth. Since openness composed of import and export, measure the country levels of trading with abroad, it is theoretically critical in determining economic growth. Another control variable private consumption (Pcons=-0.07, 0.01 and 0.08) is found to have both positively and negatively statistically significantly determining economic growth at 5 percent and 0.1 percent significance level. The effect is distributed over the time lags. The level private consumption statistically negatively significant in impacting RGDP of Ethiopia. On the contrary, its first lag positively and insignificantly, and the second lag, statistically positively significantly impacting RGDP. This variable is also very important in determining economic growth. A unit change in the private consumption will likely to result in from -0.07 to 0.08 unit increase in the RGDP, ceteris paribus.

4.3.1 Granger Causality Test Result

The Granger test approach to the question of whether bank lending causes economic growth is to see how much of the current RGDP can be explained by past values of RGDP and then to see whether adding lagged values of bank lending can improve the explanation. RGDP is said to be Granger-caused by bank loan if bank loan helps in the prediction of RGDP, or equivalently if the

coefficients on the lagged bank loans are statistically significant. In this framework the test result has shown that among bank loan indicators PSC and CDR causes RGDP, and again RGDP causes PSC (Table 7). Hence, there is bidirectional causality between bank loan and economic growth in Ethiopia. However, this test doesn't show any causal relationship between lending rate and RGDP and other banking development indicators and control variables.

Table 7: Granger Causality Test

Equation	Excluded	chi2	df	Prob > chi2
RGDP	Lendrate	0.69706	2	0.706
RGDP	CDR	2.2326	2	0.327
RGDP	PSC	25.719	2	0.00
RGDP	ALL	30.177	6	0.00
Lendrate	RGDP	0.05585	2	0.972
Lendrate	CDR	2.4984	2	0.287
Lendrate	PSC	0.18155	2	0.913
Lendrate	ALL	2.9483	6	0.815
CDR	RGDP	5.33	2	0.07
CDR	Lendrate	29.137	2	0.00
CDR	PSC	0.41125	2	0.814
CDR	ALL	47.508	6	0.00
PSC	RGDP	27.441	2	0.00
PSC	Lendrate	2.5393	2	0.281
PSC	CDR	4.6364	2	0.098
PSC	ALL	34.377	6	0.0

Note: * The Variables RGDP, PSC, Lend rate and CDR were included to see the causality direction between bank lending and economic growth. These three variables were jointly indicates the bank lending development.

4.3.2 Model Diagnosis Result

The model robustness was checked by testing the estimated model for possible serial correlation, existence of heteroscedastic, and parameter stability. Existence of significant serial correlation may show dependency of model residual observations which may invalidate the results. The result from Breusch Godfrey LM (bgodfrey) test for serial correlation does not indicate this issue. Moreover, we have checked for existence of Heteroscedasticity using Cameron and Trivedi's decomposition of IM test. Existence of significant Heteroscedasticity may show non-constancy of

error variance over time which may invalidate the results as well. The output from Cameron and Trivedi's decomposition of IM (imtest) test does not indicate this problem (See Annex E to Annex I). Finally, we have checked for possible existence of structural breaks using cumulative sum test graphically. Existence of structural breaks shows instability in the estimated model. The 95 percent cumulative bands around zero for recursive cumulative sum for each models demonstrates no existence of structural break (See Annex A to Annex D). Hence, the model is stable. In all cases, we found nothing to change our results.

CHAPTER FIVE

Summary, Conclusion and Recommendation

5.1 Summary

This study has investigated the impact of bank lending and bank lending rate on the Ethiopian economic growth. The research objectives were to evaluate the impact of bank lending rate, bank lending to private sector on Ethiopian RGDP and to examine the nature of causality relationship between these core independent variables individually with Ethiopian RGDP. Previous researches have not yet been conclusive whether bank lending result in and impact on the economic performance of the country or vice versa or bidirectional. Thus, studies of this nature is very important for policy makers to reach on rational decisions. Having considered this, by using level Auto-regressive distributed lag model (ARDL), the impact was estimated by considering bank loan development indicators in the models individually and then all together.

5.2 Conclusion

From this finding, it can be concluded that the past economic performance of the country impacts the current economic performance of Ethiopia.

Our key findings: First, one of the banking loan development indicator such as bank lending to private sector (PSC) at its level statistically negatively significant in determining economic growth in Ethiopia. On the contrary, at its first lag, statistically positively but insignificantly and at its second lag, positively significant in determining the growth of Ethiopia. Such inconsistency reflects that getting the loan alone is not a guarantee for improving the economy of the country. Rather the loan should be put in place for the purpose of the target without taking time.

Secondly, the bank lending rate is found to have positive effect at its first lag; on the contrary negatively affecting economic growth at the second lag as indicated by coefficients 0.0171 and -0.016 respectively which seems contrary to the theory that the increase in interest rate will hinder economic growth. But in its first lag, it becomes in agreement with the above theory. Thus, such

inconsistency needs further deliberation on the issue. Thirdly, Credit to deposit ratio are found to be statistically insignificantly impacting Ethiopian RGDP consistently either entered in to the model individually or with other indicators also. Fourth, the causality run in both directions, from RGDP to bank lending and again from bank lending to RGDP.

The above findings have implications for development policies in Ethiopia. For one, as there is a bidirectional relationship between bank lending and economic growth, there needs a policy that liberalize the financial sector at its adequate level. So, this study area may serve as a case for how banking loan development can contribute to economic growth.

Due to the scantiness of data, it would be beneficial to pursue additional research in Ethiopia in order to set the most appropriate policies; much remains to be understood about the impact of bank lending on economic growth especially in consideration of the ever increasing profit of Banks in whatever circumstances. Openly, more complete data would be recommended in order to further analyses the effect of bank lending on aggregate economy.

5.3 Recommendation

The findings of this study clearly shows that bank lending (Bank Credit) has a positive impact on Ethiopian economy at its lags. Particularly, bank lending to private sector (PSC) took quarters to impact the Ethiopian economy positively. Hence, in general, it is recommended that a policy to encourage further development in bank lending which focuses on avoiding time lag, should be designed so as to improve the Ethiopian economy.

The other finding is indicating that there is bidirectional relationship between bank lending and economic growth. Thus, it can be logically anticipated that the findings do offer support to the belief that a rapidly growing banking sector can play a vital role in improving the economic performance of Ethiopia.

Regarding the bank lending rate, it shows inconsistency on its impact on RGDP of the country. Thus needs further deliberation on the issue. The other indicator, as the Credit to deposit ratio measures the financial health, its positive but non-significance on the economy matters a lot as it

might reflect back later. Hence, as NBE is a regulatory body with autonomous right on such issue; should see and revise the policy in connection with credit to deposit ratio (CDR).

At last but not the least, for an economy like Ethiopia; which is highly dependent on the banking sector as a source of fund; should initiate developing their capital market with appropriate policy to enable the private sector to get an alternative source of finance.

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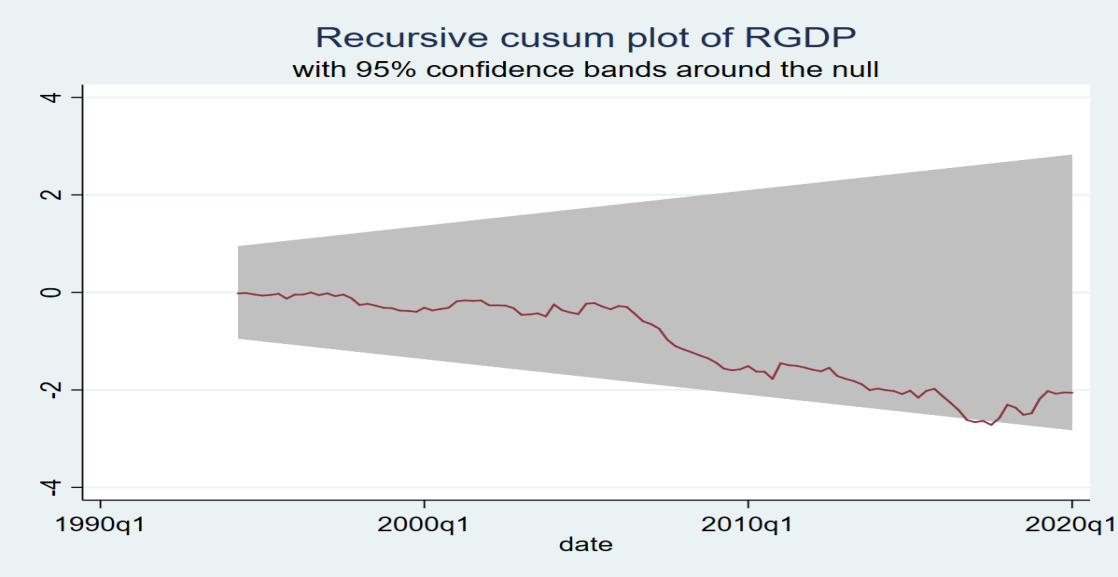
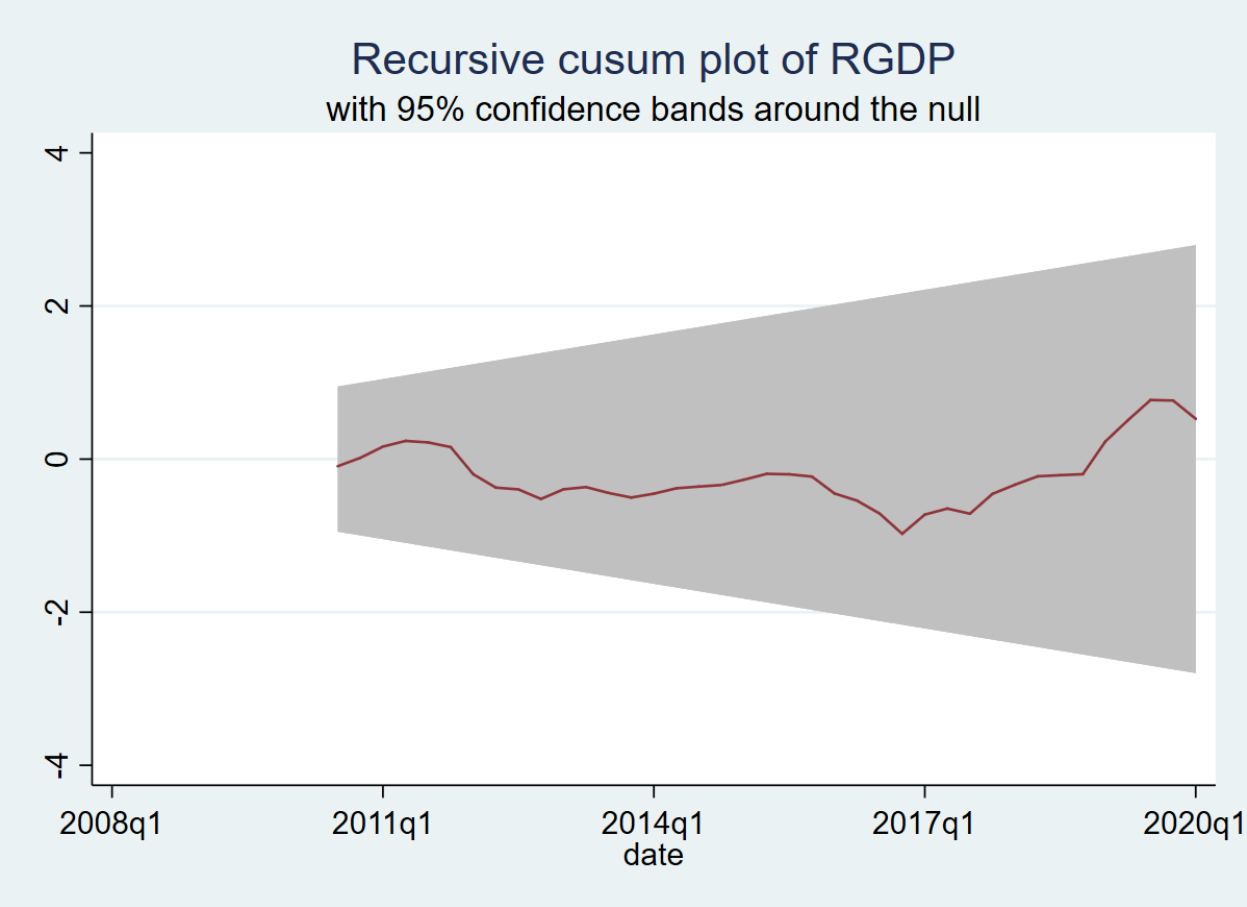
ANNEXES

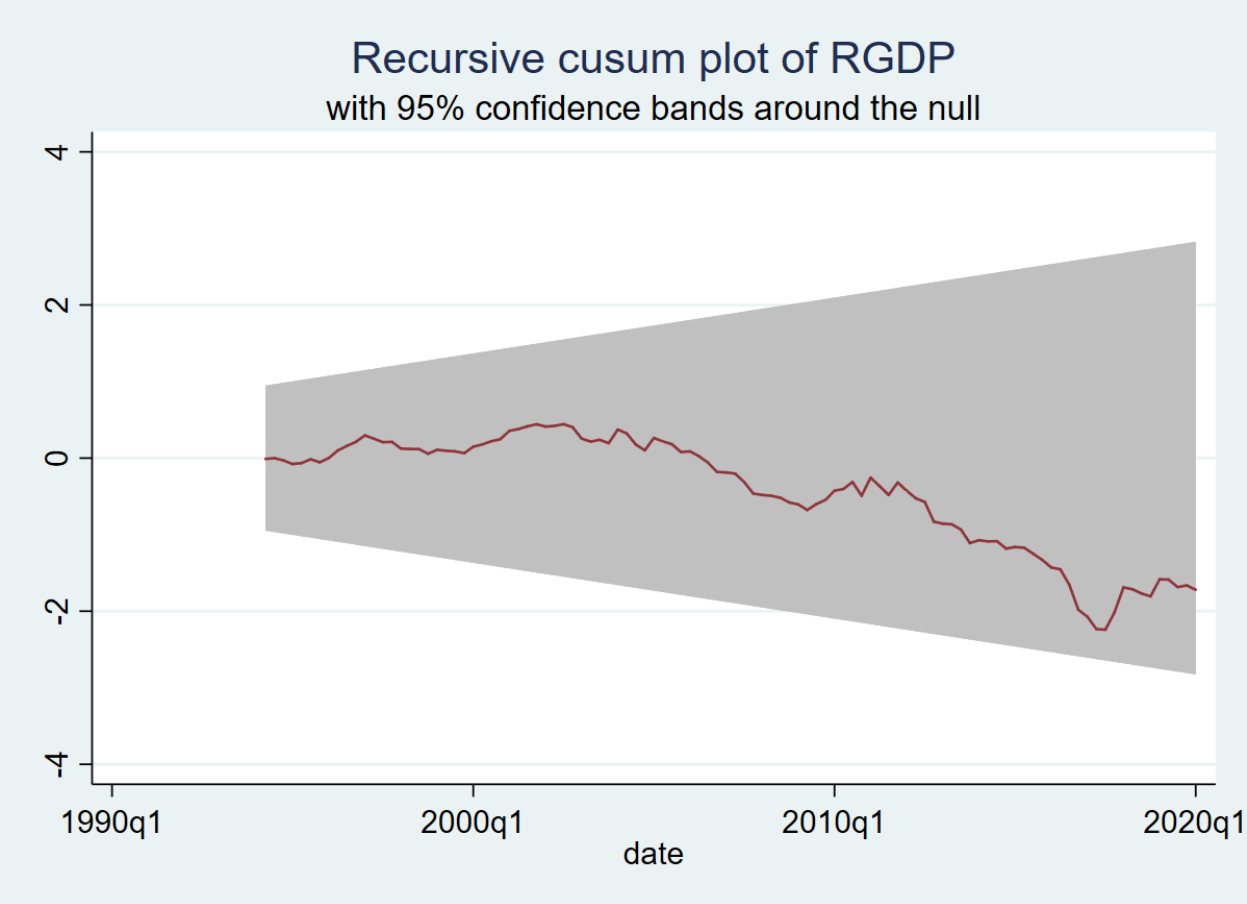
ANNEX A: Cumulative sum test for structural break



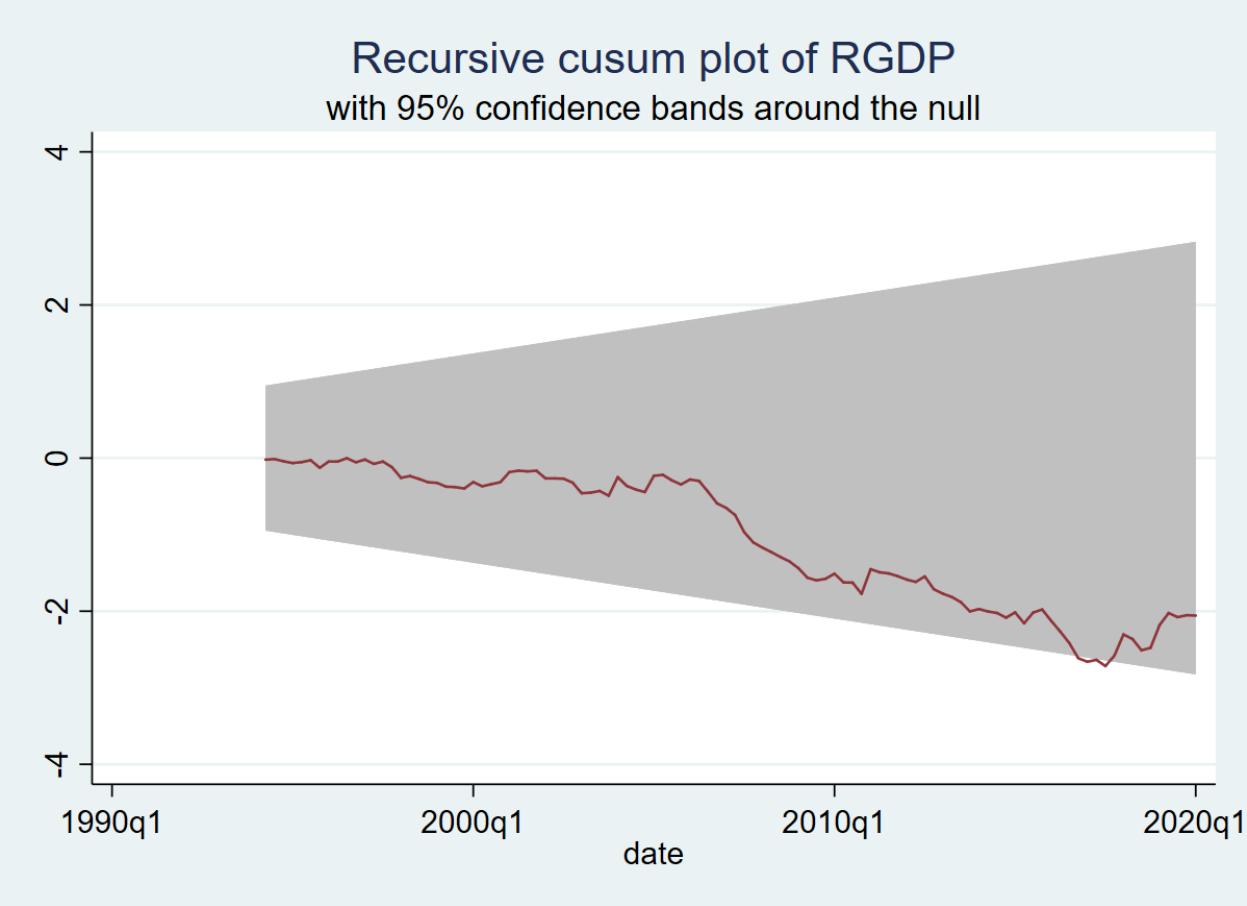
ANNEX B: Cumulative sum test for structural break



ANNEX C: Cumulative sum test for structural break



ANNEX D: Cumulative sum test for structural break



Annex E: Correlation coefficients and Model Diagnosis Tests

```
Durbin-Watson d-statistic( 12,   115) =  2.098351

. estat bgodfrey, lag(1)

Breusch-Godfrey LM test for autocorrelation
```

lags(p)	chi2	df	Prob > chi2
1	0.512	1	0.4744

```
                         H0: no serial correlation

. estat imtest, white

White's test for Ho: homoskedasticity
         against Ha: unrestricted heteroskedasticity

         chi2(71)     =     71.41
         Prob > chi2  =    0.4639

Cameron & Trivedi's decomposition of IM-test
```

Source	chi2	df	p
Heteroskedasticity	71.41	71	0.4639
Skewness	10.60	11	0.4770
Kurtosis	1.75	1	0.1853
Total	83.77	83	0.4556

Annex F: Correlation coefficients and Model Diagnosis Tests

```
Durbin-Watson d-statistic( 12,   115) =  2.109267

. estat bgodfrey, lag(1)

Breusch-Godfrey LM test for autocorrelation
```

lags(p)	chi2	df	Prob > chi2
1	0.580	1	0.4465

```
                         H0: no serial correlation

. estat imtest, white

White's test for Ho: homoskedasticity
         against Ha: unrestricted heteroskedasticity

         chi2(68)     =     87.18
         Prob > chi2  =    0.0586

Cameron & Trivedi's decomposition of IM-test
```

Source	chi2	df	p
Heteroskedasticity	87.18	68	0.0586
Skewness	12.24	11	0.3462
Kurtosis	2.15	1	0.1430
Total	101.56	80	0.0523

Annex G: Correlation coefficients and Model Diagnosis Tests

```
. estat dwatson

Durbin-Watson d-statistic( 11,   115) =  2.055729

. estat bgodfrey, lag(1)

Breusch-Godfrey LM test for autocorrelation
```

lags(p)	chi2	df	Prob > chi2
1	0.163	1	0.6862

```
                         H0: no serial correlation

. estat imtest, white

White's test for Ho: homoskedasticity
         against Ha: unrestricted heteroskedasticity

         chi2(59)     =     65.55
         Prob > chi2  =    0.2601

Cameron & Trivedi's decomposition of IM-test
```

Source	chi2	df	p
Heteroskedasticity	65.55	59	0.2601
Skewness	14.30	10	0.1597
Kurtosis	2.39	1	0.1222
Total	82.24	70	0.1503

Annex H: Correlation coefficients and Model Diagnosis Tests

```
Durbin-Watson d-statistic( 16,   115) =    1.9955

. estat bgodfrey, lag(1)

Breusch-Godfrey LM test for autocorrelation
```

lags(p)	chi2	df	Prob > chi2
1	0.001	1	0.9764

```
                         H0: no serial correlation

. estat imtest, white

White's test for Ho: homoskedasticity
         against Ha: unrestricted heteroskedasticity

         chi2(112)     =    114.67
         Prob > chi2   =    0.4125

Cameron & Trivedi's decomposition of IM-test
```

Source	chi2	df	p
Heteroskedasticity	114.67	112	0.4125
Skewness	10.31	15	0.8000
Kurtosis	1.45	1	0.2283
Total	126.42	128	0.5228

Annex I: Correlation Coefficients

Correlation Coefficients between independent variables

Variables	PSC	CDR	Pcons	TO	Lend rate
PSC	1				
CDR	0.5873	1			
Pcons	0.9265	0.5405	1		
TO	0.8903	0.525	0.7278	1	
Lendrate	0.2739	0.6541	0.2499	0.2196	1

Note: Correlation of dependent variable is excluded