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**The Financial Development, Savings and Economic Growth Nexus:
Empirical Evidence from Ethiopia.**

By

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National Bank of Ethiopia (Working Paper)

The Financial Development, Savings and Economic Growth Nexus: Empirical Evidence from Ethiopia.

Abstract

Ethiopia has experienced substantial growth in per capita income, domestic savings, and financial sector developments over the past four decades. This paper attempted to explore the empirical causal nexus among selected variables in Ethiopia from 1981 to 2023. The variables considered in this paper include per capita income, private sector credit, domestic savings, and the rate of change in the consumer price index. The study used the bounds cointegration test within the autoregressive distributive lag (ARDL) model framework to investigate the existence of long-run integration among series. The ADF unit root test was employed to determine whether variables remained stationary. The paper employed the Granger causality test to establish causal connections through the vector error correction model and identify supportive hypotheses for the Ethiopian economy. The variables considered in this paper include per capita income, private sector credit, domestic savings, and the rate of change in the consumer price index. Per capita income and private sector credit are used as proxies to measure real economic growth and financial sector development, while the inflation rate plays a crucial role in controlling these variables. The findings affirm the existence of bidirectional causal relationships among the variables. The Ethiopian economy adheres to a feedback hypothesis, which suggests that an expansion of economic growth will favour efficient financial development and stimulate savings. Similarly, having a well-functional financial sector development and steadfast domestic resources plays a crucial role in promoting economic growth.

Key Words: *Supply-leading and Demand-following Hypotheses: The Ethiopian economy adheres to a feedback-effect or bidirectional hypothesis.*

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I. INTRODUCTION

A growing body of theoretical and empirical work would push even skeptics toward the belief that saving and financial development are important to drive economic growth. But even though there is a lot of scientific research on Ethiopian economic growth and financial development, there is still a need to examine the relationship between saving and the development of the financial sector on the one hand and economic growth on the other hand, for the long-term.

Saving from the perspective of economic intellectuals is a significant requirement for economic growth with regard to both exogenous and endogenous growth theories (Lewis, 1955); (Solow, 1956); (Romer, 1986) and (Lucas, 1988). Similarly, many quantitative studies have found that a higher gross domestic saving rate leads to boosting investment rates, which in turn positively impacts economic growth. This conclusion is also supported by Harrod's growth model (1940s), which states that economic growth depends on the amount of capital that is available for investment and that the rate of capital accumulation is proportional to the rate of savings. To illustrate the importance of savings, (Blanchard & et al., 2011) suggest that when a country has a high level of savings this helps in reducing the current account deficit. In the event that there are not enough savings, a country is likely to experience current account deficit or may fail to maximize on investments in the domestic economy.

The Keynesian school of thought, who emerged in the 1930s and (1940s), posits that economic activity is primarily driven by spending decisions. They contended that individuals should save less and spend more, which would increase their marginal propensity to consume and positively influence full employment and economic growth. This means that reversed the causation that spending creates income, and it is the spending on investment that creates the income that is saved. In short, an increase in income is likely to result in an increase in savings. Finally, added that financial development might direct its efforts toward creating short-term proceeds generated by raising asset prices rather than toward profits generated by productive activities that create income flows.

The theoretical relationship between savings and financial development traced to the McKinnon (1973) and Shaw (1973) stated that a developed financial sector is expected to increase the savings by raising the efficiency of financial intermediation. On the other hand a more developed financial system has potential to provide alternative saving instruments which are more suited for individual preferences (Schmidt-Hebbel, K. and L. Serven, 2002).

Profoundly, the better developed financial sector tends to grow the economy faster over medium and long periods by encouraging investment through pooling savings, holding other things constant. As well as optimizing the allocation of resources through its intermediates. It can help with the robust of small and medium-sized enterprises (SMEs) by providing them with access to finance. Financial development leads to economic growth by positively affecting production, savings and investment in the economy. Ever since the pioneering contributions of (Goldsmith and Shaw, (1969) & (1973)), the relationship between financial development and economic growth has remained an important issue of debate.

In addition, the study examined the hypothesis of Supplying-led growth and Demand-driven growth hypotheses to assess the validity of the assumptions in Ethiopia. Does financial development promote savings and economic growth, or does economic growth drive financial development and savings? These directions of causality between financial development and economic growth, including savings, are labelled by Patrick (1966). The "Finance-led growth assumption" posits that financial development causes economic growth. This implies that deliberately creating financial institutions and markets improves the accessibility of financial services, distributes resources efficiently, offers good savings options, reduces transaction costs and information asymmetry, and enhances the capacity of financial intermediaries and thus ultimately leads to genuine economic growth (King, 1993).

On the contrary, the "Growth-driven hypothesis" asserts that businesses tend to accumulate more financial resources as the economy grows. Robinson (1952) emphasized that enterprises are the primary catalysts for financing opportunities, while Kuznets (1955) noted that financial markets typically expand during the intermediate stage of growth and become even more firmly established as the economy advances. Therefore, this paper examines the correlation between savings, financial development, and economic growth in Ethiopia. To conduct the study, the

researcher used financial development (proxies by domestic credit to private sector), along with gross domestic savings and real per capita income.

1.1 Statement of the Problem

The linkages between financial development, savings, and economic growth have been a disputable issue and received a growing concern among economists. Nowadays, most empirical researchers and policymakers give more emphasis to the causal association between savings, financial and economic development than examining the only relationship between financial and economic development (Maryam R. et al., 2012). Establishing the causal pattern between these variables is very important as it conveys important messages to policymakers to focus on policies that foster financial development, mobilize savings, and eventually promote economic growth.

In fact that, the available studies in this area have been inconclusive; While some studies have established a causal relationship between savings, financial development and economic growth (Kelly. et al, 2010) and (Odhiambo N. et al., 2008), others have found a non-causality running between the three variables (Chowdhury et al., 2001).

On the other hand, a lot of empirical studies have been conducted between financial sector development and economic growth in case of Ethiopia, but they have found different outcomes. For instance, (Tekilu T. et al., 2016) and (Meron Endris & Habtamu.T, 2014) sorted a uni-directional causality running from economic growth to financial sector development. Others have found no evidence of causality between variables (Dejene Mamo & et al., 2016). Most empirical works have only emphasized the relationship between the financial sector and economic growth, but no studies have been conducted on the relationship between savings, financial sector development, and economic growth in the country.

Ethiopia has implemented several financial reforms in recent decades. Despite this, the Global Financial Competitiveness Index of 2022 indicates that the country lags behind 144 other nations in terms of financial stability, market capitalization rate, financial development, and deepening. This is mainly because of the absence of a robust financial system, which encompasses capital and stock markets in urban and rural economies. Assuming the validity of the first strand of literature, a strong savings culture should be cultivated, and a well-structured financial system established to support savings mobilization.

However, despite the developments in the financial sector and fast and sustain economic growth over the last two decades, Ethiopia's aggregate savings have been on the decline. Gross domestic savings as a percentage of gross domestic products (GDP) stood at 19.5% between 2010 and 2017, from 24.3% in the 2000 and 2008(NBE, 2022). Moreover, the savings rate in Ethiopia is low in relation to that of Sub-Saharan African countries. This low level of savings in the country indicates that external financing is necessary to meet its investment needs. However, other types of external finance, such as portfolio investment, have proven to be unpredictable. This is particularly important given the high levels of unemployment and investment requirements in the country.

Ethiopia is a fascinating case study for a few reasons. Firstly, the country has achieved remarkable economic growth from 2004 until recently, averaging above 9% (NBE, 2022). However, despite this impressive growth, the country's national savings did not increase. Ethiopia is also implemented a series of financial sector reforms, which resulted in a rapid deepening of its financial system. This was expected to have led to an upsurge in savings, but the evidence suggests the contrary. Notably, the previous studies in Ethiopia examined saving determinants using conventional variables, rather than exploring the causal link between financial sector development, economic growth, and savings.

Given that the financial sector and economic growth can either promote or discourage the mobilization of savings, understanding the basic relationship between these variables is crucial. Given this background, this study examines the correlation between underlying variables in Ethiopia, specifically the roles of financial deepening and economic growth impacts on savings in Ethiopia, and vice versa.

1.2 Objective of the Study

The general objective of this paper is to investigate the dynamics relationship between financial development savings and economic growth using time series data over the period 1981–2023. In view of the general objective this paper attempts to achieve the following specific objectives: to carried-out the long and short run causal correlation amid variables, examine their synchronicity, and test the validity of finance-led growth and demand-driven hypothesis in Ethiopia. It also scrutinizes historical developments and statistical trends among the variables.

1.3 Hypothesis of the Study

Based on the study's specific objectives outlined above, the following testable hypotheses were formulated.

HO1: The study claims that there is no strong short-run and long-run relationship between financial development, savings and economic growth.

HO2: This study also claims that no evidence supporting the validity of supply-leading growth or demand-following hypothetical tests in Ethiopia.

1.4 Significance of the Study

This paper will undoubtedly establish a highly expert tone, exquisitely tailored to provide standardized information to businesses and policymakers for further investigation.

1.5 Organization of the Study

This paper is organized as follows. Section 2 provides an overview of savings, financial development, and economic growth in Ethiopia, including literature reviews. Sections 3 and 4 explain the methodology and interpret the results. Towards the end, conclusions and recommendations are discussed in section five.

The Financial Development, Savings and Economic Growth Nexus: Empirical Evidence from Ethiopia.

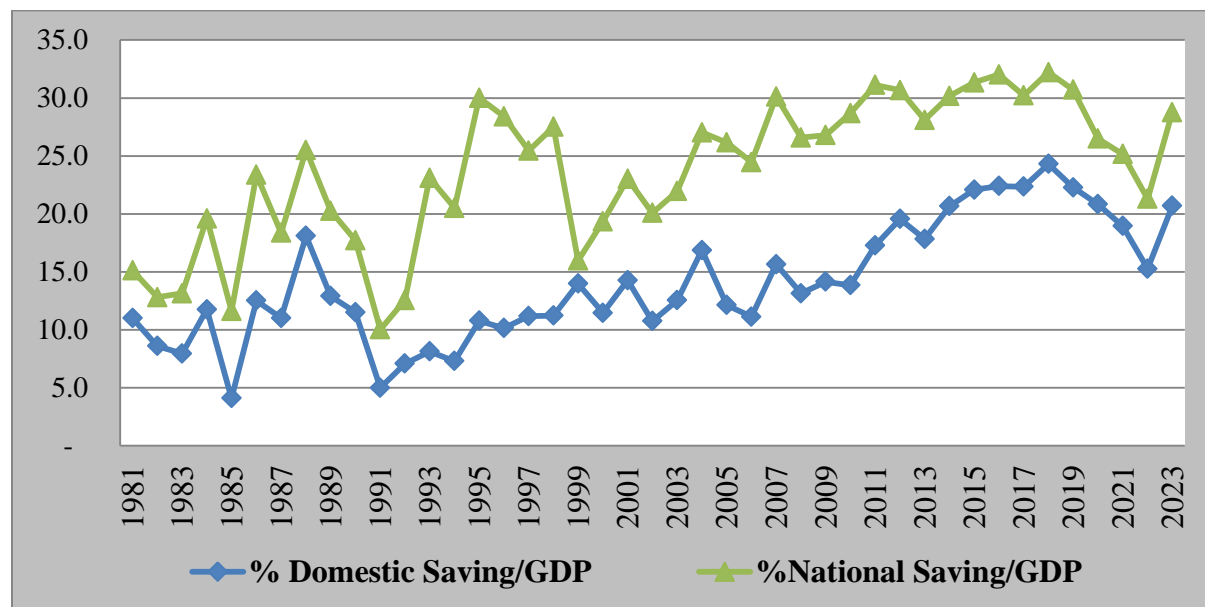
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II. OVERVIEW OF SAVINGS, FINANCIAL SECTOR DEVELOPMENT AND ECONOMIC GROWTH

2.1 Savings Evolution

Encouraging savings is not an easy task. A competitive business environment is necessary for profitability, and savers need confidence that their savings will retain their value. Safe and profitable investments are required to attract savings and guarantee returns. High inflation and low saving rates lead to increased consumption and reduced savings. To address this, Ethiopia has made significant economic and financial reforms to promote savings in recent decades. As a result, both sectors have experienced notable growth.

Fig 1: Trend of Gross Domestic Savings and National Savings (in percent of GDP)



Source: The figure was compiled using National Accounting Statistics data reported by NBE & MNP, as June, 2023

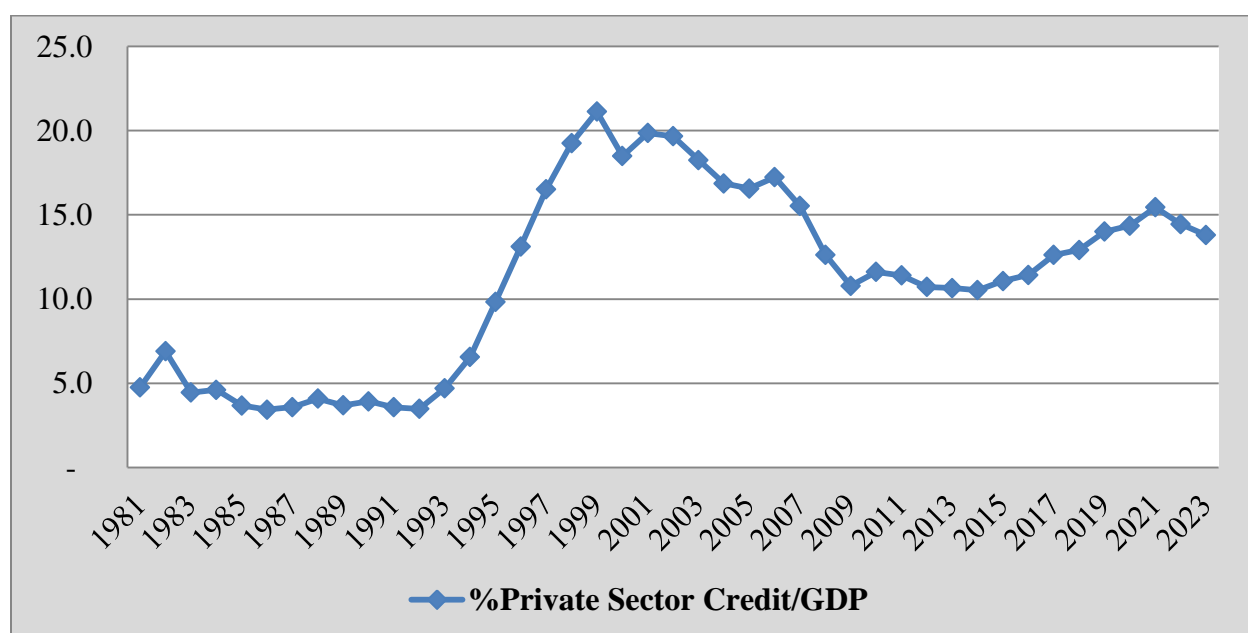
The figure above shows the country's saving trends, as measured by the gross domestic savings ratio (DSR) and national savings ratio (NSR) to GDP, which reflect the country's saving culture. The national and domestic saving ratios have been fluctuating between 1981 and 1999. However, after that period, they started changing slowly. In 2018, both ratios reached an all-time high of

32.2% and 24.3% respectively. The minimum ratios for both were found to be 10% and 4% in 1991 and 1985, respectively. The average gross savings was 23.8%. Domestic savings constituted only 14.1%, which is lower than the average gross savings ratio of sub-Saharan countries, which stands at 41.1% (WB, 2022).

2.2 Credit Developments

Increases or decreases in private sector credit affect investment and economic productivity. Figure 2 shows the trend in the private sector credit to GDP ratio.

Fig 2: Trend of Private Sector Credit (Percent of GDP)



Source: The figure was compiled using Monetary Data reported by NBE, as June, 2023

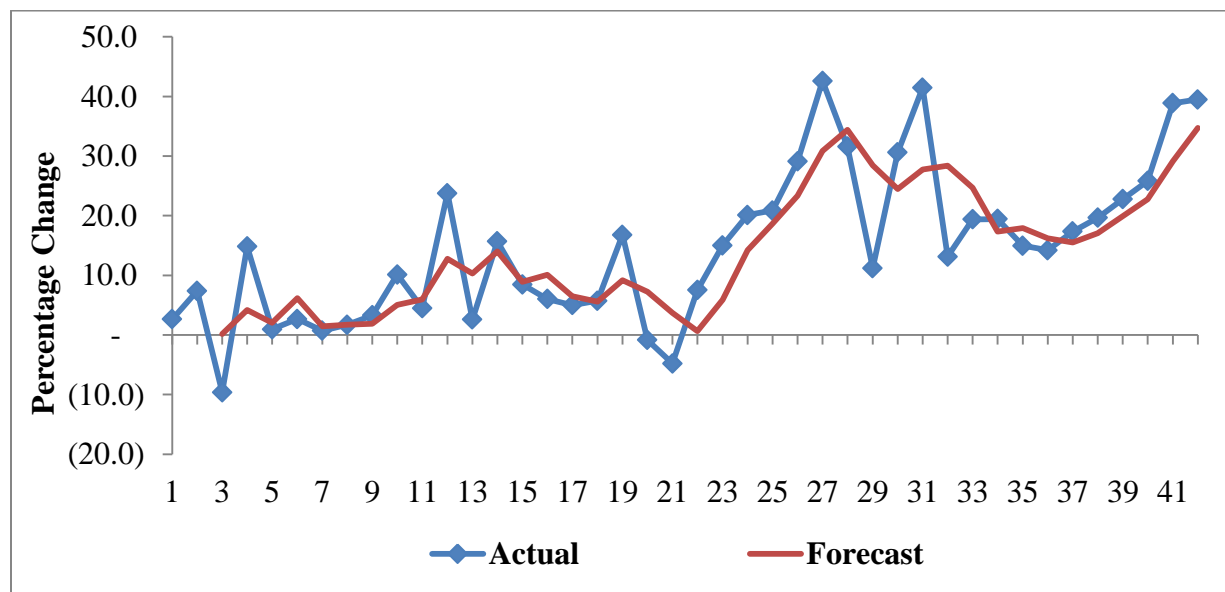
Figure 2 shows the financial development size allocated to the private sector as a GDP ratio. During the first phase, there were constant trends, and the total financial resources given to the private sector were below 5% of the overall economy. However, after 1993, there was a significant and rapid increase, reaching its peak of 21.1% in 1999. This exhibits the impact of financial reforms or sectorial liberalization. It then declined, perhaps because of the worldwide financial crisis and increased demand for public investment. During the growth and transformation plan periods (2010-2020), there was some improvement, but domestic credit to the private sector averaged 11.9 percent, which is lower than 42.5% of sub-Saharan African

countries (WB, 2022). Recently, the trend has been downward. Overall, domestic credit to the private sector fluctuated over time, perhaps due to economic conditions.

2.3. Economic Growth

In this modern era, economic growth is one of the main goals of all economies because it raises living standards and creates new jobs. The level of an economy is commonly measured by real GDP or real GDP per capita growth. This growth rate determines the average per-person income for an area and evaluates the people's standard of living and quality of life. It provides a more accurate picture of how the economy is doing for the typical citizen by accounting for population size and wealth distribution. Thus, the following figure refers to trends over time and provides measures of the build-up of the growth in the per capita income for the sample periods and its futures.

Figure 3: Trends of GDP per Capita Income Growth Rate (Actual and Forecasting)

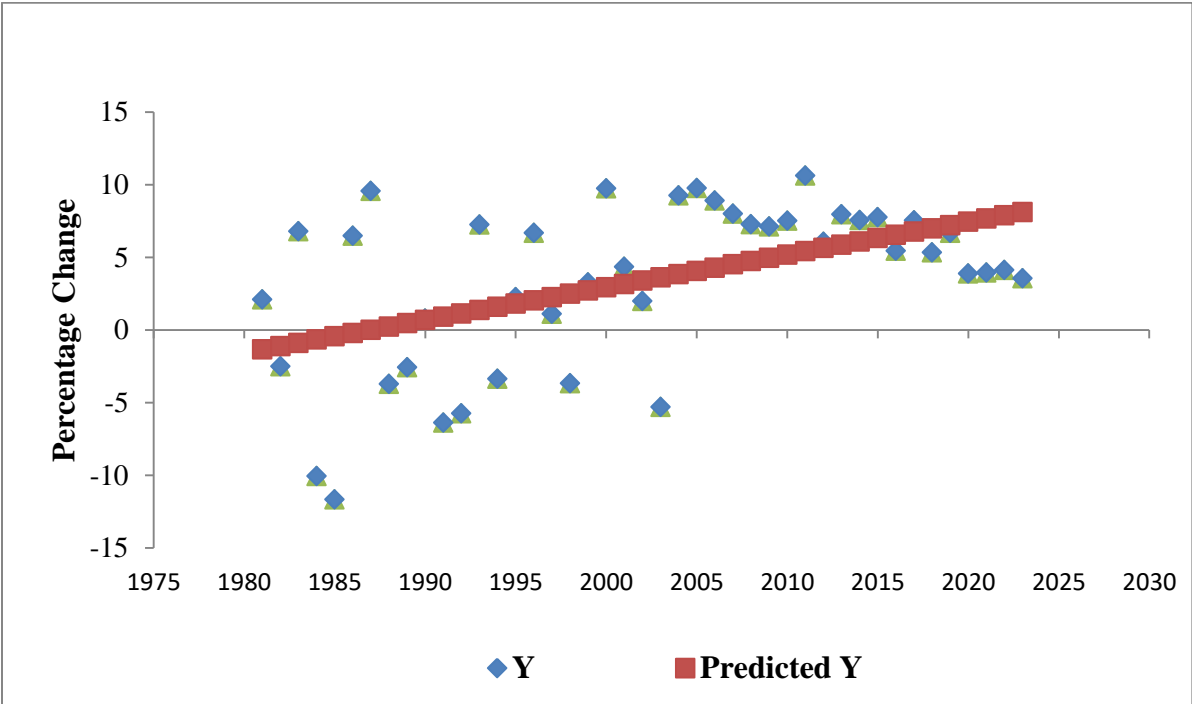


Source: The figure was compiled using Excel Regression

Figure 3 shows the short-run and long-run pattern of the Ethiopia's actual and predicated per capita income growth by tracking the year-over-year percent change over 1981-2023. Year-over-year income volatility in nominal terms, fluctuations typically occur during changes in household composition. The average annual percent change for the entire 43-year period is also illustrated on this chart to provide a benchmark for gauging periods of relative high--and relative low--growth against the backdrop of the long-term average. On average, the Ethiopia's nominal per

capita grew at an annual rate of 14.4% over the sample period. The country posted its highest growth in 2008 (42.6%) and posted its lowest growth in 1984 (-9.6%). The country's per capita income grew by 38.9% in 2022 to 39.5% in 2023. Finally, anticipated and actual trends are moving together and upwards.

Plot 3: Real per Capita Income (Growth Rate(Y = Actual))



Source: The Plot was compiled using Excel Regression

Over the past four decades, Ethiopia has experienced fluctuations in growth, and often such changes tended to coincide with the decades themselves. Plot 3 shows how much the country's real per capita income (Y) has grown each year since 1981. However, the average growth rate for the decade of the 1980s was less than one percentage point. In most cases, this fluctuation is caused by changes in household composition, which can be anticipated and planned for. The residual predicted line shows a steady upward trend, which suggests the country's future economic potential, which will be in line with demand. It is hoped that the trend will continue upward after 2004.

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III. LITERATURE REVIEW

3.1 Theoretical View

Theoretically, the role of finance in promoting technological development has long been a controversial issue. Hicks (1969) argued on the basis of economic history that the British industrial revolution was made possible by the availability of finance. He argued that the large-scale capital requirements of the industrial revolution could only be met by the development of capital market institutions that permitted the pooling of small individual savings into large funds for industrial development. Thus, there is cause-effect among financial development, saving and economic growth. Joan Robinson (1952), on the other hand, saw finance as responding passively to technological innovation and development, and that where enterprise leads finance follows.

Schumpeter (1911) was one of the pioneers in highlighting the significance of the financial sector in promoting saving and growth. In particular, he argued that economic growth was a product of interactions between financial and real innovations. As Hein and Ochsen (2001) argue; from a Schumpeterian monetary point of view, monetary variables have impacts that extend beyond merely temporary and out-of-equilibrium effects on the real variables of the economic system: production, employment, distribution and growth. More recently King and Levine (1993) and Levine and et al. (2000), the relationship amidst financial development, savings and economic growth has been extensively studied.

In the beginning, like McKinnon (1973) and Shaw (1973), offer detailed arguments and evidence on the role of organized financial structure of an economy to accelerate resources mobilization and improve economic performance. They believe that excess funds would be channeled efficiently financial structure to deficit units to drive the economy, and differences in the quality and quantity of financial services provided by financial intermediations are the main reasons for different economic growth of every country. In short, they supported supply-leading theory

which emphasizes the importance of financial sector development in promoting savings through financial intermediaries, which enhances productivity.

However, proponents of the "growth-driven or demand-following hypothesis" argue that economic growth is the catalyst for income increases and financial development. As a result, financial sector development is considered to be demand-driven (Odhiambo, 2004; Ang and McKibbin, 2007). The demand following hypothesis postulates that the causality direction runs from economic growth to financial sector development. Robison (1952, cited by Abubakar and Gani, 2013) argued that enterprises lead and finance follows. As an economy becomes more industrialized, income per capita increases and the habit of saving in different income segments develops, and this, in turn, generates a rising trend of aggregate saving in the economy (Kuznets, 1955).

From a bidirectional causality perspective, there is a positive and reinforcing causal relationship among the development of the financial sector, funds and economic growth. Patrick (1966) projected this hypothesis and identified that a feedback causal linkage exists amongst savings, finance and growth in the real sector. This hypothesis is a hybrid of supply leading and demand following hypotheses. In other words, financial development and economic growth cause each other; sequentially, depending on the stage of economies' development. As economies undergo different levels of economic development, the causal direction amid finance, saving and growth changes. It explained how the direction of causality changes as economies go through the early and advanced stages of development as follows.

During the early stages of economic development, efficient financial intermediaries and well-functioning markets play a crucial role in providing financial services. Over time, financial intermediaries and markets expand, resulting in an increased supply of financial services. As modern sectors are introduced, intermediaries mobilize savings and redirect them to the real economy. These funds aid in supporting the activities of these sectors, contributing to higher productivity and making it a lucrative investment opportunity.

The neutrality view suggests that there is no significant causal relationship among the underlying variables. This view argues that neither of the tripartite variables - substantially impacts the other. According to Lucas (1988) and Shan et al. (2001), this perception indicates that there is no

significant connection among the variables. Graff (1999) argued that the established relationship between two variables only implies a positive correlation between them, rather than causation. He further claims that a strong financial sector in an economy is only due to historical peculiarity and not necessarily because the economy is performing well. Similarly, Lucas (1988) criticized the overemphasis given to the role of finance in promoting economic development while overlooking the contribution of savings. In short, the neutrality view proposes that there is no significant causal relationship among the three underlying variables. Therefore, it can be argued that none of these variables substantially impact one another (Lucas, 1988; Shan et al., 2001).

Focusing on Keynes (1939), distinction between finance, saving and growth, Post-Keynesians, such as Terzi (1986), Chick (1998), Davidson (1996) and Wray (1998) state that in an economy characterized by a developed financial structure, finance is issued by banks, and it is the role of the credit system to provide the liquid funds to entrepreneurs, and thus, it is banks that hold a key position in the transition from lower to higher scale of economic activity. Post Keynesian, Chick (1998) argues that every credit-based financial system supports high levels of growth if other financial arrangements are created in order to overcome lack of funding in the market.

Keynes finance-saving (funding) theory of investment is based on a financial structure characterized by a developed banking system and dynamic and organized financial markets. From a Post-Keynesian point of view, Zina and Trigui (2000) argue that a financial system is efficient in the process of economic development when it increases the use of available resources.

3.2. Empirical Evidence

Various empirical studies have been conducted to investigate whether the widely accepted notion that the financial sector's growth leads to greater savings, which in turn leads to economic growth, holds true in different developing countries. However, these studies have yielded mixed results regarding the causal relationship among savings, financial development and economic growth within and across countries.

(Bethlehem, 2021) examined the causal relationship between financial development and economic growth in Ethiopia from 1983 to 2019 using the Autoregressive Distributive Lag (ARDL) model. The empirical evidence suggests that private sector credit has a significant and

positive effect on the real economy in the long run. The Granger causality test revealed a link between private sector credit and economic expansion, indicating that the Ethiopian economy is in line with the supply-driven growth hypothesis.

(Mohammed Z et al., 2013) investigated the relationship among the financial development, savings and economic growth in Bahrain during the period 1981 to 2013. The study used the Johansen cointegration test approach, along with a Vector Auto Regression (VAR) model and a VAR causality test. The results showed that there is no long-run relationship between financial development and economic growth in Bahrain, which suggests that neither the supply-leading nor demand-following hypotheses are supported by empirical evidence for Bahrain's economy. However, the causality test confirmed that there is a bi-directional causality between savings and economic growth in Bahrain.

(Hatef, 2017) Examined the long-run relationship between savings, financial development, and economic growth in Turkey from 1968 to 2017. The research utilized the error correction model and the autoregressive distributive lag model. The results indicated that there are bidirectional causal relationships among the variables, which means an expansion in the economy will support having well-developed financial development. In the same vein, a robust financial sector and adequate savings have frequently contributed to the enduring economic expansion in Turkey, indicating that Turkey's economy substantiates the feedback casual hypothesis. Furthermore, (Samiloglua and Bilal Savas, 2006) suggested similar findings.

(Hejie Zhang et al., 2021) The link between financial development, saving rates, and economic volatility in China was securitized between 1980 and 2021. An interaction among variables was explored by using a simple mathematical model. Findings showed that there is a reciprocal relationship between saving rates, financial development, and economic volatility. This leads to tripartite-directional causality. They highlighted that in developed countries, economic volatility is caused by low saving rates, whereas in emerging countries, inadequate financial development is identified as the primary source of economic volatility. Countries with low saving rates or inadequate financial development struggle to avoid economic fluctuations. This is because it becomes challenging to alleviate the financing constraints faced by firms and maintain investment stability.

(Paul Alagidede and Mingiri Kapingura, 2012) conducted to explore the association between financial sector development and savings mobilization in South Africa from 1980 to 2012. This was achieved by employing life cycle hypothesis and Johansen co-integration techniques to assess the Granger Causality testing relationship. The empirical results revealed a long-run relationship between savings and financial sector development. The Granger Causality test confirmed that there is bi-directional causal association between variables. Likewise, (Nyiko Khoza and Tumelo. M, 2014) Studies found that credit extensions and leasing finance have a positive long-term correlation with economic growth, while household savings have a negative association. The Granger causality test shows a bidirectional causal relationship between credit extensions and economic growth, as well as household savings.

(Sheilla, 2014) investigated the dynamic causal linkage between bank-based financial development and economic growth in Ethiopia during the period from 1980 to 2014. The paper used the newly developed autoregressive distributive lag bounds testing approach to cointegration and the error correction model through based granger causality model. The study finds that both financial development and economic growth granger cause each other in the short run, but unidirectional causality runs from financial development to economic growth for long run.

(Chang and Seteven, 2006) Empirical analysis was conducted on the dynamic interaction between financial development, savings, and economic growth in Taiwan from 1980 to 2006. The research utilized a vector error correction model (VECM) by employing the Granger causality test. The Granger causality test revealed a causal relationship between private sector credit and per capita income growth, indicating that Taiwan's economy aligns with the supply-leading hypothesis. Per capita income has a positive and significant causal impact on gross domestic savings. Furthermore, there exists a reciprocal causal relationship between savings and private-sector credit.

While, (Roman, 2012) Analyzed using the vector auto regressive (VAR) and vector error correction model (VECM) approach to determine the long-run and short-run relationship between financial development and economic growth in Ethiopia. Besides, the granger causality test is employed to determine directional cause-effects. The result suggested a unidirectional causality running from economic growth to financial development; this implies that past

economic growth rate is an important determinant for the development of the financial system. As the economy grows the demand for financial resources will increase and this in turn will boost the development of financial sector. This finding is consistent with Patrick's (1966) demand-following hypothesis which postulates a causal association from economic growth to financial development through expanding household and entrepreneurial incomes.

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III. DATA SOURCE AND MODEL SPECIFICATION

3.1 Data Type and Sources

The annual time series data set serially ranging from 1981 to 2023 has been employed in the study. The relevant data was collected from various sources: National Bank of Ethiopia (NBE), Ministry of Finance (MoF), and World Development Indicator databases.

3.2 Estimation Techniques

The study intends to apply a range of approaches to examine the correlation between the variables and evaluate the adequacy of the estimated model. Various methods were employed to perform tasks, including stationary tests, lag selections criteria; bounds test cointegration, and data analyzing methods. The autoregressive distributive lag (ARDL) model is employed to investigate the long-run and short-run relationships of variables. However, this paper also incorporated the Granger causality test based on the vector error correction model (VECM) to scrutinize causal directions.

3.2 Model Specification

Study used Granger causality test method based on (Muluaem, 2019) who attempted to analyze the relationship between savings, investment and economic growth in Ethiopia. He adopted Granger causality test technique based on vector error correction model in which saving is a function of gross capital formation and economic growth and reciprocal true. The ARDL model or bounds testing approach as in (Pesaran et al. 2001; Narayan, 2005), is employed to examine empirically the existence of short-and long-run relationship. This approach is preferred to other approaches for several merits. First and foremost, it can capture both long run and short run effect of saving and financial development on economic growth with other control variables. Second, it allows the variables of the model to possess a mixed order of integration. Third, the ARDL method is more appropriate for small size, and finally, this technique can eradicate the endogeneity problems existing in the model.

Based on the causality, benefits of the ARDL approach and its stages, the study specified the following models.

$$\Delta \text{LnPCI}_t = c_1 + \alpha_1 \text{LnPCI}_{t-1} + \alpha_2 \text{LnDS}_{t-1} + \alpha_3 \text{LnPSCR}_{t-1} + \alpha_4 \text{INF}_{t-1} + \sum_{i=1}^n \alpha_5 \Delta \text{LnPCI}_{t-i} + \sum_{i=1}^n \alpha_6 \Delta \text{LnDSt}_{-i} + \sum_{i=1}^n \alpha_7 \Delta \text{LnPSCR}_{t-i} + \sum_{i=1}^n \alpha_8 \Delta \text{INF}_{t-i} + \sum_{i=1}^n \alpha_9 \text{ECT}_{t-i} + \mu_t \text{---(3.1)}$$

$$\Delta \text{LnDS}_t = c_2 + \beta_1 \text{LnDS}_{t-1} + \beta_2 \text{LnPCI}_{t-1} + \beta_3 \text{LnPSCR}_{t-1} + \beta_4 \text{INF}_{t-1} + \sum_{i=1}^n \beta_5 \Delta \text{LnDSt}_{-i} + \sum_{i=1}^n \beta_6 \Delta \text{LnPCI}_{t-i} + \sum_{i=1}^n \beta_7 \Delta \text{LnPSCR}_{t-i} + \sum_{i=1}^n \beta_8 \Delta \text{INF}_{t-i} + \sum_{i=1}^n \beta_9 \text{ECT}_{t-i} + \varepsilon_t \text{---(3.2)}$$

$$\Delta \text{LnPSCR}_t = c_3 + \gamma_1 \text{LnPSCR}_{t-1} + \gamma_2 \text{LnPCI}_{t-1} + \gamma_3 \text{LnDS}_{t-1} + \gamma_4 \text{INF}_{t-1} + \sum_{i=1}^n \gamma_5 \Delta \text{LnPSCR}_{t-i} + \sum_{i=1}^n \gamma_6 \Delta \text{LnPCI}_{t-i} + \sum_{i=1}^n \gamma_7 \Delta \text{LnDSt}_{-i} + \sum_{i=1}^n \gamma_8 \Delta \text{INF}_{t-i} + \sum_{i=1}^n \gamma_9 \text{ECT}_{t-i} + \lambda_t \text{---(3.3)}$$

Where, PCI_t refers to per capita income growth, which is the average income of an individual in a country. It indicates the standard of living of people in a particular period (t). DS_t represents gross domestic savings at a particular time (t), which is the amount of income saved after consumption. It also shows the financial independence of a country. PSCR_t/GDP Private sector credit/GDP generally is represents domestic credit provided to the private sector at a time (t), which exhibits the flow of financial resources into productive sectors. Typically, the inflation rate (INF_t) is considered a controlling variable in each equation to determine its impact on the economy.

Δ is the first difference operator, (n = 1, 2, 3, 4, and 5) are the optimal lag length; α_5 - α_9 , β_5 - β_9 and γ_5 - γ_9 represent short- run dynamic coefficients and α_1 - α_4 , β_1 - β_4 , and γ_1 - γ_4 represent the long-run multipliers of the underlying ARDL model. (c1-c3) are the intercept, and μ_t , ε_t and λ_t represents the white noise error term. Ln is refers to natural logarithmic. The error correction term (ECTt) indicates the short-term convergence resulting from any long-run disequilibrium.

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IV. DISCUSSION AND RESULTS

4.1 Descriptive Statistics

Table 1: Summary of Descriptive Statistics

| Variables | Observations | Mean | Sta.dev. | Maximum | Minimum | Skewness |
|-----------|--------------|------|----------|---------|---------|----------|
| LnPCIt | 43 | 7.7 | 1.7 | 11.3 | 5.8 | 0.6 |
| LnDSt | 43 | 9.8 | 2.3 | 14.1 | 6.5 | 0.4 |
| LnPSCRt | 43 | 9.5 | 2.4 | 14.0 | 6.4 | 0.1 |
| INFt | 43 | 11.2 | 14.1 | 55.2 | -11.8 | 1.1 |

Source: Own Computation Using Eviews Version 10

The table below shows that real domestic savings and domestic credit to the private sector had an average growth rate of around 9.8% and 9.5%, respectively, during the specified period. This observation suggests that Ethiopia's domestic financing approach has remained relatively in line with domestic savings. In addition, per capita income had an average growth rate of 7.7%, while the inflation rate had an average growth rate of 11.2%. The Skewness statistics indicate that all variables are positively skewed, as their P-values were lower than the conventional alpha value ($\alpha = 0.05$). This suggests that all variables under examination follow a normal distribution.

On the other hand, the inflation rate displayed a notable divergence in its maximum and minimum values, indicating a considerable fluctuation in the rate of price increase over a given period.

4.2 Econometric Analysis

4.2.1 Unit Root

Table 2: ADF Unit Root Test Result

| Variables | Statistic at Level | | Statistic at First Difference | | Remarks |
|-----------|--------------------|---------|-------------------------------|---------|---------|
| | Stat. Value | P-Value | Stat. Value | P-Value | |
| LnDSt | 0.67 | 0.99 | -9.55* | 0.00 | I(1) |

| | | | | | |
|---------|--------|------|--------|------|------|
| LnPSCRt | 0.60 | 0.98 | -4.62* | 0.00 | I(1) |
| LnPCIt | -0.56 | 0.97 | -4.87* | 0.00 | I(1) |
| INFt | -5.05* | 0.00 | | | I(0) |
| CV | -2.93 | | -3.52 | | |

Source: Own Computation Using Eviews Version 10

Based on the unit root test, it was found that after taking the first difference, all variables except for the inflation rate were stationary. This means that credit to the private sector, gross domestic savings, and per capita income moved together. On the other hand, inflation remained integrated at the order level. All the variables were found to be statistically significant at a one percent level

4.2.2 Cointegration

Table 3: Bound Test for Cointegration

| ARDL Model | K | Computed F-statistic (Wald Test) | Inference |
|---|---|----------------------------------|---------------|
| FDS _t (DS _t /PCIt, PSCR _t , INF _t) | 3 | 7.15* | Cointegration |
| FPCIt(PCIt/DS _t , PSCR _t , INF _t) | 3 | 6.81* | Cointegration |
| FPSCR _t (PSCR _t /DS _t , PCIt, INF _t) | 3 | 7.21* | Cointegration |
| Narayan (2005) critical values | | | |
| Level of Significance | | I(0) | I(1) |
| 1% | | 3.65 | 4.66 |
| 5% | | 2.79 | 3.67 |
| 10% | | 2.37 | 3.20 |

Source: Own Computation Using Eviews Version 10

Note: *, ** and *** denote significant at 1%, 5% and 10 % level respectively.

The ARDL bound cointegration test indicates that there are long-term relationships among the variables being studied. In particular, the bound cointegration equations (3.1), (3.2), and (3.3) have statistics of 7.15, 6.81, and 7.21, respectively, which are higher than the upper bound Narayan critical values. This implies that the null hypothesis of no cointegration cannot be accepted at all levels therefore signifying that there exist a long run equilibrium relationship

running from saving, private sector credit and economic growth. The nature of the long run association was established by estimating the error correction of the ARDL model. Specifically, the study did this to determine the speed of convergence of the system back to equilibrium.

4.2.3 Optimal Lag Length Criteria

Table 4: Optimal Lag Selection Test Result

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|----------|---------------|---------------|-------------|--------------|--------------|--------------|
| 0 | -274.25 | NA | 12.95 | 13.91 | 14.08 | 13.97 |
| 1 | -80.30 | 339.41 | 0.00 | 5.01 | 5.85 | 5.32 |
| 2 | -43.46 | 57.10* | 0.00 | 3.97* | 5.49* | 4.52* |
| 3 | -25.30 | 24.52 | 0.00* | 3.86* | 6.06 | 4.65 |

Source: Own Computation Using Eviews Version 10

The research has applied lag length selection criteria to determine the best lag length for the ARDL model bounds test for cointegration, and the results showed that lag order 2 is the optimal lag. All the selection criteria in the Table 4, including LR, AIC, SC, and HQC, recommended lag order 2.

4.2.4 Vector Error Correction Model

The ARDL test results indicate a cointegration relationship among the variables. However, it doesn't provide information about the direction of the causality link between them. To establish the direction of the causality relationship, Granger causality tests are conducted within a VECM framework using equations (3.1), (3.2), and (3.3). The results are presented below.

Table 5: Equation (3.1) Dependent Variable: D(LnDS)

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|-------------|---------------------|-------------|-------|
| D(LnDSt(-1)) | 0.003 | 0.192 | 0.016 | 0.986 |
| D(LnPCI) | 1.925 | 0.471 | 4.084 | 0.000 |
| D(LnPSCRt) | -0.749 | 0.307 | -2.440 | 0.021 |
| D(INF) | -0.012 | 0.003 | -3.018 | 0.005 |
| ECT(-1) | -0.996 | 0.176 | -5.637 | 0.000 |
| C | 1.468 | 0.276 | 5.303 | 0.000 |
| R-Squared | 0.716 | Prob (F-Statistics) | 0.000 | |
| Adjusted R-Squared | 0.631 | Durbin-Watson stat | 1.573 | |
| F-Statistics | 8.4149 | | | |

Source: Own Computation Using Eviews Version 10

Table 5 shows the Vector Error Correction Model results. The long run dynamics in the model is shown by the error correction terms for the equation (3.1) that are estimated in the study. The

estimated equation (3.1) suggests that per capita income growth in Ethiopia is positively correlated with domestic savings growth. As the economy expands, individuals typically observe an uptick in their earnings and, as a result, augment their savings, which have a high possibility of being channeled into productive sectors, which leads to higher profits for firms. This is a clear indication of the growth-driven income hypothesis.

The error correction term for the domestic saving Model is negative and significant at -0.996. It measures the speed of adjustment between the short-run and long run equilibrium of the model. If domestic saving development is in disequilibrium, the system converges back to equilibrium at a speed of 99%. Adjusted R-Squared for the Model is 63% and Durbin Watson test for autocorrelation is 1.57 indicating the absence of autocorrelation.

Table 6: Equation (3.2) Dependent Variable: D(LnPSCRt)

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|-------------|---------------------|-------------|-------|
| D(LnPSCRt(-1)) | 0.239 | 0.102 | 2.329 | 0.028 |
| D(LnPCIt) | 0.817 | 0.190 | 4.286 | 0.000 |
| D(LnDSt) | 0.323 | 0.076 | 4.244 | 0.000 |
| D(INF) | -0.001 | 0.000 | -2.244 | 0.033 |
| ECT(-1) | -0.205 | 0.038 | -5.375 | 0.000 |
| C | 1.155 | 0.206 | 5.586 | 0.000 |
| R-Squared | 0.847 | Prob (F-Statistics) | | 0.000 |
| Adjusted R-Squared | 0.787 | Durbin-Watson stat | | 2.079 |
| F-Statistics | 14.103 | | | |

Source: Own Computation Using Eviews Version 10

The model estimated in equation 3.2 indicates that there is a strong and statistically significant positive correlation between credit granted to the private sector and growth in per capita income. This means that as the private sector credit grows, economic growth in Ethiopia is likely to be high, and is still robust. This suggests that, for Ethiopia, an expansion in the economy is accompanied by an increase in private sector credit, which contributes to more robust economic development. Moreover, it has been confirmed that private sector credit in Ethiopia is "demand following" rather than supply leading hypothesis".

Similarly, there is a significant and positive association between domestic savings and private sector credit growth, indicating that an increase in savings results in a positive impact on private sector credit.

The error correction term for the private sector credit model is -0.205, implying its negative and statistically significant relationship. The speed of adjustment from short-run disequilibrium is 20.5%, indicating that if Private Sector Credit is in disequilibrium in any one period, the system will converge back to equilibrium at a speed of 20.5%. Adjusted R-Squared for the Model is 78.7% and Durbin Watson test for autocorrelation is 2.07 showing the absence of autocorrelation.

On the other hand, findings suggest that there is a negative association between the expansion of private-sector credit and inflation volatility during sample period. Indicating the previous monetary policy measures in Ethiopia have had a lasting impact on targeted factors. However, there have been significant delays in the transmission process. The adverse reaction of private sector credit expansion to previous inflation fluctuations suggests an uncertain monetary policy framework in the country.

Table 7: Equation (3.3) Dependent Variable: D(LnPCIt)

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|-------------|---------------|-------------|-------|
| D(LnPCIt(-1)) | -0.399 | 0.199 | -2.000 | 0.054 |
| D(LnPSCRt) | 0.340 | 0.114 | 2.962 | 0.005 |
| D(LnDSt) | 0.086 | 0.037 | 2.300 | 0.028 |
| D(INF) | 0.005 | 0.001 | 4.308 | 0.000 |
| ECT(-1) | -0.120 | 0.021 | -5.468 | 0.000 |
| C | 0.005 | 0.019 | 0.273 | 0.786 |
| R-Squared | 0.684 | Prob(F-Stat.) | | 0.000 |
| Adjusted R-Squared | 0.629 | Durbin-Watson | | 2.028 |
| F-Statistics | 12.306 | | | |

Source: Own Computation Using Eviews Version 10

The results of Auto Regressive Distributed Lag (ARDL) model indicate that a year lag of growth significantly unaided the current growth level at a five percentage significance level. There is a positive and significant correlation between credit to the private sector, saving, and growth in per capita income in Ethiopia, which indicates that the country has a strong economy. The study reveals that economic growth has a positive and significant impact on credit for the private sector, meaning that an increase in financial resources contributes to greater economic resilience.

Additionally, the positive relationship with savings suggests that people can access credit more easily in the economy. Moreover, this finding confirms that Ethiopia follows the "supply following" hypothesis, rather than the "demand-driven hypothesis. "Likewise, the result depict that there is a statistically significant relationship between per-capita income and inflation which is made evident by the t-value and its coefficient. The model further predicts that there will be a change in general price level of inflation increases or decreases by less than one unit.

The per capita income model shows a significant and negative error correction term of -0.120, implying a long-term relationship between variables. If the income is out of balance due to a shock, the system will return to equilibrium at a rate of 12%. The model has an adjusted R-squared of 63%, and the Durbin-Watson test shows no autocorrelation.

4.2.4.5 Model Diagnosis

The residual and stability diagnostic tests were established to ensure the accuracy of residual robustness. The tests included homogeneity of variance; sample normality, serial LM test, autocorrelation and stability diagnostic tests were conducted. As a result, the estimated model I, model II and model III are well-fitted, which indicates the absence of misspecification and Multicollinearity between the estimated models. The stability test was taken place which represents by CUSUM test of each order that presented in the annex section.

Table 8: Diagnostic Robustness Test Results

| Estimated Models | Normality | | Serial Cor. LM | | Heteroscedasticity | | VIF | |
|------------------|-----------|-------|----------------|-------|--------------------|-------|------------|----------|
| | Stat. | PV | Stat. | PV | Stat. | PV | Uncentered | Centered |
| Model I | 0.463 | 0.793 | 1.392 | 0.267 | 0.346 | 0.559 | 0.074 | 0.847 |
| Model II | 0.949 | 0.622 | 0.667 | 0.520 | 0.883 | 0.550 | 1.250 | 0.790 |
| Model III | 0.302 | 0.859 | 4.573 | 0.042 | 0.864 | 0.602 | 1.610 | 1.228 |

Source: Own Computation Using Eviews Version 10

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V. Conclusion and Recommendation

Within the context of macroeconomic theories, saving, financial development, and economic growth are inseparable and significant macroeconomic parameters. Thus, this study examined the causal relationship among saving, financial development and growth in Ethiopia. The study utilized the Autoregressive Distributive Lag model (ARDL) and Granger causality tests based on the vector error correction model (VECM) to identify the long run and short run relationships among variables by using macro time series data from 1981 to 2023. The paper also employed ADF unit root test and bounds cointegration tests to determine the existence of smoothness and long run relationship among series, respectively.

The research findings confirm that domestic savings have a positive impact on per capita income growth, which suggests that current savings will positively affect future economic growth. Likewise, an increase in per capita income also positively impacts domestic savings, meaning that expanding the domestic economy improves domestic resource mobilization. This is supported by the endogenous growth model and the Harrod-Domar growth model, which show that savings and the capital-output ratio are crucial for an economy's growth. Similarly, it has been observed that there is a positive correlation between per capita income and private-sector credit. This correlation is statistically significant, which suggests that there is a two-way causality between the two variables. This also indicates that there exists a feedback hypothesis between credit and economic growth.

On the other hand, there are mixed results between savings and private-sector credit. Saving has a positive impact on private sector credit, but credit harms savings; and this impact is statistically significant. These two opposing signals suggest that an increase in savings is favors for private-sector financing, but when the demand for domestic resources exceeds the available resources, it can negatively affect domestic savings.

To sum up, this result is consistent with Several previous studies reviewed in the literature have found causality running from private sector credit and savings to GDP per capita and reverse

causality, suggesting that monetary policies favour economic growth through its policy transmission mechanisms and likewise the better economic status will promote well-functioning financial development and savings in the country. To maximize the potential of new opportunities and attract more savings into the financial system, the government and policymakers need to prioritize encouraging credit market development and domestic resource mobilization. This will foster the creation of novel financial resources that can be channeled towards the productive sector, empowering the real economy to fully capitalize on its capacity.

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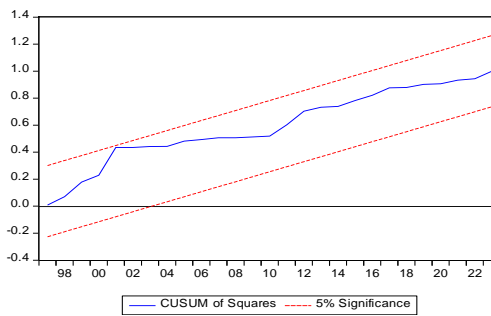
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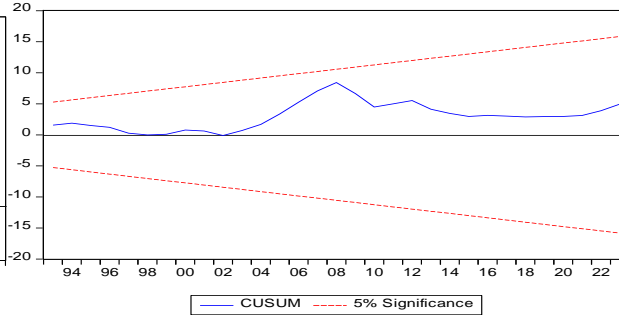
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Annex Section

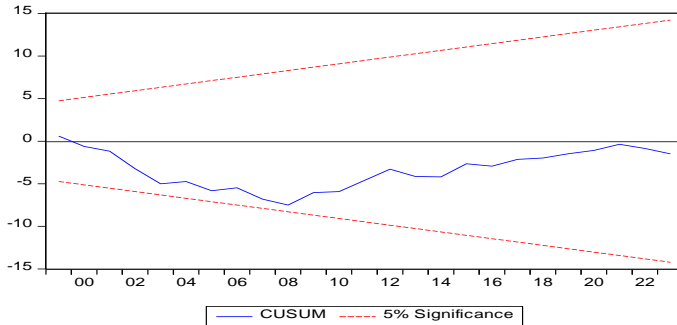
Model I: Stability Test Result



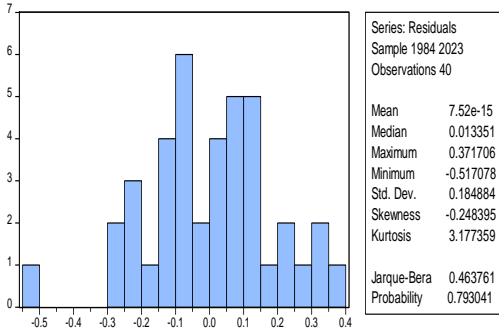
Model II: Stability Test Result



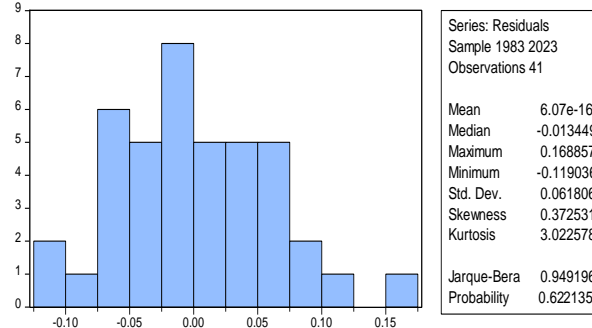
Model III: Stability Test Result



Model I: Normality



Model II: Normality



Model III: Normality

