2025

MASTER'S THESIS

Chabo Shabani MKOKO

T.C.

ANKARA YILDIRIM BEYAZIT UNIVERSITY

GRADUATE SCHOOL OF SOCIAL SCIENCES

THE IMPACT OF FINANCIAL DEEPENING ON ECONOMIC GROWTH IN TANZANIA

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Supervisor
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Ankara, 2025

APPROVAL PAGE

The thesis “The Impact of Financial Deepening on Economic Growth in Tanzania” prepared by Chabo Shabani MKOKO has been accepted as a Master’s Thesis at Ankara Yıldırım Beyazıt University, Graduate School of Social Sciences, Department of Economics by the following jury by unanimous vote.

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Date of the Defence: 14/07/2025

I hereby certify that this thesis fulfils the requirements for being a Master’s Thesis at Ankara Yıldırım Beyazıt University, Graduate School of Social Sciences, Department of Economics.

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Director of the Graduate School of Social Sciences

DECLARATION

I hereby declare that this thesis is my own work, that I have not had any unethical behaviour that violates patent and copyright rights in any stage, from the planning to the writing up of the thesis, that I have collected all the information by following academic and ethical rules and that I have cited all the information and comments used in this study. 14/07/2025.

Signature

Chabo Shabani MKOKO

ACKNOWLEDGEMENTS

This thesis reflects the unwavering support and unlimited love I received from my family and friends throughout this difficult academic journey. I owe a great deal of thanks to my parents for nurturing my interest and supporting my academic pursuits from the start. I am deeply grateful to my supervisor, Assoc. Prof. Dr. Önder ÖZGÜR, for his continuous support and constructive critiques throughout my research journey. His unwavering dedication to academic achievement and rigorous attention to detail have greatly influenced this thesis. I am also grateful to the member of my thesis committee, Prof. Dr. Murat ASLAN and Assoc. Prof. Dr. Erkan GÜRPINAR for their constructive input and helpful ideas that improved the quality of my work.

ABSTRACT

The Impact of Financial Deepening on Economic Growth in Tanzania

This study utilizes an autoregressive distributed lag (ARDL) approach with annual data from 1990 to 2023 to investigate how financial deepening affects Tanzania's economic growth. We examine short-term dynamics and long-term equilibrium relationships using basic ARDL model alongside unrestricted and restricted error correction models. While broad money supply shows delayed beneficial impacts, bounds testing reveals a stable long-term relationship and identifies private sector credit as the main driver of growth. Short-term dynamics indicates that credit expansions boost GDP immediately, while broad money first decrease output before producing benefits. Adjustments to equilibrium occur quickly. Effective government spending increases growth, while population growth has nonlinear effects. Based on these findings, Tanzania's growth is credit-constrained, highlighting the necessity of reforming the financial sector to increase credit availability, adjust monetary policy to counteract the initial contractionary impacts of money supply expansion, and strengthen institutional frameworks for long-term equilibrium.

Key Words: Financial Deepening, Economic Growth, Tanzania, ARDL.

ÖZET

Finansal Derinleşmenin Tanzanya'daki Ekonomik Büyüme Üzerindeki Etkisi

Bu çalışma, finansal derinleşmenin Tanzanya'nın ekonomik büyümesini nasıl etkilediğini incelemek amacıyla 1990–2023 dönemine ait yıllık verilerle Otoregresif Dağıtılmış Gecikme (ARDL) yaklaşımını kullanmaktadır. Temel ARDL modeli ile birlikte sınırlı ve sınırsız hata düzeltme modelleri kullanılarak kısa dönem dinamikleri ve uzun dönem denge ilişkileri analiz edilmektedir. Anlizlerden elde edilen sonuçlara göre geniş para arzı gecikmeli olarak olumlu etkiler gösterirken, sınır testi uzun vadeli istikrarlı bir ilişkiyi ortaya koymakta ve büyümenin temel belirleyicisi olarak özel sektöre verilen krediyi işaret etmektedir. Kısa dönem dinamikleri ise kredi genişlemesinin GSYH'yi hemen artırdığını göstermektedir. Buna karşın geniş para arzı başlangıçta çıktıyı azaltmakta, ardından olumlu etkiler yaratmaktadır. Dengeye uyum hızlı bir şekilde gerçekleşmektedir. Etkili kamu harcamaları büyümeyi artırmakta, nüfus artışı ise doğrusal olmayan etkiler göstermektedir. Bu bulgulara dayanarak, Tanzanya'nın büyümesinin kredi kısıtı altında olduğu ve bu nedenle kredi erişimini artırmak için finansal sektörün reforme edilmesi, para arzı genişlemesinin başlangıçtaki daraltıcı etkilerini dengelemek için para politikasının yeniden düzenlenmesi ve uzun dönem dengeyi sağlamak üzere kurumsal yapının güçlendirilmesi gerektiği vurgulanmaktadır.

Anahtar Kelimeler: Finansal Derinleşme, Ekonomik Büyüme, Tanzanya, ARDL.

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LIST OF ABBREVIATIONS

SSR_R	Restricted Some of Squared Residuals
SSR_U	Unrestricted Some of Squared Residuals
ADF	: Augmented Dickey Fuller
ARDL	: Autoregressive Distributed Lag
BOT	: Bank of Tanzania
CRDB	Cooperative Rural Development Bank
DSE	Dar es Salaam Stock Exchange
ECT	Error Correction Term
FSSA	Financial System Stability Assessment
GDP	: Gross Domestic Product
IMF	: International Monetary Fund
JB	Jarque-Bera
NBC	National Bank of Commerce
NMB	National Microfinance Bank
NPLs	Non-Performing Loans
PP	: Phillips-Perron
SACCOS	Savings and Credit Cooperative Societies
SADC	Southern African Development Community
SMEs	Small and Medium Enterprises
SSA	Sub-Saharan African Countries
VAT	Value Added Tax
WB	: World Bank

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INTRODUCTION

The relationship between economic growth and financial development has been a prominent focus of both theoretical and empirical macroeconomic study. Financial deepening, which is defined as the expanded provision and utilization of financial services, including diverse financial instruments, enhanced institutional frameworks, and extended credit availability, has been identified as a critical factor in the promotion of sustainable growth Levine, (2004); King & Levine, (1993). Financial deepening, particularly in developing economies, cultivates a favorable environment for private investment and innovation by improving capital allocation, mobilizing savings, and streamlining risk management Ang, (2008).

Tanzania has implemented significant economic and financial changes in the last two decades, such as the deregulation of its banking system, the development of mobile money technologies, and the increase of private sector lending. The financial landscape of the country has been significantly altered as a result of these changes, which has provided an appropriate backdrop for evaluating the macroeconomic consequences of financial deepening. Although cross-country analyses frequently confirm the finance–growth connection Gregorio & Guidotti, (1995); Beck et al. (2014), argue that there are comparatively few research that offer a detailed, country-specific examination within the Sub-Saharan African setting. This paper endeavors to address the empirical vacuum by assessing the impact of several financial deepening factors on economic development from 1990 to 2023, in light of Tanzania's distinctive trajectory.

Focus and Purpose of the Research

The primary goal of this study is to determine the extent to which Tanzania's economic growth trajectory is influenced by financial deepening through controlling for the trade openness, school enrollment,government expenditıre and population growth. To be more precise, it evaluates the individual and combined effects of two primary financial indicators the broad money supply (M3) and credit to the private sector on real GDP. The inquiry aims to provide insights that are essential for the development of macroeconomic

policy by examining both the short-run fluctuations and long-run equilibria within the finance-growth connection.

Originality of the Study and Contribution to the Literature

The rationale for examining financial deepening in Tanzania arises from the capacity of financial development to narrow the gap between savings and investment requirements. This may result in enhanced capital formation, productivity gains, and ultimately, elevated GDP growth rates. Additionally, financial deepening has the potential to strengthen economic stability by providing a broader selection of financial products, which can result in better risk diversification and management

While the finance-growth nexus has been extensively researched, this study broadens the empirical horizon of financial deepening research in Tanzania to include three decades (1990-2023), giving the most recent and comprehensive time series analysis to date. Previous studies, such as Aikaeli and Mbellenge (2016), have typically focused on shorter time periods or ended around 2020. Our inclusion of the years through 2023 captures the most recent policy reforms, addresses the consequences of technical innovation and financial inclusion, which are widely acknowledged as moderating variables in the finance-growth connection Ang, (2008); Abu-Bader & Abu-Qarn, (2008), and post-COVID 19 recovery dynamics. In doing so, the study provides new insights into how long-run and short-run finance-growth links may have evolved in response to Tanzania's changing macroeconomic environment and regulatory landscape.

The study uses advanced econometric approaches (such as ARDL models) to analyze the causal relationship between financial deepening and economic growth. This adds to the continuing argument over whether financial development drives growth or vice versa, by providing context-specific evidence from a developing economy with a distinct financial ecosystem. Furthermore, the findings of this study will be extremely important for Tanzanian decision-makers in charge of designing effective economic plans. Understanding the processes of financial deepening can influence the creation of policies focused on reforming the financial sector, strengthening monetary policy, and stimulating growth in the private sector.

Research Methodology

The empirical technique is founded on ARDL framework that employs yearly time series data from 1990 to 2023, which is obtained from the world bank website. Unit root tests such as the Augmented Dickey-Fuller (ADF), Phillips-Peron, and KPSS were computed to verify that the variables are I(0) or I(1) rather than I(2) before employing the ARDL methodology. GDP was selected as the dependent variable in the model, and the money supply, private sector credit, trade openness, school enrollment, population growth, and government spending were chosen as the explanatory factors. The Akaike Information Criterion (AIC) was then used to ascertain the ideal lag lengths for the independent and dependent variables. The F-bounds testing approach was used to test for a long-run relationship (cointegration) between the variables; based on our results, cointegration was established, thus we estimated the long-run and short-run coefficients. Residual autocorrelation, heteroskedasticity assessment, the Jarque-Bera normalcy test, and the CUSUM test for model stability were conducted for model diagnostic evaluation. ARDL has a long and distinguished history of academic research. Pesaran and Shin (Pesaran & Shin, 1999) initiated the discussion by demonstrating the ability of ARDL to manage cointegration with mixed I(0) and I(1) variables. Their 2001 paper with Smith introduced the bounds test, cementing ARDL's place in econometrics.

Scope and Limitations of the Study

Although the research provides useful insights into the macroeconomic implications of financial deepening in Tanzania, it is restricted by certain constraints. Initially, it employs aggregate macro-level measures such as private sector credit to GDP and broad money (M3) ratios, which may hide substantial micro-level heterogeneities, such as geographical or demographic variations in financial access. In Tanzania, for example, urban areas such as Dar es Salaam and Arusha have far higher banking penetration and credit access than remote rural districts with scarce branch networks and inadequate collateral enforcement procedures. Demirguc-Kunt and Klapper (2012) contend that macro-level measures frequently hide major differences in financial inclusion between regions and socioeconomic levels, underlining the necessity for disaggregated data to fully understand financial access discrepancies in contexts such as Tanzania.

Secondly, mobile money services are not statistically modeled due to data restrictions, despite their conceptual inclusion. Given that mobile money agents now outnumber bank branches by a factor of three in many regions (World Bank, 2023), and that M Pesa-style platforms facilitate credit scoring and micro loans using alternative data, ignoring this channel may underestimate Tanzania's financial system's depth and inclusiveness. Thirdly, the consistency of time series may be influenced by structural breakdowns, such the global financial crisis and the COVID-19 epidemic. Finally, despite the use of exhaustive diagnostic techniques, endogeneity and omitted variable bias, which are prevalent in macroeconomic modeling, may continue to be present. Macro-econometric models of finance and growth frequently suffer from reverse causality whereby higher output may itself spur financial development as well as from unobserved confounders like institutional quality, regulatory uncertainty, and political stability (Wooldridge, 2010; Leamer, 1983). However, the investigation offers a comprehensive framework for assessing financial progress in a dynamic, transforming economy.

The organizaton of this thesis is as follows. The following part explains the financial system, financial deepening and the link between financial deepending and the economic growth. The second section explains the Tanzania’s financal sector and provides an overview. The third section provides a theoretical background on the link between financial deepening and economic growth and reviews the empirical literature in this issues. The fourth section introduces data, variables and the empirical methodology. The fifth section illustrates empirical findings and the last section provide some disucssions and concludes the study.

1. THE FINANCIAL SYSTEM, FINANCIAL DEEPENING AND ECONOMIC GROWTH

1.1. Financial System

The central bank, financial institutions, and financial markets are the three primary components of the financial system. The primary objective of a financial system is to facilitate the exchange of funds between investors and borrowers. Households, firms, and the government serve as repositories of funds. Their saving behaviors are indicative of the broader economic conditions and sentiment, whereas borrowers are a combination of households, enterprises, and government entities. Firms borrow to invest in capital products, households take out loans for housing, and governments finance infrastructure or social programs through debt issuance. Their need for capital is the foundation of much of economic activity. Initially, the financial system establishes a connection between savers and creditors by facilitating risk sharing, which enables savers to mitigate financial asset risk by diversifying their assets. Second, liquidity is the ease with which financial markets facilitate the development of more liquid financial assets. Thirdly, financial markets determine the prices of stocks, bonds, and other securities, which is a means of communicating information to both investors and borrowers. In overall, the financial system is essential for the promotion of investment and the efficient allocation of resources, thereby facilitating economic development. Financial markets contribute to the overall stability and development of an economy by offering a platform for depositors and borrowers to interact.

The central bank influence financial deepening through monetary policy, primarily by controlling the money supply and setting interest rates. By lowering interest rates, they can encourage borrowing and investment, stimulating economic activity and expanding financial markets. moreover, central bank act as regulators and supervisors of financial institutions, such as banks and other intermediaries. Through regulation and supervision, they ensure the stability and integrity of the financial system. additionally, an efficient payment system is the backbone of financial transactions, and central bank is responsible for its operation and oversight. By ensuring that payment systems are reliable, secure, and cost-effective, central banks facilitate smoother and faster transactions. This efficiency lowers barriers to financial market participation, encouraging businesses and individuals to engage more actively, thereby deepening the financial ecosystem.

Financial institutions which encompass banking and non-banking financial intermediaries are the mobilizer of savings through deposits, insurance premiums, pension contributions and responsible for efficient allocation of capital. on the other hand, financial markets which entail equity market, foreign exchange market, debt security market, derivative market are responsible for liquidity provision that is enable participants to buy/sell financial instruments quickly with minimal price impact, facilitation of trading and mobilization of capital. Together, financial institutions and financial markets create a robust, efficient, and inclusive financial ecosystem essential for sustainable economic development. Their effective functioning, supported by the central bank's foundational role is the bedrock of financial deepening.

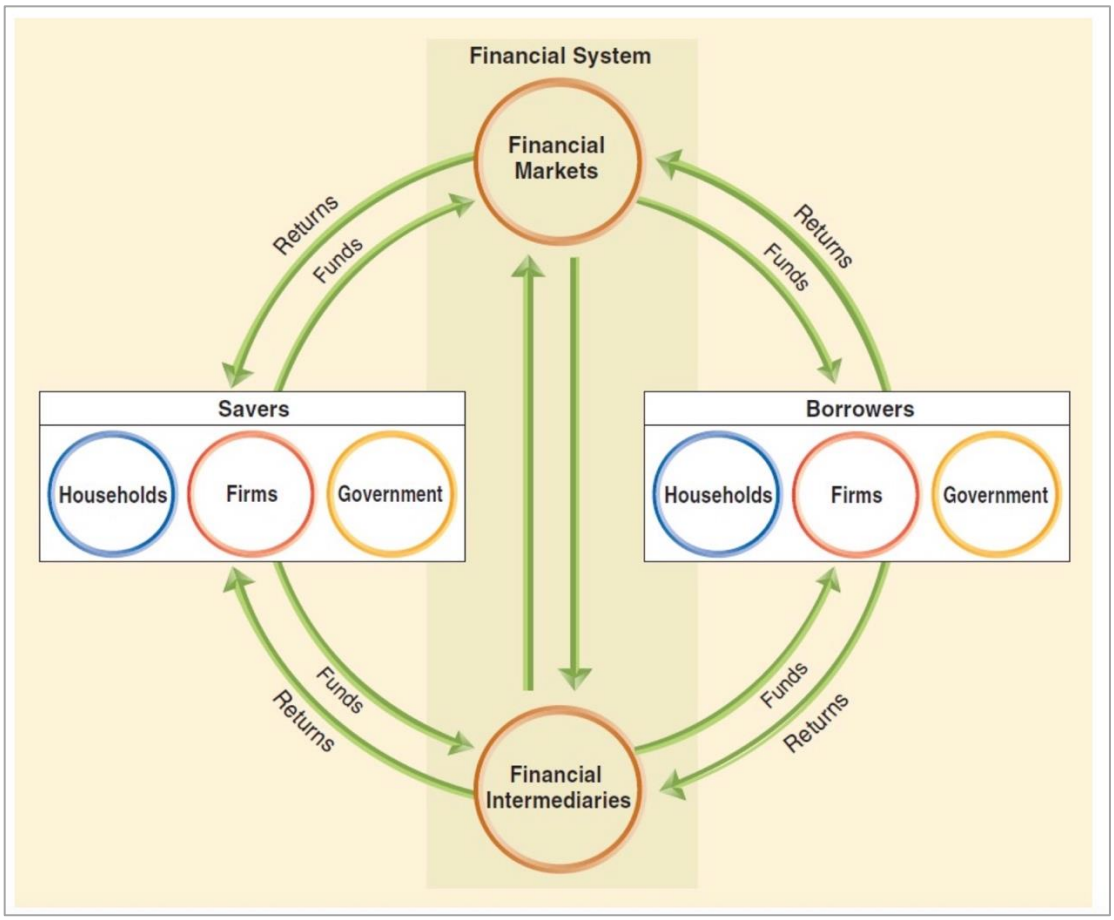


Figure 1.1. Financial System

Source: Madura, Financial Markets and Institutions, 11th Edition.

1.2. Financial Deepening

It may be seen as the process of improving and expanding financial systems by increasing the depth, liquidity, efficiency, and volumes of financial institutions and markets,

as well as diversifying domestic sources of financing and expanding access to banking and other financial services. Economic growth and development are substantially influenced by financial inclusion, particularly in Africa. Despite the fact that formal account ownership rates are low, ranging from 4 percent in the Democratic Republic of Congo to 54 percent in South Africa as of 2011 by Oji, (2015), financial exclusion continues to be a concern. Income constraints, distance from financial institutions, and illiteracy are among the primary obstacles that impede access to formal financial services. Informal systems, such as "tontine" in Benin and "esusu" in Nigeria, are frequently employed as alternatives, despite the potential for uncontrolled behaviors.

Financial inclusion is influenced by a variety of issues in the African setting, notably between 2005 and 2014. Per capita income, literacy rates, internet connectivity, and the engagement of Islamic banking, which has had favorable benefits on financial participation, are among the key drivers by Zins & Weill, (2016). Domestic credit and deposit interest rates had minor influence throughout this era, despite the fact that broad money as a proportion of GDP had an impact on financial services. Particularly in places with inadequate banking infrastructure, microfinance is crucial in promoting financial development. By improving the accessibility of financial services to low-income persons, sustainable microfinance efforts can encourage economic growth. It complements current financial systems and contributes to poverty eradication by serving as a transitional platform for more comprehensive financial development methods by Barr, (2024).

1.3. The Link Between Financial Deepening and Economic Growth

The literature has long devoted considerable attention to the correlation between financial deepening and economic development. A deeper understanding of the role of the financial sector in driving economic development provides enough justification for this focus. An important factor in promoting economic growth and alleviating poverty is the expansion of the financial sector. The sector serves multiple purposes, such as informing the market about potential investments and allocating capital, overseeing investments and ensuring good corporate governance following the provision of finance, easing trade, diversification, and risk management, mobilizing and pooling savings, and facilitating the exchange of goods and services.

1.3.1. Macroeconomic Volatility

Through several pathways, an economy's resilience and ability to manage macroeconomic volatility can be enhanced by more varied and deep financial systems. The volatility of investment and production can be mitigated by deep financial systems, which can ease iliquidity limitations on enterprises and sectors. In the same way, households are able to more effectively manage their consumption over time by having access to insurance arrangements and savings possibilities. In frontier and developing countries, shallow financial systems can restrict the options for fiscal, monetary, and exchange rate policy, inhibit the transmission of macroeconomic policy, and obstruct the diversification or hedging of risk by Dept, (2012).

1.3.2. Enhancing Macroeconomic Policy Effectiveness

Shallow financial systems can significantly constrain a country's ability to design and implement effective macroeconomic policies. The underdevelopment of financial markets not only limits the choice of exchange rate and monetary policy regimes but also undermines the efficacy of fiscal policy tools. In such settings, the capacity to maintain macroeconomic stability and respond to external shocks through countervailing policy measures is severely restricted.

For instance, the choice of exchange rate regime a critical aspect of macroeconomic management is often influenced by the degree of financial development. Countries with underdeveloped financial systems tend to opt for fixed or pegged exchange rate regimes due to the lack of depth and flexibility in domestic markets. Empirical studies support this association, indicating that financial depth significantly impacts the selection of exchange rate frameworks, with less financially developed economies more inclined toward rigid pegs by Obstfeld & Taylor, (2004); Ye, (2011).

Similarly, the effectiveness of monetary policy is closely linked to the sophistication of financial systems. In financially shallow environments, the range of instruments available for monetary policy implementation is limited, and the transmission mechanism through which policy adjustments influence inflation and output is often weak. This diminishes the central bank's ability to manage inflationary pressures and stabilize the economy.

Fiscal policy is also affected. In the absence of deep and diversified financial markets, governments face unstable and narrow financing options. This fragility can exacerbate fiscal risks and limit the feasibility of implementing countercyclical fiscal strategies. For example, when domestic debt markets are thin and access to foreign financing is volatile, governments may be forced into pro-cyclical stances, thereby magnifying economic fluctuations. Furthermore, increased government borrowing in shallow markets can crowd out private investment, undermining long-term growth and macroeconomic resilience.

These dynamics are not unidirectional. Policy regimes themselves can influence the trajectory of financial development. Greater exchange rate flexibility, for instance, may stimulate the development of new financial products and expertise in foreign exchange markets. Thus, the relationship between financial depth and macroeconomic policy is characterized by mutual reinforcement and potential feedback loops, underlining the critical importance of financial sector development for effective economic governance.

1.3.3. Managing Capital Flows

A high level of financial integration can have a substantial impact on economic growth and risk sharing, as well as helping to strengthen the financial sector and deepen capital markets. However, the unpredictability of capital inflows can pose issues to macroeconomic and prudential policy.

1.4. Financial Stability

In general, the financial systems of emerging nations are less integrated than those of more established nations. Their relative resilience during the global financial crisis has been somewhat influenced by this limited integration. Nevertheless, the lack or illiquidity of financial markets in these locations continues to render them susceptible to substantial shocks and instability, hence hampering the implementation of effective risk management strategies.

Underdeveloped financial systems are particularly susceptible to foreign currency risk. The broader economy and financial institutions are exposed to exchange rate volatility in such situations, since the realized risks to market players are often larger due to insufficient hedging mechanisms and poor regulatory infrastructure.

The management of liquidity is likewise a significant concern. Financial institutions are unable to properly alter their liquidity positions due to the shallowness of their financial markets. For instance, the expenses associated with portfolio management and liquidity needs are increased for banks in weak domestic money markets. In order to protect against sudden or unforeseen obligations, banks in numerous frontier and developing countries maintain a significant portion of their assets in liquid form, as evidenced by the liquidity ratio in Papua New Guinea, which exceeds 60%. These high adjustment costs are partially responsible for this. Furthermore, the maturity of banks' assets is restricted by the high incidence of short-term and unpredictable liabilities, which exacerbates the risk of financial contagion and weakens their ability to absorb shocks.

Concentration hazards and poor resource allocation are further concerns. In shallow markets, banks are exposed to a narrow group of counterparties due to the constricted economic diversity and the limited number of formal financial entities. This concentration of exposures exacerbates credit and interest rate risks and exerts additional pressure on the profitability and solvency of banks, particularly in the context of deteriorating external conditions. The financial sector's development and resilience are further restricted by the limited emphasis, which also restricts banks' capacity to optimally reallocate resources.

2. TANZANIA FINANCIAL SECTOR OVERVIEW

The financial industry is divided into the following subsectors: banking, capital markets, insurance, micro finance, and social security. Over the last two decades, Tanzania's banking business has experienced substantial shifts as a result of economic advances, technology breakthroughs, and regulatory reforms. The banking business in Tanzania has its origins in the colonial era; nonetheless, it saw significant expansion and reform in the late 20th century. The 1990s financial sector reforms, which encompassed the deregulation of the banking system, were a significant turning point. The objectives of these changes were to promote financial stability, boost efficiency, and encourage competitiveness.

The Bank of Tanzania (BOT) as an independent central bank was a critical first step in this direction. BOT has played a critical role in maintaining a stable financial climate by regulating and monitoring the banking sector. Furthermore, the Banking and Financial Institutions Act (BFIA) established a strong legislative framework for the functioning of financial institutions and banks in the nation. Collective investment schemes accounted for 0.6 percent, insurance for 2.2 percent, social security for 27.5 percent, and the banking sub sector for 69.7 percent of the total assets as of December 2018. On the other hand, the market capitalization of businesses listed on the Dar es Salaam Stock Exchange (DSE) was TZS 19.1 trillion.

Tanzania's financial system structure is indicative of the results of these policy changes as of December 2023. While the banking subsector continues to dominate, it accounts for around 25% of GDP and 66.2 percent of the overall financial system assets. In addition to 39 commercial banks, there are five community banks and other specialist institutions, including mortgage, development finance, and microfinance banks. Insurers and open-ended collective investment schemes account for 2.2 percent, 2.2 percent, and 0.6 percent of total assets, respectively. Pension funds are the second-largest component, accounting for 27.5 percent of financial assets (equal to nearly 10 percent of GDP). Although their individual shares are modest, these non-bank financial entities make a significant contribution to the larger financial diversity and risk-sharing.

Table 2.1. The Financial Sector Landscape in Tanzania as of 2018

	Number of institutions	Assets (in billions of TZS)	Percent of total assets	Percent of I GDP[3]
Banks	53			
Commercial banks	39	29,023.80	66.2%	25.00%
Community banks	5	148.70	0.34%	0.13%
Development finance institutions	2	1,037.22	2.37%	0.89%
Mortgage	2	184	0.42%	0.16%
Microfinance banks	5	173.28	0.40%	0.15%
Insurers1	31	947.6	2.16%	0.82%
Pension funds2	2	12,042.12	27.47%	10.37%
Open-ended collective schemes	5	281.67	0.64%	0.24%
Total financial system		43,838	100%	37.76%

Source: (Finance, 2020-2030)

The financial environment of Tanzania is characterized by both continuous problems and improvement, as seen by these trends. Although the banking sector has increased in depth and diversification, other sectors, such as capital markets and insurance, are relatively underdeveloped. This suggests that there is potential for future policy support to be directed toward the enhancement of resource allocation and the expansion of financial inclusion throughout the economy. Sectoral asset sizes have expanded along with this institutional expansion. In 2017, the overall financial system assets had reached 37.8 percent of GDP, with banking contributing 26.3 percent, social security 10.4 percent, insurance 0.8 percent, and open-ended collective schemes 0.2 percent. These results confirm the substantial contribution of financial sector reforms to the deepening of the macro-financial system.

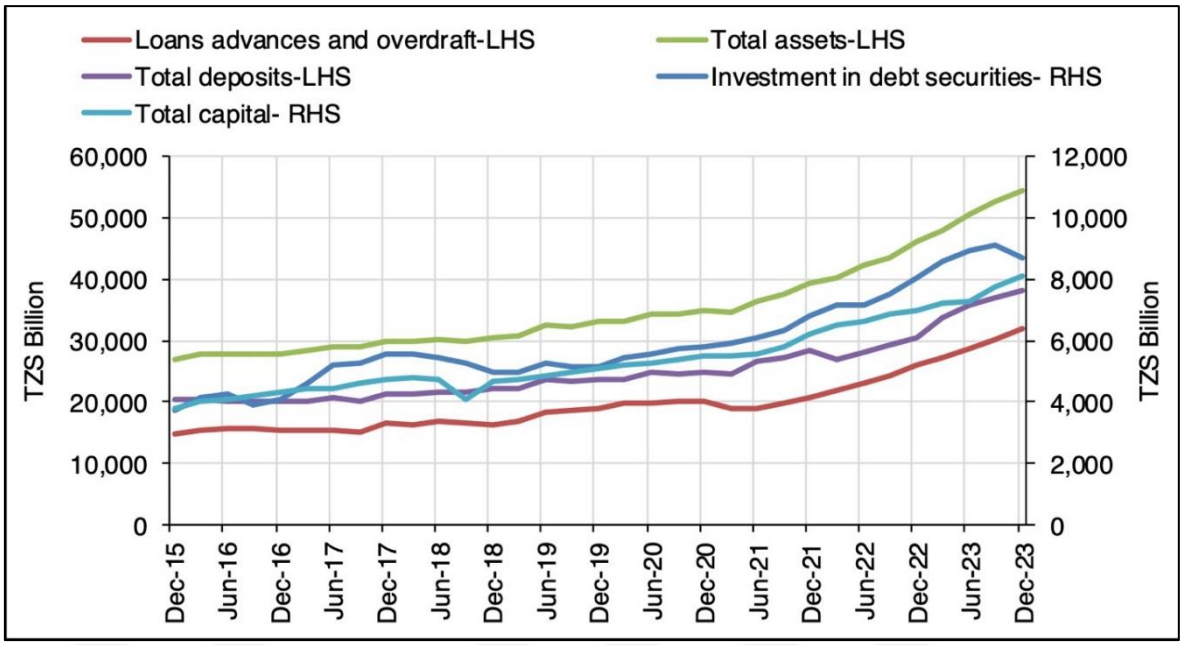


Figure 2.1. Composition of Selected Bank's Assets and Liabilities

Source: (Tanzania, 2023)

The dynamics of the banking system's balance sheet, as seen in the time series chart from December 2015 to December 2023, further illustrating this sectoral mix. The banking sector's total assets have increased by over twofold throughout this period, continuously increasing from around TZS 28,000 billion to nearly TZS 58,000 billion. The trajectory of loans, deposits, and capital has likewise been upward, which is indicative of the deepening of the financial system and the growing intermediation. Notably, the sector's expanding importance in government funding and financial market growth is demonstrated by the expansion of investments in debt securities.

2.1. After Independence Era

The financial industry in Tanganyika remained weak and limited following its independence. Tanzania inherited a banking system that was built during colonial rule. The inherited system was founded on the East African Currency Board (EACB) and a small number of colonial banks, however other institutions, including private banks and other financial intermediaries, were already operating under a framework that was intended to serve colonial economic interests (BOT, 2011).

In the early 1960s Tanzania was served by a few large foreign Commercial Banks**.** Principal players were Barclays Bank, Standard Bank (later Standard Chartered) and the National & Grindlays Bank. These banks had been licensed under colonial rule to serve settler and merchant clients, and even by 1967 they remained effectively foreign-owned. In 1965 the government sought to build a public sector bank the Tanzania Bank of Commerce (TBC) was created with 60% state equity, in Zanzibar, the People's Bank of Zanzibar was similarly founded in 1966 as the government's banker. Aside from these, a Post Office Savings Bank Tanganyika Post Office Savings Bank existed for small savers, and pension or provident funds held savings but had few outlets (World bank, 1967). Tanzania's own central bank did not yet exist at independence. The EACB continued issuing currency and holding foreign reserves until it was phased out. The EACB was abolished in 1965, making room for the development of national central banks in Kenya, Tanzania, and Uganda.

The Bank of Tanzania was founded under the Bank of Tanzania Act of 1965 to carry out the traditional central banking tasks. The BOT took over the EACB's functions and (later) its assets for Tanzania. From 1966 onward it performed all standard central banking functions issuing the new shilling, regulating the money supply and acting as banker to the government (Tanzania, Report, 2011). In the 1960s Tanzania had no domestic insurance firms coverage was provided by branches or agencies of British and other foreign insurers. Following the 1967 Arusha Declaration, all insurance was nationalized the state formed the National Insurance Corporation of Tanzania (NIC**)** to assume the businesses and reserves of private insurers (Dept. 2009).

2.2. Financial Sector Reforms

Since the 1990s, the government has launched a number of sector-specific programs, such as the First- and Second-Generation Financial Sector Reforms, in recognition of the sector's significance (Financial Sector Development Master Plan, 2020-30). The primary goal of the First-Generation Financial Sector Reforms (FGFSR: 1991–2003) was to create a regulatory and legislative framework that would encourage private sector involvement in banking and capital markets. As part of the reforms, several laws were passed, including those pertaining to banking and financial institutions (1991), capital markets and securities (1994), cooperative societies (2003), foreign exchange (1992), and zanzibar social security (1998). Microfinance policy (2000) and social security policy (2003) were also formulated.

Interest rate liberalization, capital market introduction, and an increase in the number of local and foreign banks and financial institutions were also part of the reforms.

The 2006 Second-Generation Financial Industry Reforms (SGFSR) aimed to regulate and oversee the financial sector, as well as provide access to long-term financing, insurance, pension plans, and financial markets. Expanding on the FGFSR's reforms, the SGFSR sought to improve the financial system's efficiency, competition, and the ability of financial institutions to mobilize savings; increase the efficacy of monetary policy instruments; and broaden the scope of reforms to improve access to financial services for the majority of people (Financial Sector Development Master Plan, 2020-30).

There were a total of 53 banks and financial institutions in Tanzania as of December 2018, up from 10 in the 1990s. Insurance companies grew from two to thirty-one; the number of companies listed on the Dar es Salaam Stock Exchange (DSE) increased from zero to twenty-eight; the number of collective investment schemes increased from zero to nine; the number of microfinance institutions increased from zero to four hundred and fifty-five; the number of Savings and Credit Cooperative Societies (SACCOS) increased from zero to four hundred and seventy-seven in mainland Tanzania and two hundred and thirty-one in Tanzania Zanzibar; and the number of non-bank payment system providers also increased. (15 payment system providers, 6 electronic money issuers and 483,283 agents).

There was a merger of five pension funds into two in the social security sector in Mainland Tanzania (2). Total financial sector assets also rose to 37.8 percent of GDP in 2017 as a consequence of the reforms' effects on the financial industry. Subsectors of banking(26.3%), social security(10.4%), insurance(0.8%), and open-ended collective schemes (0.2%) of GDP were identified. Financial inclusion, in contrast, rose from 57% in 2013 to 65% in 2017. (Financial Sector Development Master Plan, 2020-30).

On the other hand, the development of the capital market is still inconsistent. As shown in Figure 2.2, while total market capitalization in absolute terms has remained relatively stable since 2016 (hovering between TZS 15–20 trillion), the market capitalization-to-GDP ratio declined significantly from over 20 percent in 2017 to below 12 percent in 2023. This implies that market growth has not kept pace with the expansion of the actual economy, which might indicate possible restrictions in market depth and investor involvement. Furthermore, domestic market capitalization remains a smaller share of total

capitalization, indicating continued reliance on cross-listed companies rather than domestic corporate listings.

Additional information are provided by share index trends. The Tanzania Share Index (TSI) and the All Shares Index (DSEI) have exhibited a progressive increasing tendency, particularly after 2021. Nevertheless, sectoral indices, notably Industrial and Allied (IA) and Commercial Services (CS), have either stalled or deteriorated, which is indicative of the difficulties in industry diversification and private sector capitalization. In contrast, the Banks, Finance and Investment Index (BI) has had a substantial recovery in recent years, suggesting that investor confidence in the financial sector has increased.

The capital market in Tanzania, which is represented by the Dar es Salaam Stock Exchange (DSE), has a market value of TZS 19.1 trillion. Collective investment schemes accounted for 0.6 percent of financial assets, indicating that the capital markets are still in the process of development.

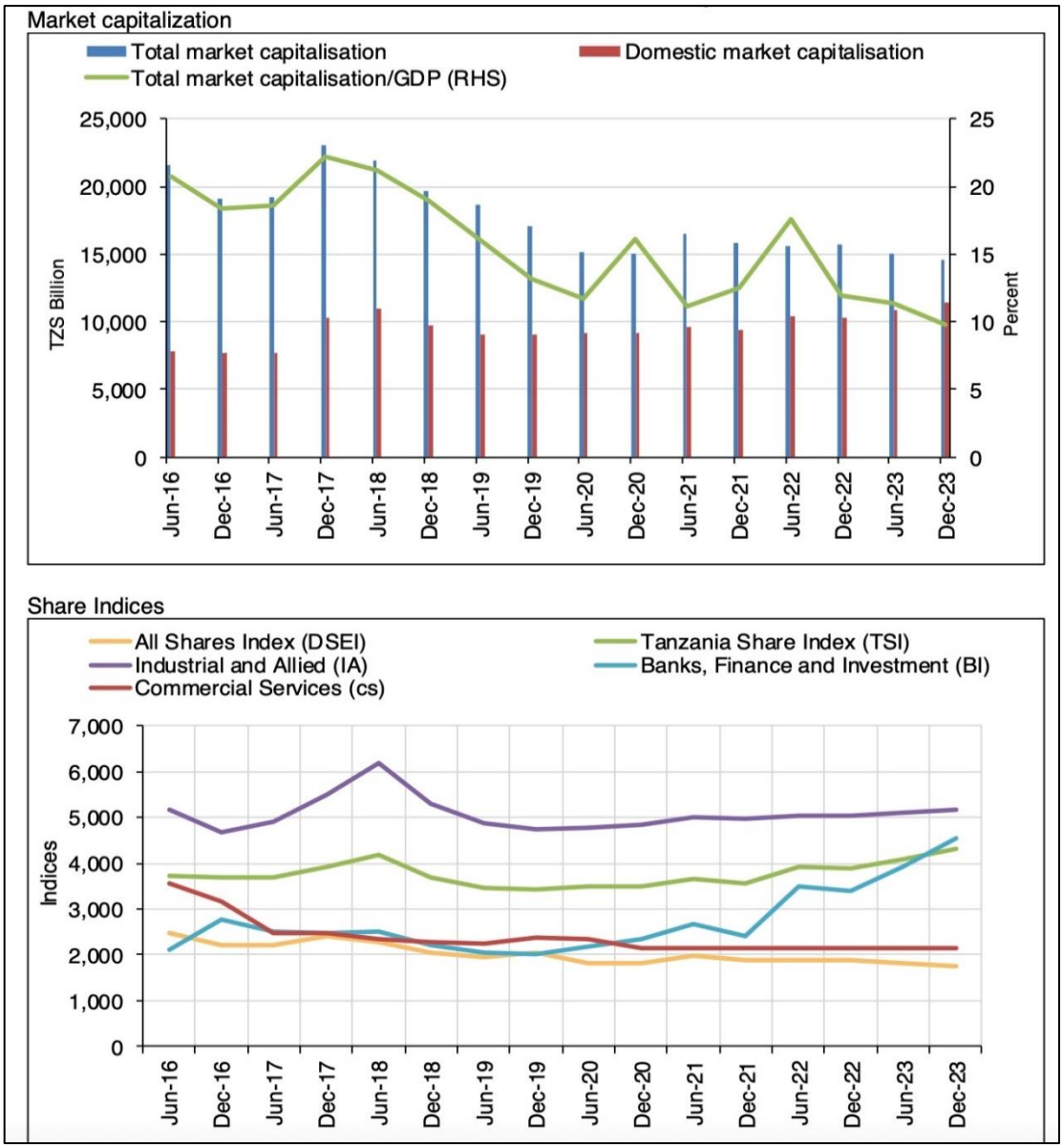


Figure 2.2. Performance of the Dar es Salaam Stock Exchange

Source: Financial Stability Report, 2023

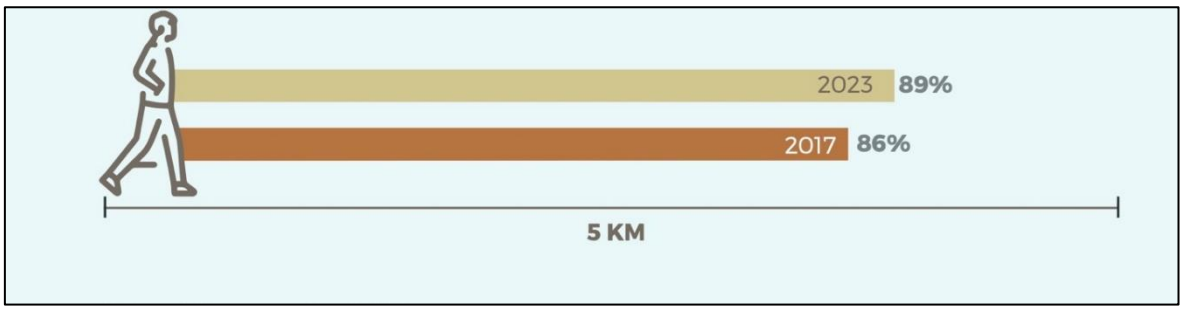


Figure 2.3. Tanzanian Adults living within 5Km from financial Services Access Points

Source: (Tanzania, Annual Financial Inclusion Report, 2023)

Financial access also improved significantly in conjunction with institutional growth. In 2023, the percentage of Tanzanian adults residing within 5 kilometers of a financial services access point increased from 86 percent in 2017 to 89 percent, as demonstrated in Figure 2.3. This increase underscores the physical expansion of financial infrastructure and the broadening of outreach to underserved populations.

2.3. Financial Sector Modernization

The period beginning 1990s Tanzania witnessed rapid advancements and development in Information Communication Technology (ICT). Recognizing the impact of ICT on various cross cutting sectors of the economy, the Government developed a National Information Communication Technology Policy, 2003 to address and provide a policy framework for ICT-related issues in the country. The Policy recognized the need for modernization of the National Payment Systems (NPS) and its regulatory framework in the country. Thus, the Government of Tanzania issued the Electronic Payment Schemes Guidelines (2007) which permitted a framework for the Bank to "Test and Learn" by issuing "Letter of No Objections" for non-banks to form partnerships with commercial banks and provide innovative financial services. The enactment of a new NPS Act 2015, Payment Systems Licensing and Approval Regulations 2015 and Electronic Money Regulations 2015 created a critical pathway for non-banks (fintech companies) to be licensed and regulated for provision of various innovative financial services using new technologies. The Cybercrimes Act of 2015 was enacted to criminalize offenses involving computer systems and information communication technologies, as well as to provide for the investigation, gathering, and use of electronic evidence and other connected topics.Furthermore, the Electronic Transactions Act of 2015 established legal recognition of electronic transactions, e-Government services, the use of information and communication technology in evidence gathering, and the admission of electronic evidence. The act also facilitates the use of secure electronic signatures and other relevant topics. The Government has implemented the National Information Communication Technology Policy and modernization of the National Payment Systems and its regulatory framework in the country, which promote the application of information technologies in economic activities, in order to enhance the country's competitiveness. At the same time, advances in Information Technology (IT), electronic devices, and consumers' increasing acceptance of technology have pushed the

public, private, and the financial sectors to adopt IT as a tool to increase operational efficiency, develop new business models and offer new service channels.

Table 2.2. Value and Volume of Digital Financial Services.

Category	2013	2014	2015	2016	2017	2018
Internet banking						
Volume	1,889,105	2,280,451	2,588,924	2,654,858	3,439,865	4,114,453
Value (TZS billions)	22,724.9	27,415.2	33,665.7	45,469.0	50,764.5	54,678.6
Mobile (SMS) banking						
Volume	38,559,274	46,640,239	50,642,727	53,458,713	51,947,772	45,680,623
Value (TZS billions)	587.1	1,161.8	1,800.3	2,176.9	2,759.6	2,997.6
Mobile payment systems (mobile financial services)						
No. of registered customers/accounts	31,830,289	41,380,791	53,843,917	71,245,336	75,559,441	82,661,992
No. of active customers/ accounts	11,016,657	13,856,667	19,006,176	17,025,685	19,383,246	23,302,040
Volume	1,005,133,297	1,234,147,232	1,388,090,111	1,578,200,387	2,061,054,802	2,684,701,221
Value (TZS billions)	28,852.3	40,809.8	47,219.1	57,641.9	68,897.4	81,379.0
Trust account balances (TZS billions)	293.5	451.0	583.8	665.7	720.0	780.4
Number of agents	153,369	238,461	270,974	371,132	427,445	483,283
Automated Teller Machines (ATMs)						
Number of machines	1,481	1,597	1,771	1,964	2,158	2,144
Volume of transactions	71,418,912	69,197,549	62,213,097	66,872,908	66,089,912	73,216,579
Value of transactions (TZS billions)	7,637.1	8,892.8	9,230.8	9,428.2	9,724.5	9,768.3
Point of Sales (POS)						
No. of machines	2,552	2,158	5,143	8,075	14,300	24,386
Volume of transactions	733,864	875,254	1,794,384	3,848,313	5,902,627	6,993,768
Value of transactions (TZS billions)	346.7	530.0	1,289.3	1,815.4	1,864.6	1,180.1

Source: Financial Sector Development Master Plan, 2020-30

Table 2.2 demonstrates the progression of digital and electronic financial services in Tanzania from 2013 to 2018, emphasizing the financial sector's increasing digitalization. The most significant rise was seen in mobile payment systems (mobile financial services). The number of registered accounts increased from roughly 31.8 million in 2013 to over 82.6 million in 2018, while the number of active users more than doubled. The overall amount of transactions climbed by almost fourfold, reaching TZS 81.4 trillion in 2018, while transaction volumes increased from 1 billion to over 2.6 billion. In the meanwhile, online banking grew significantly, with transaction volumes rising from 1.9 million to 4.1 million

and transaction values increasing from TZS 22.7 billion to TZS 54.7 billion. Mobile (SMS) banking also saw growth in terms of volume and value, but at a slower pace than mobile payments. The expansion of digital financial services across the nation is shown by the increase in the number of agents who support mobile services, which increased from 153,369 to 483,080. Furthermore, the deployment of Automated Teller Devices (ATMs) and Point of Sale (POS) machines increased, with the number of POS machines growing from 2,552 to 24,386 and the volumes and values of ATM transactions constantly increasing. These trends emphasize the growing use of digital channels, which is a reflection of both consumer desire for more accessible, efficient financial services and regulatory backing.

The number of digital accounts in Tanzania had a significant increase between 2022 and 2023, as seen in Figure 2.4, increasing from 32,090,476 to 95,894,379. The fast acceptance of digital financial services is underscored by this spike, which marks a nearly threefold rise in only one year. A gender analysis indicates that male account holders climbed from 20.8 million to 60.7 million, while female account holders increased dramatically from 11.3 million to 35.2 million. Despite the fact that a gender gap persists, the percentage growth in female digital accounts is large, which is indicative of the increasing financial inclusion of women. The general development underscores the increasing penetration of mobile and digital platforms in Tanzania's financial system, indicating a significant advancement in the extension of financial services to all demographic categories.

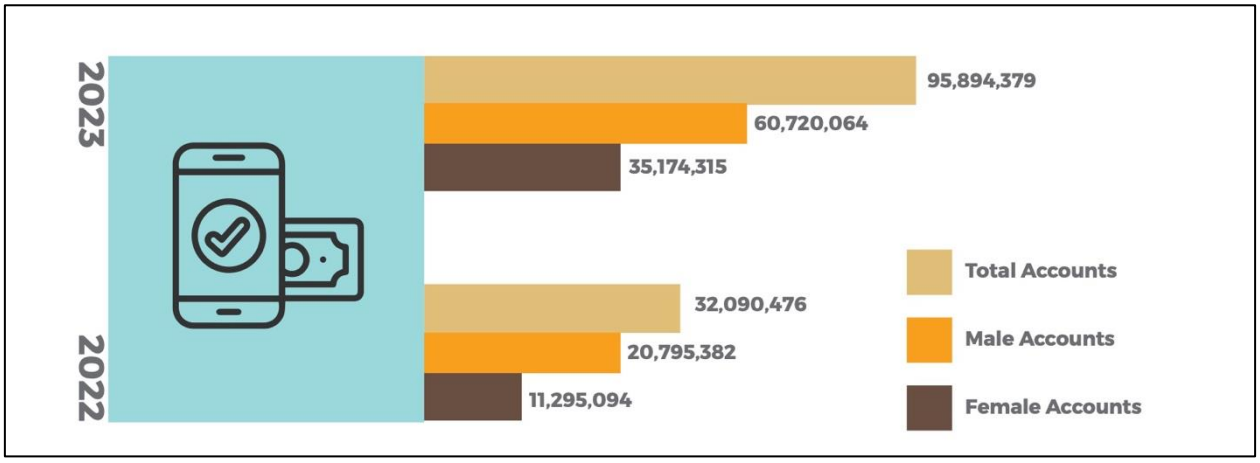


Figure 2.4. Number of Digital Loans

Source: Annual Financial Inclusion Report, 2023

3. LITERATURE REVIEW

3.1. Theoretical Background

3.1.1. Supply-Leading Hypothesis

The supply-leading hypothesis states that the establishment of financial institutions and markets promote economic growth. The establishment and advancement of financial markets lead to increased savings and investments, thereby improving the efficiency of capital accumulation. This hypothesis asserts that effective financial institutions can enhance overall economic efficiency, generate and increase liquidity, mobilize savings, boost capital accumulation, shift resources from traditional (non-growth) sectors to more modern, growth-inducing sectors, and foster a capable entrepreneurial response in these contemporary sectors of the economy. This idea originated with Schumpeter's (1911) groundbreaking study on how financial intermediaries help new ideas come to life. He argued that banks and venture capitalists are crucial engines of innovation: effective banking systems finance new technologies and thereby power growth.

Similarly, Goldsmith (1969) and Gurley & Shaw (1955) emphasize the functional importance of financial markets in directing resources to productive use. McKinnon (1973) and Shaw (1973) develop the “financial repression” model: they argued that repressed financial policies (e.g. low interest-rate caps) distort savings and investment, so liberalization (higher real rates) would raise savings, capital formation and output.

Subsequently, this perspective is substantially validated by empirical research. For example, King and Levine (1993) show that nations with more robust financial systems tend to see quicker growth, mostly as a result of enhanced productivity rather than just capital accumulation. In the same vein, Levine (2004) emphasize that financial development accelerates innovation and efficiency by reducing information and transaction costs. The supply-leading approach is further validated by Abu-Bader and Abu-Qarn (2008), who give regional data from MENA nations, demonstrating that finance drives growth in five of the six countries investigated. Levine (2005) suggests in his cross-country research that financial institutions accelerate development by reducing transaction costs and information asymmetry, which serves as an example of empirical evidence. In support of this assertion,

Demirguc-Kunt & Levine (2008) assert that there is “compelling evidence that financial development plays a key influence”.

Theoretically, the assumption that financial development leads to growth via greater resource allocation and liquidity management is supported by models by Greenwood and Jovanovic (1990) and Bencivenga and Smith (1991). Beck et al. (2014) provide a nuanced perspective on this perspective by demonstrating that finance stimulates growth until a certain threshold is reached, beyond which the connection begins to deteriorate. This implies that returns in highly developed financial systems are declining. Bloch and Tang (2003) emphasize the dual-channel process, observing that financial growth facilitates both technical advancement and capital accumulation.

Nevertheless, a degree of prudence is necessary. Murinde and Eng (1994) contend that the force of the supply-leading theory is contingent upon the proxies used to measure financial development, including broad money and monetization indicators. However, this concept continues to be pertinent for policy advice in the majority of developing nations, especially those that are experiencing structural changes, such as Tanzania.

3.1.2. Demand-Following Hypothesis

Demand-following, on the other hand, says that economic expansion is the result of financial development, not the other way around. There is a greater need for financial services like credit, payment systems, and insurance as the economy grows. The financial sector then grows to suit these needs because of the increased demand. The most important question is whether financial deepening leads to economic growth or whether economic prosperity leads to the growth of the financial sector. The demand-following says that real sector expansion leads to financial development Robinson, (1952).

Robinson (1952) and Patrick (1966) refer to this as “growth-induced finance” in which the development of the real sector requires a more intricate financial infrastructure. Mixed support is offered by empirical investigations. For example, Odhiambo (2008) concludes that financial development is facilitated by growth in many African nations, particularly when credit limits are alleviated by increasing wages. Wolde-Rufael (2009) and Demetriades & Hussein (1996) further contend that causation patterns vary among nations

and historical periods, indicating that financial sector development may be reactive rather than proactive.

Ireland (1994) and Demetriades & Hussein (1996) both assert that financial markets may adjust in reaction to events rather than preparing in advance. This implies that the economy's growth leads to a greater demand for a wider variety of financial services, hence promoting the expansion of the financial sector. Economic expansion is a causative element for financial development, according to specific studies. Their claim is that the financial sector is stimulated by the increased demand for financial services that results from expansion in the real sector. A viewpoint holds that financial deepening is only a consequence or outcome of expansion in the real sector of the economy. Odhiambo (2007) discover that the intensity and clarity of the evidence supporting causation vary across time and between countries. Ang (2008) provides a nuanced approach by demonstrating that the short-term connection in Malaysia is demand-following, while the long-term relationship is consistent with the supply-leading concept. Mansur and Nizar (2023) also endorse this dual causality perspective, observing that the direction of impact may fluctuate based on the country’s growth phase and time horizon.

Furthermore, Abu-Bader and Abu-Qarn (2008) underscore the significance of context-specific analysis. Their work emphasizes the limits of cross-sectional research in capturing the dynamic nature of finance-growth interactions, instead arguing for country-specific VAR models to evaluate causality direction.

3.2. Empirical Review

3.2.1. Empirical Review in Advanced Economies

The supply-leading concept is backed by the data provided by Rousseau & Sylla (1999). They look at the idea that the US was "finance-led" in its development and expansion. They said that the growth of the American economy in the 1780s was aided by innovations in finance and the maturation of the financial system. The research incorporates a set of multivariate time series models that show a relationship between indices of banking and stock market activity as well as indices of company incorporations, imports, and investment from 1790 to 1850. Based on the data, the "finance-led" growth theory makes

sense for the US. Consequently, the current interest in enhancing financial systems as a means of promoting sustainable development is not misplaced.

These results are related to the empirical work by Dehejia and Lleras-Muney (2003) that uses historical state-level banking regulatory data to determine the impact of financial development on economic growth in the US from 1900 to 1940. (branch banking and deposit-insurance laws). There is evidence from the results that financial development and growth are causally related. Financial development was a driving force behind the structural shift happening in the US at the time, and this article sheds light on that.

Samad (2016) looks at the expansion of the American economy and the depth of the country's financial markets from 1834 to 1863, the antebellum era. This analysis uses the measures of per capita loan and per capita bank capital to quantify financial deepening. Before using the VEC model, the ADF and Zivot-Andrew unit root with structural break tests are carried out since these factors impact the time series data. According to the Granger Causality/Block Exogeneity Wald tests, financial depth in antebellum America was due to financial development and not economic growth driven by Granger.

Bodenhorn (1990) conduct a comprehensive examination of the banking records of antebellum America. He investigated numerous financial deepening indicators, including loan per capita, bank credit-GDP, banknote per capita, and bank offices per capital. His investigation determined that economic growth was triggered by financial advancements.

According to Yülek (1997), the Japanese economy has grown rapidly since financial deregulation. The supply-leading concept is supported by this discovery. During Japan's HGP (1953–1973), a period of fast economic development, Yülek (1997) examines the country's fiscal policies. One reason Japan's economy grew at such a rapid pace from 1953 to 1972 was the tight regulation of the country's financial sector. During this regulatory era, the Bank of Japan was responsible for overseeing interest rate regulation and supervision. The temporary interest rate adjustment statute was a vital instrument in this process. As a result, conditions favorable to financial deregulation developed. Another effort at financial control was to limit participation in the stock and bond markets. Under the HGP, banks were essentially elevated to the status of most important financial institution due to the elimination of foreign financial access and the suppression of bond and equities markets. Evidence

suggests growth performance dropped post-1973, leading the study to claim that these policies were intended while being distortionary.

Similar findings to those are identified by Fukao et al. (2020). In their study, they look at Japan's economic growth from 1885 to 1970, a time of great change that includes early industrialization, wartime problems, and the economic miracle that followed World War II. It examines at three main things: changes in the structure of the economy, the development of capital, and growth in total factor productivity (TFP). These three things explain Japan's long-term economic growth. Among other things, the study finds that capital deepening was a key cause of growth, especially in the years after the war, from the 1950s to the 1970s, when Japan quickly became more modern and industrialized. This rise in capital intensity was caused by people saving a lot of money, the government investing, and companies growing. This made workers more productive and the economy producing more.

A further study that reinforces our findings and the supply-leading hypothesis was carried out in Germany, France, and the UK. This study by Bhattarai (2015) examines the relationship between financial deepening and economic growth. The findings reveal that financial deepening in these countries surpassed optimal levels, with the UK exhibiting the highest degree of over-financing at 5.1 times the optimal threshold, followed by Germany and France at 2.4 times. The pronounced financial development correlates with economic instability and employment difficulties, particularly highlighted in the aftermath of the 2008 financial crisis. This analysis utilizes a dynamic general equilibrium (DGE) model, which effectively simulates the interactions among economic variables over time. The model integrates cash-in-advance and money-in-utility functions to illustrate the function of money and financial transactions. This study quantifies over-financing by comparing actual financial deepening levels to theoretically optimal levels derived from the model. It assesses the effects of simulated shocks to financial deepening, observing impacts on output and employment. The study concludes that financial deepening can promote economic growth; however, surpassing optimal levels poses considerable risks, such as heightened volatility and increased susceptibility to crises. The text advocates for policy measures aimed at mitigating information asymmetries in financial markets to effectively manage the expansion of the financial sector and promote sustainable economic growth.

In their thorough theoretical and empirical examination of the connection between strengthened European financial integration and its macroeconomic advantages, particularly

in terms of growth and employment outcomes Belke & Gros (2007) conduct a research that provides insight into the theory of the supply-leading hypothesis. The study is based on the idea that financial integration, which includes things like capital mobility, cross-border investment, and harmonised financial markets, reduces transaction costs, increases competitive pressures, and optimizes resource allocation, which in turn leads to innovation-driven growth and productivity gains. The authors postulate that, subject to flexible labor markets and adaptable institutions, employment benefits materialize indirectly via higher investment, company expansion, and labor demand. Using panel data on all fifteen EU nations from 1960 to 1999 (Luxembourg is not included in this sample), the article draws empirical conclusions. In order to conduct growth regressions, the author creates financial development indicators for every nation. These indicators include, for banking, the size of banks relative to GDP, the share of private credit, and the concentration of banks. In the insurance sector, the author compares life-insurance penetration and market structure to GDP growth and employment rates. There are strong positive relationships between integration and macroeconomic performance, and these impacts have only grown stronger since the Euro was adopted. One of the main reasons for these advantages is the Eurozone's efforts to eliminate transaction costs and exchange rate volatility. Nevertheless, the advantages differ greatly from one nation to another. An rise in integration boosts the growth rate of every country, but countries with strong national regulations or rigid institutions would still lag behind even after integration, because the "growth bonus" is recorded in disparities in country intercepts and does not eradicate gaps that already exist. Put simply, the quality of institutions determines the long-term impact on growth.

Based on this empirical review studies done in advanced economies, like the US, Japan, and some EU members, mostly support the finance-led growth hypothesis. This means that financial development, through elements like financial liberalization and deepening, is a key factor in driving economic growth. Rousseau & Sylla (1999), Dehejia & Lleras Muney (2003), Bodenhorn (1963), Yülek (1997), Fukao et al. (2019), and Belke & Gros (2002) all show that a strong financial sector improves the overall economy. Bhattarai (2013), on the other hand, adds an important detail to research on Germany, France, and the UK. He says that while financial depth helps growth, going over a certain point may cause economic problems, which means that the link is not linear. Samad (2016), on the other hand, disagrees with this story and says that in antebellum America, economic growth came before financial development. This suggests a growth-led finance dynamic. This difference shows

how complicated the relationship between finance and growth is, as historical and institutional factors may affect the direction of causality and the total effect of financial development.

3.2.2. Empirical Review in Emerging Economies

Darrat (1999) investigates the impact of financial depth on economic growth in Middle Eastern nations, notably Saudi Arabia, Turkey, and the UAE. To distinguish between various theoretical ideas, the researchers looked at the causal relationship between the level of financial deepening and economic development. The researchers used multivariate Granger-causality tests within an error-correction framework. The findings largely support the assumption that financial depth is a necessary causative component for economic growth, however the strength of the evidence differs depending on the country and the proxies used to measure it. The long-term nature of causal interactions distinguishes them the most.

Darrat and Al-Sowaidi (2010) assess the influence of information technology and financial development in the context of Qatar's fast growing economy. The study employs vector-error-correction modeling to examine short-run causal dynamics and discovers that real economic growth in Qatar is significantly connected with both financial deepening and information technology in the long term. It concludes that financial development is more important than information technology in terms of fostering short-term economic growth.

In another study, Ardic and Damar (2006) evaluate the influence of financial sector strengthening on economic development using province-level data from Turkey from 1996 to 2001. The time in question was marked by the banking sector's loosely regulated and comparatively uncontrolled growth, which culminated in the 2001 financial crisis. The findings show a strong negative link between financial depth, which includes both the public and private sectors, and economic development. The paper contends that financial development may not always lead to economic progress, necessitating greater research into the conditions that enable such contributions.

By using banking sector vartiables Demetriades & Luintel (1996) looks at the impact of banking sector controls on economic growth and financial deepening in India. In their research the effect of banking sector regulations on financial deepening and economic growth was evaluated using data from the Reserve Bank of India, principal component

analysis for banking controls, and the Unrestricted Error Correction Method (UECM) for estimate. In general, Indian banking regulations impede financial deepening, which has an effect on economic expansion. Ceilings on lending rates have a slight benefit. Economic growth and financial deepening are mutually determined, suggesting that policies that impact one also have an impact on the other.

The study by Pradhan (2010) examines the long-term connections among India's economic growth, foreign direct investment, and financial deepening (1970-2007). Johansen's cointegration technique and the Error Correction Model (ECM) were used as part of the empirical strategy to analyze long-term relationships and examine causality between variables for the 1970–2007 time frame. According to the study's findings, FDI, financial deepening, and economic expansion in India are all related. With a unidirectional causation relationship between financial deepening and FDI and a bidirectional causal relationship between FDI and growth, a well-developed financial system is crucial for drawing in FDI and boosting economic growth.

In China Tu & Qiao (2016) comes to the conclusion that financial deepening has a positive effect on economic growth, which supports the supply-leading theory. On the other hand, Chen & Ji (2022), differ and come to the opposite conclusion. Tu & Qiao (2016) investigate panel data from 31 provinces and used econometric models to figure out how financial deepening affects economic growth. The models included indicators for the banking system, the non-bank financial market, venture capital values, and control variables like R&D spending and patent metrics. The study comes to the conclusion that China's economic growth is facilitated by deeper financial integration, with the banking system having the most significant effect. Additionally, a well-developed venture capital industry supports growth that is driven by new ideas. Chen & Ji (2022) examine the link between finance and growth using a panel dataset of 275 Chinese towns from 2009 to 2018. They use city-level data, which has more specific information. They focus on the time after the global financial crisis because China's economic stimulus program from 2008–2009 messed up the Chinese financial market in some ways, like making the problem of capital misallocation worse. a new financial growth index that makes it easier to figure out how deep China's financial institutions, especially its banking sector, really are. the ratio of all loans in the financial system to GDP, minus loans to the government that are used as a stand-in for financial depth. To deal with the possibility of endogeneity in the finance-growth nexus

study, we use both the two-step system generalized method of moments (GMM) and the Instrumental Variable (IV) method with outside tools.

The study shows that there is a negative link between financial development and economic growth in 275 Chinese cities. This is because of unfair loan practices by banks, housing market bubbles, and uneven growth across sectors. This is different from the mixed results of earlier regional studies.

The relationship between financial development and economic growth is examined by Güryay & Cavusoglu (2007). The study showed that financial development has a negligible beneficial impact on economic growth in Northern Cyprus using the ordinary least squares methodology. According to the authors, there is no reciprocal connection between growth and financial development.

Wadud (2009) examines the long-term causal link between economic growth and financial development in Bangladesh, Pakistan, and India, three South Asian nations. He divided the financial system into two groups: "bank-based" and "capital market-based." The study assessed the long-term association between financial development and economic growth using a co-integration vector autoregressive model. The results of the error correction model show a causal association between financial development and economic growth, according to the empirical findings.

Waqabaca (2004) uses low-frequency data from 1970 to 2000 to examine the causal connection between Fiji's financial development and economic growth. Within a bivariate VAR framework, the study applied cointegration and unit root testing techniques. According to empirical data, Fiji's financial development and economic growth are positively correlated, with economic growth being the cause of financial development. He claims that nations with less developed financial systems are more likely to see this result.

Inoue & Hamori (2012) and Sachsida (2001) both give evidence in favor of the supply-leading hypothesis. Inoue & Hamori (2012) examine empirically the evidence to see if financial deepening has contributed to lowering poverty in India. They create models that illustrate the relationship between financial depth and poverty rates while controlling for inflation, economic growth, and international openness using unbalanced panel data from 28 Indian states and union territories between 1973 and 2004. They use the dynamic generalized method of moments (GMM) estimation and find that economic development and financial

deepening reduce poverty, but inflation and international openness have the opposite impact. These findings remain true even if the overall economy, urban poverty rates, and rural poverty rates change.

Sachsida (2001) looks at Brazilian time-series data from 1980 to 1997 and uses Granger causality tests to find out how financial deepening indicators (such bank lending and liquidity metrics) affect economic growth. There is evidence that financial depth and economic expansion cause each other in both directions. The study reveals that not only does a stronger financial sector lead to more economic growth, but more economic activity also leads to more growth in the financial market. The study ends by saying that the financial sector and economic growth work together to make each other stronger, which is very important in Brazil. This discovery suggests that monetary and financial policies should be made with this two-way relationship in mind. This means that financial measures that help growth should be part of larger economic strategy.

Ghildiyal et al. (2015) utilize an Autoregressive Distributed Lag (ARDL) bounds testing methodology and confirm the findings of Havrylchyk (2004) that financial deepening has a beneficial impact on economic growth. Ghildiyal (2015) investigates the cointegration between financial deepening indicators and economic growth over time using an Autoregressive Distributed Lag (ARDL) bounds testing methodology. Time-series data is used in the study to identify long-term equilibrium linkages as well as short-term dynamics in the Indian context. Economic growth and financial deepening indices have a long-term cointegrating relationship, according to the ARDL paradigm. The results show that a statistically significant improvement in long-term economic performance is associated with deeper financial sector knowledge.

Financial deepening is a crucial factor influencing economic growth in India. The policy implication underscores the necessity for structural reforms in financial markets that both expand access and guarantee the sustainability of growth dividends in the long term. Additionally, Havrylchyk (2004) employs time-series analysis of Russian banking data to investigate intervals of accelerated loan growth. The research utilizes empirical analyses to differentiate between cyclical lending surges and enduring trends that signify authentic financial deepening. The research indicates that instances of rapid lending are more typical of short-term credit booms than of a consistent, sustainable expansion of financial markets. This explosive behavior, if unregulated, may result in vulnerabilities in the future, including

asset price bubbles or heightened default risks. The article finishes with a warning perspective, indicating that although credit expansion typically fosters prosperity, authorities must enforce regulatory monitoring to guarantee the sustainability of such growth. Accurate calibration of credit policies is essential for transforming ephemeral booms into enduring financial deepening.

Bonelli & Pinheiro (2005) implement a mixed-method approach that integrates qualitative policy evaluations with quantitative econometric analysis. Regression models are employed to establish a connection between macroeconomic growth and income distribution measures and a variety of financial development indicators. The analysis encompasses a variety of data sources, such as household income surveys and financial sector metrics. The findings indicate a substantial positive correlation between economic growth and financial development in Brazil. The study also reveals that the benefits are not evenly distributed, resulting in disparities in income equity, despite the fact that overall development increases. The intricate trade-offs in a financial system that is swiftly evolving are underscored by this dual discovery. The authors propose that financial deepening can serve as a powerful growth generator; however, it must be implemented in conjunction with policies that alleviate income inequality and guarantee that growth dividends are distributed equitablely. It is advisable to establish an integrative policy framework in order to achieve a balance between efficiency and social equity.

Kucukkaya & Soytas (2006) investigate the correlation between economic growth and financial development in the Russian Federation from 1994 to 2005. They employed VECM and Granger causality tests to control for fiscal and monetary policy disruptions. The results indicated that there is a unidirectional causality that extends from financial depth to economic growth. Nevertheless, it does not appear that Granger is causing economic development or the other way around as a result of the size of domestic credits outstanding in relation to the size of the economy. Consequently, our findings contradict the majority of the studies in the literature that establish bi-directional causality.

Ardic & Damar (2006) examine the negative impacts of financial sector deepening on economic growth in Turkey from 1996 to 2001. Their methodology involved analyzing financial sector data from this period, investigating the correlation between financial deepening and economic growth, and assessing the influence of government bank ownership on sector development. The findings reveal a significant inverse correlation between

financial sector deepening and economic growth in Turkey (1996-2001), underscoring that financial expansion does not invariably promote growth and necessitating distinct research of the private banking sector's impact.

The transmission mechanisms linking financial deepening to economic growth are explored by Abramova et al. (2022) using a panel data econometric framework that incorporates monetary variables, such as interest rates and inflation. This method is useful for disentangling the credit-to-growth nexus's indirect impacts from those of monetary policy. According to the results, the most successful pathways of financial deepening are greatly affected by monetary conditions. The productivity-enhancing effect, which accounts for a large portion of the observed development trends, is the most robust of the numerous channels when stable monetary frameworks are in place. To completely reap the benefits of financial deepening, the study says, a stable and predictable monetary environment is essential. For lawmakers, this means that in order to prevent distortions or overheating, effective monetary policies should be implemented alongside financial reforms.

The overall studies carried out in emerging economies based on our empirical review, including India, China, Turkey, Brazil, Russia, and Middle Eastern countries, mostly support the finance-led growth hypothesis. Demetriades and Luintel (1996) in India, Darrat (1999) in Middle Eastern countries, Tu and Qiao (2016) in China, Sachsida (2001) and Castelar and Bonelli (2005) in Brazil, and Havrylchyk (2004) and Abramova et al. (2022) in Russia all show that there is a positive, often causal, link between financial development and economic growth. Wadud (2005) in South Asia and Pradhan (2010) in India both support the idea that a strong financial system encourages saves, improves capital allocation, and promotes growth. But there are also outliers. For example, Ardic and Damar (2006) in Turkey and Guryay et al. (2007) in Northern Cyprus show a growth-led finance dynamic or a weak or negative link, which could be because of inefficiencies or poor institutions. Chen and Ji (2022) in China, on the other hand, report an inverse correlation, which suggests that there may be problems, such as financial instability in some situations. Darrat and Al-Sowaidi (2010) in Qatar talk about a short-term effect, which shows that time is important. Overall, the evidence points to finance-led growth, but the intensity and direction of the link depend on the country, the quality of its institutions, and its stage of development. This shows how important it is to look at each case in its own context.

3.2.3. Empirical Review in African Countries

The effect of financial development on South Africa's economic growth is examined by Odhiambo (2004). Three proxies for financial development are used in this study: the currency to narrow money ratio, the M2 to GDP ratio, and the ratio of private sector bank claims to GDP in connection to real GDP per capita, which measures economic growth. A strong demand-following link between financial development and economic growth was empirically shown using the Johansen-Juselius co-integration approach and vector error correcting model. The study unequivocally disproves the supply-leading theory.Nzotta and Okereke (2009) examine the connection between Nigeria's economic growth and financial deepening between 1986 and 2007. Four of the nine variables—lending rates, financial savings ratio, checks/GDP ratio, and deposit money banks/GDP ratio—showed a significant link with financial deepening, according to the study, which used time series data and a two-stage least squares analytical methodology. According to the findings, the financial sector has not been able to maintain efficient financial intermediation, especially when it comes to credit allocation and the economy's high degree of monetization.

Chukwu & Agu (2009) investigate the causal relationship between "bank-based" financial deepening characteristics and economic growth in Nigeria between 1970 and 2005 using the augmented Granger causality test method developed by Toda and Yamamoto (1995). Economic growth and financial deepening are positively correlated, according to the co-integration analysis. According to the study, the Nigerian data supports the demand-following theory for "bank-based" financial deepening indicators including broad money and private sector credit in the Toda-Yamamoto framework. On the other hand, for "bank-based" financial deepening measures like loan deposit ratio and bank deposit liabilities, it supports the supply-leading hypothesis. The study comes to the conclusion that the causality outcome is influenced by the choice of bank-based financial deepening variables.

A study conducted across 34 selected sub-Saharan African countries by Ndebbio (2004) employ ordinary least squares (OLS) multiple regression to analyze the cross-country relationships between financial deepening, economic growth, and development. The findings revealed that shallow finance impedes growth in SSA countries, underscoring the significance of financial depth and intermediation. The results of this study stand in opposition to the findings presented by Karagöl et al. (2020) and Taivan & Nene (2016),

who investigate various African nations concerning the finance-growth nexus and arrived at mixed conclusions.

Karagöl et al. (2020) and Taivan and Nene (2016) discover conflicting results when it came to the supply-leading versus demand-following hypotheses. Karagöl et al. (2020) used a panel data Toda-Yamamoto Fisher causality test termed Emirmahmutoglu-Kose (EK), which was proposed by Emirmahmutoglu and Kose (2011), to investigate the relationship between financial deepening and economic activity in five North African nations from 1990 to 2017. When it comes to the relationship between finance and growth in North African countries, empirical data yield varied outcomesTaivan and Nene (2016) investigate the connection between financial development and economic growth in the countries of the Southern African Development Community (SADC) between 1994 and 2013. Granger causality tests were performed in their study using the vector autoregressive model (VAR) to determine the direction of the relationship between financial development and economic growth. The results supported both the demand-following hypothesis and the supply-leading notion. The results show that the order of causality is different across SADC countries, with some countries having reverse causality and others having no causality. The study suggests that countries with reverse causality should focus on reviving economic growth through channels other than financial development, while countries with no causality should put their resources into developing the financial sector.

Despite employing distinct approaches to investigate the correlation between financial depth and economic growth in Tanzania, Odhiambo (2005), Kapaya (2021) and Maganya (2018) arrive at a unified conclusion of finance-led growth. Odhiambo (2005) examined the influence of Savings and Credit Cooperative Societies (SACCoS) on Tanzania's economic growth from 1990 to 2012, utilizing data analysis from the Ministry of Agriculture, Food and Cooperatives and the IMF; employed Newey-West standard errors regression and Wald Granger causality tests; and utilized credits/real GDP per capita and savings/real GDP per capita ratios as proxies for financial services and economic growth. The results indicated that Savings and Credit Cooperative Societies substantially impact Tanzania's economic growth, exhibiting a robust positive correlation and bidirectional Granger causation. Savings mobilization is more essential than credit, underscoring the necessity to strengthen SACCoS for economic advancement.

Kapaya (2021) examine the correlation between financial development and economic growth in Tanzania from 1980 to 2017. The research utilized an ARDL model with bound testing, performed principal component analysis for variable aggregation, and concentrated on empirical data from Tanzania spanning 1980 to 2017. The findings indicate a favorable short-term correlation between the depth of the financial system and economic growth in Tanzania, whereas liquidity and efficiency exert a detrimental effect on growth. Cointegration is present; yet, financial reforms have not entirely contributed to economic growth.

Lastly, Maganya (2018) uses a time-series econometric approach to examine the long-term relationship between Tanzania's economic growth and proxies of financial development. The researcher uses the Johansen cointegration test to determine whether a long-term equilibrium relationship exists and unit root tests, such as the Augmented Dickey-Fuller test, to evaluate the stationarity of variables. A Vector Error Correction Model (VECM) was employed in the study to account for both long-term changes and short-term dynamics. While per capita income or growth rate is used as the indicator for economic performance, the chosen proxies for financial development include broad money supply (M2), foreign direct investment, customer deposits from domestic and foreign banks, and credit as a proportion of GDP. The empirical results show a stable, long-term equilibrium relationship between Tanzania's financial development and economic growth, demonstrating their cointegration. The study specifically identifies that enhancements in financial deepening via augmented access to credit and extended banking operations significantly connect with elevated rates of economic growth. The analysis indicates that the Tanzanian financial sector significantly contributes to the promotion of sustainable growth over the long term. The report asserts that ongoing progress in Tanzania's financial sector is crucial for promoting sustained economic growth. It underscores the necessity for more legislative and macroeconomic reforms to improve financial intermediation. These reforms are seen essential to fully actualize the benefits of financial deepening, underscoring the assertion that a resilient financial sector is a crucial catalyst for economic advancement in emerging nations.

Both the finance-led growth theory and the positive correlation between financial deepening and economic growth are empirically supported by Karimo & Ogbonna (2017) and Rateiwa & Aziakpono (2016). Karimo & Ogbonna (2017) use the Toda-Yamamoto

augmented Granger causality test and analyzed data from 1970 to 2013 to investigate the causal relationship between financial deepening and economic growth in Nigeria. The study supports the supply-leading hypothesis by showing that financial deepening in Nigeria promotes economic growth. Highlighting the effects of stock market turnover and the prime lending rate on economic growth, the document promotes policies targeted at enhancing private sector credit and restoring trust in the stock market. Rateiwa and Aziakpono (2016) examined the relationship between financial structure and economic performance in Egypt, Nigeria, and South Africa from 1971 to 2013. From 1971 to 2013, cointegration tests were used to investigate the relationship between financial structure and per capita GDP in Egypt, Nigeria, and South Africa, weighing the effects of financial development and economic rigidities in each country. The research indicates that financial structure has a significant impact on economic performance in Egypt and South Africa, whereas it does not in Nigeria, attributed to limited financial development. Low error correction term coefficients across all countries indicate inefficiencies and rigidities in the financial system.

In Uganda, Eton et al. (2019) conduct a study on financial inclusion and economic growth, yielding results that contradict those of Mengesha & Berde (2023), who conduct analogous research in Ethiopia. Eton et al. (2019) conducted a cross-sectional survey utilizing both quantitative and qualitative methodologies, sampling 194 respondents to analyze the influence of financial inclusion on economic growth, identify correlations, and evaluate household vs national income indicators. The study demonstrated that financial inclusion substantially fosters economic growth, facilitating equitable advantages and access to financial services. Nevertheless, enterprises perceive governmental assistance as ineffectual. The paper advocates for policy evaluations and tools to measure wealth inequalities, highlighting a limited positive association between financial inclusion and economic growth. Mengesha and Berde (2023) examine the causal relationship between financial development and economic growth in Ethiopia, employing the Toda-Yamamoto causality test and the Nonlinear Autoregressive Distributed Lag (NARDL) model to analyze data from 1980 to 2021. The results reveal that there is no causality from financial development to economic growth in Ethiopia; rather, economic growth positively influences financial development. It underscores the necessity for robust policies to guarantee that financial development fosters economic growth.

Khoutem et al. (2014) investigate the correlation between financial liberalization and economic growth in Tunisia from 1980 to 2015. She developed a financial liberalization index through Principal Component Analysis, executed unit root tests (Dickey-Fuller), conducted Johansen's cointegration test, and employed a vector error correction model for Granger causality analysis. The study indicates that financial liberalization positively impacts economic growth in Tunisia, indicating a long-term link and unidirectional Granger causality from the financial liberalization index to economic growth from 1980 to 2015.

In African countries a lot of research backs up the finance-led growth hypothesis. For example, Agu and Chukwu (2008) and Karimo and Ogbonna (2017) in Nigeria, Ndebbio (2004) in sub-Saharan Africa, Rateiwa and Aziakpono (2016) in Egypt, Nigeria, and South Africa, Marus et al. (2019) in Uganda, Odhiambo (2005), Kapaya (2021), and Maganya (2018) in Tanzania, and Uysal Şahin (2016) in Tunisia all find that financial development is linked to economic growth. However, this story is refuted by studies like Odiambho (2004) in South Africa and Nzotta and Okereke (2009) in Nigeria, which find that growth-led finance or a negative association may be attributable to problems in the financial sector or volatility in the economy as a whole. In SADC, Taivan and Nene (2016) and in North African nations, Karagöl et al. (2020) find bidirectional causality or inconsistent outcomes. In Ethiopia, Mengesha and Berde (2023) find no causality from financial development to growth. This variety shows how important country specific factors are, like the maturity of the financial sector, the policy frameworks, and the economic structures. It also suggests that while financial development often leads to growth, tailored policy approaches are needed to deal with the differences between African economies.

Table 3.1. Empirical Review Summary

Author	Country	Theory	Summary of Findings
Peter L. Rousseau & Richard Sylla (1999)	US	Finance-led Growth	The results validate the idea of "finance-led" growth in the United States
Rajeev Dehejia & Adriana Lleras-Muney (2003),	US	Finance-led Growth	The findings establish a causal relationship between financial development and economic growth.
Abdus Samad (2016)	US	Growth-led Finance	The results indicate that financial depth did not Granger-cause economic expansion in antebellum America instead, economic growth Granger-caused financial development.
Bodenhorn (1963	US	Finance-led Growth	The study revealed that financial development resulted in economic growth.
Yülek (1997)	Japan	Finance-led Growth	Financial liberalization results in substantial economic growth.
Fukao, K., Makino, T., & Settsu, T. (2019)	Japan	Finance-led Growth	Financial liberalization results in substantial economic growth.
Bhattarai, K. (2013)	German	Finance-led Growth	Financial deepening can promote economic growth; yet, above appropriate levels present considerable concerns
Bhattarai, K. (2013)	France	Finance-led Growth	Financial deepening can promote economic growth; yet, above appropriate levels present considerable concerns
Bhattarai, K. (2013)	UK	Finance-led Growth	Financial deepening can promote economic growth; yet, above appropriate levels present considerable concerns
Belke and Gros (2002),	EU Members	Finance-led Growth	The results indicate strong favorable associations between financial integration and macroeconomic performance.
Panicos Demetriades, Kul B. Luintel (1996)	India	Finance-led Growth	Financial deepening and economic growth are interconnected
Darrat (1999)	Middle-eastern countries	Finance-led Growth	The findings usually lend weight to the idea that financial deepening is an essential cause of economic expansion.
Darrat and Al-Sowaidi (2010)	Qatar	Finance-led Growth	In the short term, financial development is more important for boosting economic growth.
Ardic and Damar (2006)	Turkey	Growth-led Finance	The findings show that there is a significant inverse association between financial deepening and economic expansion.
Guryay et al. (2007)	Northern Cyprus	Growth-led Finance	There is no considerable positive influence of the financial sector on economic growth.
Wadud (2005)	South Asian countries	Finance-led Growth	causality running from financial development to economic growth
Rudra P. Pradhan (2010)	India	Finance-led Growth	A sophisticated financial system is crucial for promoting economic progress.
Lifeng Tu, Guiming Qiao (2016)	China	Finance-led Growth	argues that financial development has a favorable effect on economic growth.
Oya Pınar Ardıç and H. Evren Damar (2006)	Turkey	Growth-led Finance	The findings demonstrate a significant inverse correlation between financial sector deepening and economic growth.
Jingzhu Chen, Yuemei Ji (2022)	China	Finance-led Growth	The research reveals an inverse correlation between financial development and economic growth.
Takeshi Inoue & Shigeyuki Hamori, (2012)	India	Finance-led Growth	Find that financial deepening and economic growth are interconnected
Adolfo Sachsida (2001),	Brazil	Finance-led Growth	creates an equal relationship between economic growth and the financial sector.
Vipin Ghildiyal (2015)	India	Finance-led Growth	Economic growth is positively impacted by financial deepening.
Olena Havrylchyk (2004)	Russia	Finance-led Growth	Economic growth is positively impacted by financial deepening..

Armando Castelar & Regis Bonelli o, (2005	Brazil	Finance-led Growth	The findings show a strong positive relationship between economic growth and financial development.
Kucukkaya & Soytas (2006)	Russia	Finance-led Growth	The relationship between financial depth and economic growth is unidirectional.
Abramova, Artemenko, and Krinichansky (2022)	Russia	Finance-led Growth	Financial deepening positively impact economic growth.
Odiambho (2004)	South Africa	Growth-led Finance	The supply leading hypothesis is completely disproved by the investigation.
Nzotta and Okereke (2009)	Nigeria,	Growth-led Finance	Economic growth and financial deepening have a negative association
Agu and Chukwu (2008)	Nigeria	Finance-led Growth	Economic growth and financial deepening are favorably correlated.
Ndebbio John (2004)	Sub-Saharan African Countries	Finance-led Growth	The results indicated that shallow finance hinders growth in SSA countries,
Karagöl et al. (2020)	North African Countries	Both	Empirical evidence demonstrates inconsistent outcomes on the finance-growth relationship in North African nations.
A. Taivan and G. Nene (2016)	SADC	Both	Both the supply-leading theory and the demand-following hypothesis were supported by the findings
Karimo, T. M., and Ogbonna, O. E. (2017)	Nigeria	Finance-led Growth	According to the study's findings, financial depth spurs economic expansion
R Rateiwa and MJ Aziakpono (2016)	Egypt	Finance-led Growth	According to the study, financial structure has a big impact on economic success.
R Rateiwa and MJ Aziakpono (2016)	Nigeria	Finance-led Growth	According to the study, financial structure has a big impact on economic success
R Rateiwa and MJ Aziakpono (2016)	S.Africa	Finance-led Growth	The study reports that financial structure significantly influences economic performance
Eton Marus, Gilbert Uwonda, Godfrey Barigye (2019)	Uganda	Finance-led Growth	The study revealed financial inclusion significantly supports economic growth
Teffera Mengesha and Eva Berde (2023)	Ethiopia	Growth-led Finance	The results indicates that there is no causality from financial development to economic growth
Nicholas M. Odhiambo (2005)	Tanzania	Finance-led Growth	According to the study, financial inclusion has a big impact on economic success.
Saganga Kapaya (2021)	Tanzania	Finance-led Growth	The findings indicate a favorable short-term correlation between economic development and the depth of the financial system.
Maganya (2018)	Tanzania	Finance-led Growth	To promote long-term economic prosperity, the financial sector must advance.
Khoutem et al. (2014)	Tunisia	Finance-led Growth	Financial liberalization positively influences economic growth

4. DATA AND METHODOLOGY

4.1. Data

This study aims to examine the effects of financial deepening on economic growth in Tanzania, focusing on broad money velocity M, credit to the private sector that are the representative of the financial deepending in any economy. The study also controls for trade openness, school enrolment, government expenditure and population growth in the anaylsis between financial deepending and economic growth over the period between 1990 to 2023. Annual time series data were obtained from the World Bank-World Development Indicators website which is an open-source publicly available data source, which provides a range of monetary and financial statistics. The research utilized two variables as indicators of financial deepening and four controlling variables to assess its effect on economic growth. The subsequent table precisely highlights the variables employed in this investigation.

Table 4.1. Variables Description

Variable	Description	Source	Proxy
GDP	Provides information about the size of the economy as well as how the economy is operating during a specific time period, which is usually a year. In this study, real GDP (inflation-adjusted) is used to measure the actual size of the economy	World Bank-World Development Indicators	GDP growth rate is adopted as measure of economic growth (% growth rate). GDP = $\frac{(GDP2-GDP1)}{GDP1}$
M	M3 is a broad monetary aggregate that encompasses M2 along with institutional money market mutual funds, large time deposits, and repurchase agreements. This is a more reliable measure for monitoring and controlling the money supply in the economy.	World Bank-World Development Indicators	Broad money is utilized as an indicator of financial deepening (% of GDP). M = $\frac{M3}{Real\ GDP}$
C	This variable relates to credits issued by financial institutions to the non-financial private sector, effectively facilitating the transfer of cash from savers to borrowers within that sector. It illustrates the broad scope of the financial sector through the services rendered to the private sector.	World Bank-World Development Indicators	Credit to the private sector represents financial deepening (% of GDP). C = $\frac{Credit\ to\ Private\ Sector}{Real\ GDP}$
T	Trade openness is usually measured by the ratio between the sum of exports and imports and gross domestic product (GDP). The extent to which an economy engages in international trade and allows free flow of goods, services, and capital	World Bank-World Development Indicators	Trade openness is utilized as control variable (% of GDP). T = $\frac{(EX+IM)}{GDP}$
S	Gross enrollment ratio for tertiary school is calculated by dividing the number of students enrolled in tertiary education regardless of age by the population of the age group which officially corresponds to tertiary education, and multiplying by 100.	World Bank-World Development Indicators	School enrollment is utilized as control variable (% gross) S = $\frac{School\ Enrollment}{Real\ GDP}$
P	Population growth directly affects the labor force size and composition, a growing population increases demand for goods and services, stimulating production and investment hence demographic trends are particularly relevant in assessing financial deepening and economic stability	World Bank-World Development Indicators	Population growth is utilized as control variable (annual % growht) P = $\frac{Population\ growth}{Real\ GDP}$
G	Public spending as a percent of GDP is a crucial component of aggregate demand. Expansionary fiscal policies such as increased investment in infrastructure, healthcare, and education stimulate growth by raising consumption and investment levels.	World Bank-World Development Indicators	Government spending is utilized as control variable (% of GDP) G = $\frac{Government\ Expenditure}{Real\ GDP}$

4.1.1. Descriptive Statistics

Table 4.2 indicates that the dataset comprises 34 annual observations of Tanzania's key macroeconomic indicators. GDP growth (GDP) averages 5.16% with moderate volatility (SD = 1.94), exhibiting a left-skewed distribution (skewness = -0.76) and light tails (kurtosis = -0.46). This indicates occasional contractions below the mean growth rate, though the interquartile range (4.37–6.75%) confirms generally stable expansion.

Table 4.2. Descriptive Statistics

	GDP	M	C	T	P	S	G
Minimum	0.584322	0.178037	0.095218	23.989115	1.833646	0.31	5.704927
Maximum	7.672155	1.200571	0.369274	56.166124	3.841799	7.50898	13.523253
Mean	5.156195	0.390932	0.166262	37.438237	2.831456	2.160019	9.864325
Median	5.577249	0.273464	0.158641	35.544133	2.800203	1.446725	9.782335
Stdev	1.942689	0.251099	0.050313	8.689911	0.374043	1.851854	2.037187
Skewness	-0.764227	1.567046	1.947233	0.366711	-0.08056	0.888619	0.225735
Kurtosis	-0.460016	1.786599	5.670828	-0.979009	1.154144	-0.006695	-1.086698

Financial deepening proxies reveal divergent characteristics: broad money supply (M) displays significant right-skewness (1.57) and leptokurtosis (1.79), signaling periodic aggressive monetary expansions that drive its mean (0.39) above the median (0.27). Private credit (C) shows even stronger positive skewness (1.95) and exceptionally high kurtosis (5.67), reflecting accelerating financial inclusion despite initial low penetration (minimum = 0.095).

Trade openness (T) demonstrates near-normal distribution (skewness = 0.37) with moderate dispersion (SD = 8.69), consistent with steady integration into global markets. Population growth (P) exhibits remarkable stability (SD = 0.37, skewness ≈ 0), suggesting consistent demographic trends. School enrollment (S) displays high variability (SD = 1.85) and right-skewed distribution (0.89), revealing persistent disparities in educational access (min = 0.31, max = 7.51). Government expenditure (G) maintains relative fiscal discipline (mean = 9.86, median = 9.78) with slight positive skewness (0.23) and platykurtic distribution (kurtosis = -1.09), indicating controlled spending with occasional expansionary periods.

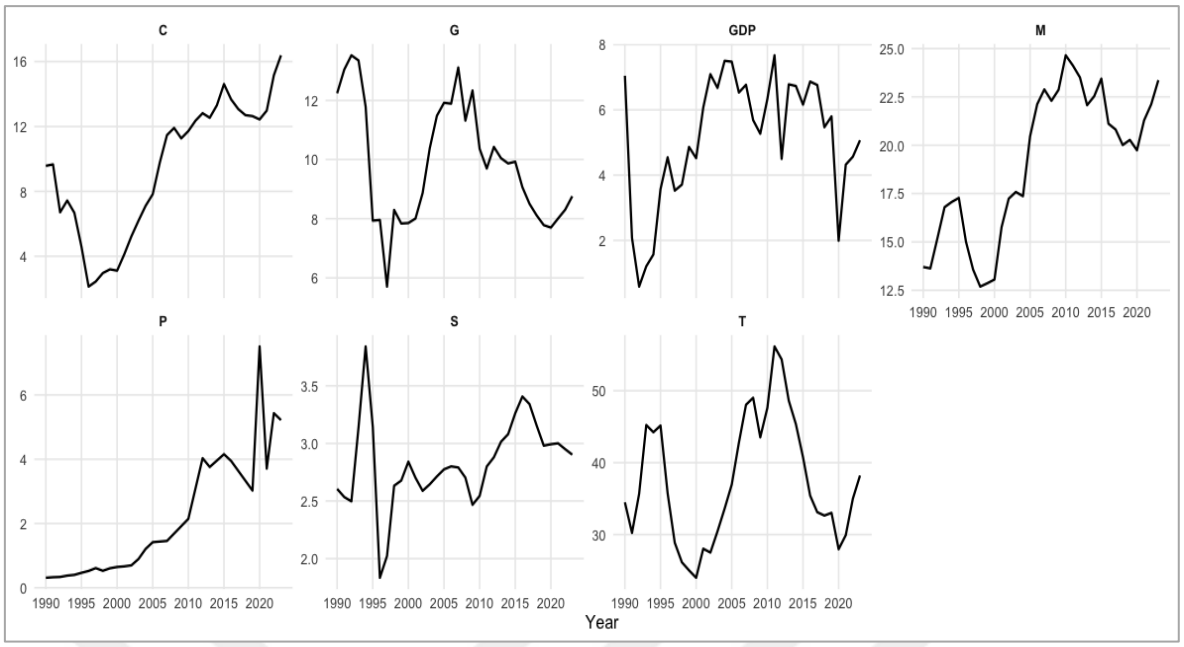


Figure 4.1. Time Series Trend

Figure 4.1 shows that broad money supply (M) demonstrates a consistent upward trend, indicating ongoing financial deepening. This trend aligns with economic theories that associate increased liquidity with enhanced credit creation, supporting investment and consumption. The private sector credit trajectory closely follows M, reinforcing the notion that liquidity expansion enables greater access to credit. GDP growth, on the other hand, exhibits noticeable fluctuations, signaling periods of economic volatility or structural shifts, Government consumption expenditures show a relatively stable upward trend, with some deviations that may correspond to budgetary adjustments or economic stabilization policies. The population growth rate remains relatively stable, fluctuating between 2.5% and 3.5%. This steadiness suggests that demographic dynamics do not undergo abrupt shifts, making population growth a relatively predictable variable. Meanwhile, school enrollment rates demonstrate a strong upward trajectory, reflecting improvements in educational access and possibly long-term investments in human capital.

4.1.2. Correlation Matrix

Before running our analysis the correlation between variables might indicate about the strength of the linear relationship across variables. Table 4.3 provides correlation matrix among variables.

Table 4.3. Correlation Matrix

	GDP	M	C	T	S	G	P
GDP	1						
M	0.50104138	1					
C	0.7356988	0.6959931	1				
T	-0.065373	-0.4036151	-0.1514075	1			
S	-0.048371	-0.5032702	-0.1248696	0.1517597	1		
G	0.46112271	0.9540561	0.6583736	-0.4786987	-0.4471433	1	
P	-0.1068926	-0.2386464	0.1520136	0.21437436	0.39294119	-0.2846823	1

Table 4.3 demonstrates a strong positive relationship among GDP and C (0.7357) suggests that higher credit availability tends to accompany higher GDP levels, supporting the idea that financial intermediation plays a key role in economic performance. GDP and M (0.5010) reveals a moderate positive relationship indicates that increases in the broad money supply are associated with GDP growth, on the other hand GDP and Trade openness (-0.0654) and GDP and School enrollment (-0.0484) values imply that in this dataset, trade openness and school enrollment rates do not have strong direct linear relationships with GDP. additionally, School enrollment and Population growth (0.3929) exhibit a moderate positive correlation suggests that regions with higher population growth also tend to have higher school enrollment, possibly due to a growing youth demographic.

4.2. Methodology

This paper adopts the bound testing and autoregressive distributed lag ARDL methodology to analyze how GDP relates to financial deepening (money supply and credit to private sector) and control variables (trade openness, school enrollment, population growth, government expenditure), it captures both the short-run dynamics and long-run equilibrium interactions among six time series variables.

Unit root tests such as the Augmented Dickey-Fuller (ADF), Phillips-Peron, and KPSS were computed to verify that the variables are I(0) or I(1) rather than I(2) before employing the ARDL methodology. GDP was selected as the dependent variable in the model, and the money supply, private sector credit, trade openness, school enrollment, population growth, and government spending were chosen as the explanatory factors. The Akaike Information Criterion (AIC) was then used to ascertain the ideal lag lengths for the independent and dependent variables. The F-bounds testing approach was used to test for a

long-run relationship (cointegration) between the variables; based on our results, cointegration was established, thus we estimated the long-run and short-run coefficients. Residual autocorrelation, heteroskedasticity assessment, the Jarque-Bera normalcy test, and the CUSUM test for model stability were conducted for model diagnostic evaluation.

ARDL has a long and distinguished history of academic research. Pesaran and Shin (Pesaran & Shin, 1999) initiated the discussion by demonstrating the ability of ARDL to manage cointegration with mixed I(0) and I(1) variables. Their 2001 paper with Smith introduced the bounds test, cementing ARDL's place in econometrics. Since then, it's been used in tons of studies. For instance, Odhiambo (2010) applied ARDL to study energy consumption and economic growth in Tanzania, while Jalil & Ma (2008) looked at urbanization and air pollution in Asia.

Narayan (2005) refined the approach by providing critical values for small samples, making ARDL more reliable in those cases. Menegaki, (2019) review is a great resource, summarizing how ARDL is used in energy-growth research. More recent works, like Ali et al. (2016) on urbanization and CO2 emissions or Rahman & Kashem (2017) on carbon emissions and industrial growth, show ARDL's versatility across different topics. These studies highlight how ARDL has evolved and adapted over time.

4.2.1. Unit Root Test

The statistical method utilized to assess the stationarity of a series is referred to as the unit root test; a time series may be classified as either stationary or non-stationary. A time series is deemed stationary if its values exhibit a tendency to revert to a long-term average, with the properties of the data series remaining unaffected by temporal changes. Conversely, a non-stationary time series fails to return to its long-run average, resulting in variations in its mean, variance, and covariance over time. Time series variables may exhibit non-stationarity in several forms, yet two are particularly significant for the regression analysis of economic time series data: (1) The series may display persistent, long-term movements, indicating the presence of trends; and (2) the population regression may demonstrate instability over time, suggesting the occurrence of breaks in the regression model. The deviations from stationarity pose significant risks to the accuracy of forecasts and the validity of inferences derived from time series regression analysis (Stock & Watson, 2002).

Many macroeconomic variables, including the volume of gross domestic product (GDP), consumer price index, and inflation, possess non-stationary characteristics as they often demonstrate significant upward or downward trends over time, lacking a propensity to return to a stable mean. Shrestha & Bhatta (2018). The series Y_t is considered stationary from a mathematical perspective if;

$$E(Y_t) = E(Y_{t-s}) = \mu \text{ for } s > 0, \text{Var}(Y_t) = \text{Var}(Y_{t-s}) = \delta y^2, \text{ and Cov}(Y_t, Y_{t-s}) = \gamma_s \quad (4.1)$$

This study initially examined the unit root of GDP, money supply, credit to the private sector,trade openness, school enrollment, population growth and government expenditure series through visual inspection, some of them revealing a wandering or trending behavior instead of fluctuating around a fixed mean while others revealed a stationarity behavior. The plotted series exhibited a consistent drift, accompanied by an increase in variance over time. Furthermore, the visual diagnostic was enhanced by the application of formal statistical tests, specifically the ADF, KPSS and PP tests. Figure 4.2 below illustrate the behavior of these series in both non-stationary and stationary states.

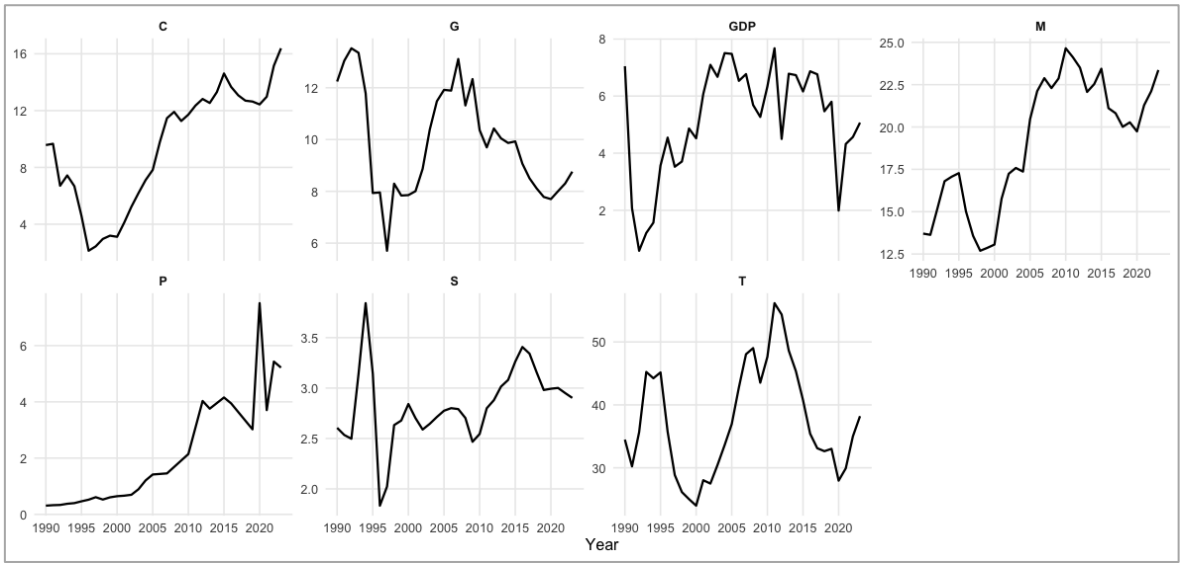


Figure 4.2. Behavior of Variables

4.2.1.1. ADF Test

The the one-sided alternative H_1: δ > 0 is tested against the null hypothesis H_0: δ = 0 using the augmented Dickey–Fuller (ADF) test for a unit autoregressive root. Yt is stationary under the alternative hypothesis and has a stochastic trend under the null hypothesis. This is how unit root is tested by the ADF:

$$\Delta y_t = \beta_0 + \delta y_{t-1} + \sum_{i=1}^{p-1} \gamma_i \Delta y_{t-i} + \mu_t \quad (4.2)$$

where;

$\mu_t \sim$iid $(0,\sigma^2)$

δ = α - 1

α = coefficient of y_{t-1}, and

$\Delta y_t = y_t - y_{t-1}$

The ADF test was conducted on all seven variables, GDP, money supply, credit to the private sector,trade openness, school enrollment, population growth and government expenditure at the data level. The test yielded mixed results that is non-stationary and stationary variables. To eliminate the stochastic trend in the non-stationary series, a first-order difference, and subsequent ADF, test were implemented. The non-stationary series subsequently achieved stationarity, and the series are integrated of order one I (1).

4.2.1.2. Phillips-Perron Test (PP)

Phillips and Perron created a thorough theory for unit root non-stationarity Phillips & Perron, (1988). The tests seem a lot like ADF tests. The way the Phillips-Perron (PP) unit root tests handle serial correlation and heteroskedasticity in the error terms is where they diverge from the ADF tests. By directly modifying the test statistics, the PP tests account for serial correlation and heteroskedasticity in the test regression errors. Furthermore, a lag period for the test regression does not need to be specified by the user.

The hypothesis to be tested;

H_0: δ = 0 H_1: δ < 0

These modified statistics, denoted Z_t and Z_δ, are given by

$$Z_t = \sqrt{\frac{\hat{\sigma}^2}{\hat{\lambda}^2}} t_\delta - \frac{1}{2}\left(\frac{\hat{\lambda}^2 - \hat{\sigma}^2}{\hat{\lambda}^2}\right)\left(\frac{n(s.e.(\hat{\delta}))}{\hat{\sigma}^2}\right) \tag{4.3}$$

and,

$$Z_\delta = n\hat{\delta} - \frac{1}{2}\frac{n^2(s.e.(\hat{\delta}))}{\hat{\sigma}^2}\left(\hat{\lambda}^2 - \hat{\sigma}^2\right) \tag{4.4}$$

The ADF test was conducted on all seven variables, GDP, money supply, credit to the private sector, trade openness, school enrollment, population growth and government expenditure at the data level. The test yielded mixed results that is non-stationary and stationary variables. To eliminate the stochastic trend in the non-stationary series, a first-order difference, and subsequent PP test were implemented. The non-stationary series subsequently achieved stationarity, and the series are integrated of order one I (1).

4.2.2. Optimal Lag Order Selection

In autoregressive distributed lag (ARDL), determining the optimal lag order is essential for accurately capturing both the long-run equilibrium relationships and the short-run dynamics. A poorly defined lag specification may result in biased estimates, overlooked dynamics, and incorrect conclusions. the lag lengths (1,1,1,2,0,0,0) were determined empirically using information criteria particularly the Akaike Information Criterion (AIC).

Table 4.4. Lag Selection

Lag	GDP	M	C	T	S	G	P	AIC
1	1	1	1	2	0	0	0	55.57187
2	1	1	1	2	1	0	0	55.6346
3	1	1	1	1	2	1	1	57.08036
4	1	1	1	2	1	1	1	57.87604
5	1	1	1	2	0	1	1	58.426
6	1	1	1	1	1	1	1	63.15198

4.2.3. Autoregressive Distributed Lag model (ARDL)

The ARDL approach, introduced by Pesaran & Shin (1999) and extended by Pesaran, Shin, and Smith Pesaran et al. (2001), is designed to handle variables with mixed orders of integration (I(0) or I(1)) as long as none are I(2) (requiring two differences), making it ideal for macroeconomic studies. Traditional cointegration methods demand that all variables be I(1), but real-world data often mixes I(0) and I(1) variables, like interest rates and GDP. ARDL sidesteps this issue with a single-equation framework that can estimate both short-run dynamics (temporary effects) and long-run equilibrium relationships (stable, long-term links). The bounds testing procedure is potential for testing cointegration without worrying about whether all variables are non-stationary upfront.

Early groundwork came from researchers like J.D. Sargan (1964), used similar ideas to analyze wage and price dynamics in the UK. However, the ARDL approach we know today really started taking off in the 1990s, thanks to M. Hashem Pesaran and Yongcheol Shin. In 1999, they showed how ARDL could be used to study cointegration long-term relationships between variables whether those variables were stationary (stable over time) or non-stationary (trending). Then, in 2001, Pesaran, Shin, and Richard J. Smith introduced the bounds testing approach, a major innovation that made ARDL stand out. Unlike older methods like Johansen's cointegration test, which required all variables to be non-stationary, ARDL's bounds test allowed researchers to check for cointegration without needing to pre-test every variable's property. This flexibility, combined with its ability to work with small datasets, has made ARDL a popular tool in fields like economics, finance, and energy studies. in this study, financial deepening, proxied by money supply and credit, reflects the expansion of financial intermediation, potentially boosting GDP through increased investment and consumption. Control variables like trade openness capture external economic interactions, school enrollment represents human capital development, population growth affects labor supply, and government expenditure influences fiscal policy impacts, all of which may have lagged effects on GDP. The basic ARDL (p, q) model can be written as:

$$y_t = \alpha_0 + \alpha_1 t + \sum_{i=1}^{p} A_i y_{t-i} + \beta_0 x_t + \sum_{i=1}^{q-1} \beta_i \Delta x_{t-i} + \mathcal{E}_t \tag{4.5}$$

where y_t is the dependent variable at time tt, $x_t$is a set of explanatory variables, Δ is the first difference, and $\mathcal{E}_t$ is the error term. The terms $\alpha_0$and $\alpha_1 t$ are a constant and optional time trend, while A_i and $\beta_i$coefficients capture the effects of lagged y and x variables. The "p" and "q" represent the number of lags for y and x, respectively.

To find the long-run relationship, we derive the long-run multiplier:

$\mathcal{E}_t=\frac{\beta}{A_1}$ where A_1= 1- $\sum_{i=1}^{p} A_i$

For cointegration testing, we use an unrestricted error correction model (UECM):

$$\Delta y_t = \alpha_0 + \alpha_1 t + \sum_{i=1}^{p} A_i \Delta y_{t-i} + \sum_{i=1}^{q-1} \beta_i \Delta x_{t-i} + \lambda_1 y_{t-1} + \lambda_2 x_{t-1} + \mathcal{E}_t \quad (4.6)$$

Based on our study the model is specified as:

$$\Delta GDP_t = \alpha_0 + \sum_{i=1}^{p} A_i GDP_{t-i} + \sum_{i=1}^{q1} \beta_{1i} M_{t-i} + \sum_{i=1}^{q2} \beta_{2i} C_{t-i} + \sum_{i=1}^{q3} \beta_{3i} T_{t-i} + \sum_{i=1}^{q4} \beta_{4i} S_{t-i} + \sum_{i=1}^{q5} \beta_{5i} P_{t-i} + \sum_{i=1}^{q6} \beta_{6i} G_{t-i} + \varepsilon_t \quad (4.7)$$

where;

GDP_t= dependent variable,

Explanatory variables are: -

M_t= Money supply,

C_t= credit to the private sector,

T_t=trade openness,

S_t= school enrollment,

P_t= population growth

G_t= government expenditure

p is the number of lags for GDP

$q_1, q_2, q_3, q_4, q_5$and q_6 are the number of lags for explanatory variables

4.2.4. Cointegration Using Bounds Test

Cointegration refers to a long-run equilibrium relationship among nonstationary time series variables. The ARDL (autoregressive distributed lag) bounds testing approach, introduced by Pesaran et al. (2001), is a robust method to assess such cointegration relationships even when the underlying regressors are a mix of I(0) and I(1) series. This methodology is particularly valuable in small sample contexts where conventional cointegration tests may be less reliable. The bounds test for cointegration involves setting up the null hypothesis that no long-run relationship exists among the variables (i.e., the coefficients on the lagged level terms are jointly equal to zero), against the alternative that such a relationship does exist. The test computes an F-statistic for the joint hypothesis, and the critical values are derived from two bounds:

- Lower Bound**:** Suggests that all regressors are stationary (I(0)).
- Upper Bound**:** Suggests that all regressors are nonstationary (I(1)).

The null hypothesis is rejected if the computed F-statistic is greater than the upper bound, which strongly implies the presence of cointegration. On the other hand, one concludes that there is no cointegration if the statistic is below the lower bound. The result is inconclusive when the statistic falls between these bounds, necessitating additional research or the application of complementing tests. An error correction model (ECM) is created by recasting the autoregressive distributed lag model to incorporate both the long-term equilibrium and short-term dynamics. Assuming a single regressor for simplicity's sake, the ECM form is as follows::

$$\Delta y_t = \alpha_0 + \sum_{i=1}^{p} A_i \Delta y_{t-i} + \sum_{i=1}^{q-1} \beta_i \Delta x_{t-i} + \lambda_1 y_{t-1} + \lambda_2 x_{t-1} + \varepsilon_t \quad (4.8)$$

$H_0 = \lambda_1$=λ_2=0 (no cointegration)

H_1= at least one of λ_1 or λ_2 is non-zero (cointegration exist)

An F-statistic is computed based on the joint significance of the lagged level terms. the test statistic is given by:

$$F=\frac{(SSR_R-SSR_U)/r}{SSR_U(T-(p+q)-1)}$$

SSR_R and SSR_U are the sum of squared residuals from restricted and unrestricted models respectively. T is the sample size, r is the number of restrictions

The decision rules are:

- If F > F upper: reject H0 and conclude cointegration exists.
- If F < F lower: do not reject H0 (i.e., no cointegration).
- If Flower ≤ F ≤ F upper: the test result is inconclusive.

4.2.5. Unrestricted Error Correction Model (UECM)

In the UECM, all lagged levels and differences are included without imposing any a priori restrictions on the long-run coinsurance relationship. As a result, both short-run dynamics and the equilibrium relationship are estimated simultaneously in a flexible framework. Consider a bivariate system with a dependent variable yt and a single regressor xt. The general UECM is derived by reparameterizing an ARDL(p,q) model previously specified in levels:

$$y_t = \alpha_0 + \sum_{i=1}^{p} A_i y_{t-i} + \sum_{i=1}^{q-1} \beta_i \Delta x_{t-i} + \mathcal{E}_t \quad (4.9)$$

When reparameterized, the UECM takes the form:

$$\Delta y_t = \alpha_0 + \sum_{i=1}^{p-1} A_i \Delta y_{t-i} + \sum_{i=1}^{q-1} \beta_i \Delta x_{t-i} + \lambda_1 y_{t-1} + \lambda_2 x_{t-1} + \mathcal{E}_t \quad (4.10)$$

And,

$$\Delta GDP_t = \alpha_0 + \sum_{i=1}^{p} A_i GDP_{t-i} + \sum_{i=1}^{q1} \beta_{1i} M_{t-i} + \sum_{i=1}^{q2} \beta_{2i} C_{t-i} + \sum_{i=1}^{q3} \beta_{3i} T_{t-i} + \sum_{i=1}^{q4} \beta_{4i} S_{t-i} + \sum_{i=1}^{q5} \beta_{5i} P_{t-i} + \sum_{i=1}^{q6} \beta_{6i} G_{t-i} + \lambda_1 yGDP_{t-1} + \lambda_{2,1} M_t + \lambda_{2,2} C_t + \lambda_{2,3} T_t + \lambda_{2,4} S_t + \lambda_{2,5} P_t + \lambda_{2,6} G_t + \mathcal{E}_t \quad (4.11)$$

4.2.6. Restricted Error Correction Model (RECM)

The RECM is obtained by imposing long-run restrictions on the UECM that derive from theoretical or empirical insights regarding the cointegrating vector. In effect, the RECM enforces that the long-run relationship among the variables satisfies certain normalization constraints typically by normalizing the coefficient on the dependent variable thereby directly yielding long-run multipliers consistent with economic theory. The general RECM model takes the form:

$$\Delta y_t = \alpha_0 + \sum_{i=1}^{p-1} A_i \Delta y_{t-i} + \sum_{i=1}^{q-1} \beta_i \Delta x_{t-i} + ECT_{t-1} + \mathcal{E}_t \quad (4.12)$$

And,

$$\Delta GDP_t = \alpha_0 + \sum_{i=1}^{p} A_i GDP_{t-i} + \sum_{i=1}^{q1} \beta_{1i} M_{t-i} + \sum_{i=1}^{q2} \beta_{2i} C_{t-i} + \sum_{i=1}^{q3} \beta_{3i} T_{t-i} + \sum_{i=1}^{q4} \beta_{4i} S_{t-i} + \sum_{i=1}^{q5} \beta_{5i} P_{t-i} + \sum_{i=1}^{q6} \beta_{6i} G_{t-i} + \delta(GDP_{t-1} - \mu + \lambda_{2,1} M_{t-1} + \lambda_{2,2} C_{t-1} + \lambda_{2,3} T_{t-1} + \lambda_{2,4} S_{t-1} + \lambda_{2,5} P_{t-1} + \lambda_{2,6} G_{t-1}) + \mathcal{E}_t \quad (4.13)$$

μ: intercept in the cointegrating relationship, δ: speed of adjustment parameter , $GDP_{t-1} - \mu + \lambda_{2,1} M_{t-1} + \lambda_{2,2} C_{t-1} + \lambda_{2,3} T_{t-1} + \lambda_{2,4} S_{t-1} + \lambda_{2,5} P_{t-1} + \lambda_{2,6} G_{t-1}$ is the error correction term (ECT).

4.2.7. Diagnostic Tests

The ARDL model complies with the traditional normal linear regression model's presumptions. The assumptions include a model of linear regression. The number of observations should not exceed the number of parameters to be estimated, residuals have a normal distribution, there is no serial correlation between them, and perfect multicollinearity is not present. The error-correction system has to undergo diagnostic testing to determine whether any of the presumptions have been broken. The tests include the serial correlation test, the heteroscedasticity test, the normalcy test, and the misspecification test. The following diagnostic procedures were carried out in this study:

4.2.7.1. Residual Autocorrelation Test

Residual autocorrelation refers to the cross-correlation of a signal, specifically white noise, with itself. The issue may originate from the non-stationarity of the dependent and explanatory variable data manipulation, such as averaging, interpolation, and extrapolation, as well as an incorrect functional form. The Ljung-Box test was developed by Ljung & Box (1978) as a way to assess the hypothesis that the residuals do not show autocorrelation up to any order k. The following is a description of the testing process:

H0: There is no autocorrelation up to order k.

H1: Autocorrelation exists up to order k.

The test statistic is:

$$Q_{LB} = \mathrm{T}\,(\mathrm{T}+2)\sum_{j=1}^{k}\frac{r^2{}_j}{T-j}$$

where k is the greatest rank of autocorrelation to test, r^2j is the jth autocorrelation, and T is the number of observations. We conclude that autocorrelation exists up to order k and reject the null hypothesis if the p-value is less than the significance level. The selection of the lag order (k) is the test's main flaw. The maximum number of lags that should be used, according to Ljung and Box (1978), is T=13, where T is the number of observations.

4.2.7.2. Heteroskedasticity Test

Heteroscedasticity is the result of a series of random variables with different variances. It implies that variance is inconsistent in regression analysis. The Langrange multiplier, commonly known as Engle's Arch LM test, is used to measure heteroscedasticity Engle, (1982). The evaluation technique is as follows.

H0: There is no heteroscedasticity.

H1: There is heteroscedasticity.

The test statistic is

$LM_E = nR^2$

where n is the number of observations, and R^2 is the coefficient of determination of the augmented residual regression. We reject the null hypothesis if the p-value ≤level of significance and conclude that there is heteroscedasticity.

4.2.7.3. Normality Test

To determine if the VECM has a normal distribution, the Jarque-Bera test is applied. This test assesses how a variable differs from the normal distribution in terms of kurtosis and skewness Bera & Jarque, (1982). The following are the established null and alternative hypotheses in the Jarque-Bera test:

H0: The variable is normally distributed.

H1: The variable is not normally distributed.

The test statistic is

$JB = \frac{N-k}{6}\left[S^2 + \frac{(K-3)^2}{4}\right]$

We reject the null hypothesis if the p-value is less than the level of significance, or if the JB is more than $\chi 2$ (2). where k is the number of estimated parameters, N is the number of observations, , S is the skewness of a variable, and K is the kurtosis of a variable.

4.2.7.4. Stability

In multivariate time series analysis, it is essential to ensure the stability of the model. Stability indicates that when the system experiences a temporary shock, the resulting effects will ultimately fade away instead of continuing to spread indefinitely. This property is crucial for maintaining theoretical consistency and ensuring the accuracy of impulse response analyses, forecast error variance decompositions, and interpretations of long-run equilibrium. Lütkepohl (2005) in New Introduction to Multiple Time Series Analysis examines stable vector autoregressive processes, highlighting that stability necessitates all eigenvalues of the companion matrix to possess moduli that are less than 1. CUSUM Test: This procedure calculates the cumulative sum of recursive residuals. Assuming the null hypothesis of parameter stability, the resulting plot is expected to stay within established confidence bands, which are generally based on asymptotic distributions. A violation of these bands indicates a potential structural change or instability, suggesting that the model parameters are not constant.

5. EMPIRICAL RESULTS

5.1. Unit Root Results

The first step in the empirical specification of our study is to provide the unit root analysis of the employed variables. Table 5.1 illustrate that, GDP, Credit, and Population Growth consistently reject the unit root hypothesis across the ADF, KPSS, and PP tests implying that the particular variables have no unit root they are Stationary in Levels (I(0)).

Table 5.1. Unit Root Results

Variable	Test	T.statistic	1%	5%	10%	p_value	Stationarity
GDP	ADF	-4.2217	-3.58	-2.93	-2.6		I(0)
GDP	KPSS	0.0947				0.1	I(0)
GDP	PP	-32.849				0.01	I(0)
M	ADF	-2.1399	-3.58	-2.93	-2.6		I(1)
M	KPSS	0.3757				0.08763	I(0)
M	PP	-10.794				0.4373	I(1)
C	ADF	-4.1962	-3.58	-2.93	-2.6		I(0)
C	KPSS	0.0782				0.1	I(0)
C	PP	-22.266				0.01668	I(0)
T	ADF	-2.5103	-3.58	-2.93	-2.6		I(1)
T	KPSS	0.13885				0.1	I(0)
T	PP	-7.2698				0.6664	I(1)
S	ADF	-0.2182	-3.58	-2.93	-2.6		I(1)
S	KPSS	0.88835				0.01	I(1)
S	PP	-34.062				0.01	I(0)
G	ADF	-1.9166	-3.58	-2.93	-2.6		I(1)
G	KPSS	0.2847				0.1	I(0)
G	PP	-9.1262				0.5457	I(1)
P	ADF	-4.7997	-3.58	-2.93	-2.6		I(0)
P	KPSS	0.35919				0.09474	I(0)
P	PP	-14.145				0.2196	I(1)

However, M3, Trade Openness, School Enrollment, and Government Expenditure show mixed but overall stronger evidence of nonstationarity. Both the ADF and PP tests (and, in some cases, the KPSS test) suggest that these series are integrated of order one that is Nonstationary in Levels (I(1)).

5.2. Bounds Test Cointegration Results

The Bounds F-test (Wald) examines the null hypothesis that there is no cointegration (i.e., no long-run equilibrium relationship) among the variables against the alternative that cointegration exists. Table 5.2 provides bounds test results as follows:

Table 5.2. Bounds Test Cointegration Results

Test	F-statistic	p-value	k (regressors)	T (critical look-up)	Conclusion
ARDL Bounds F-test	4.6041	0.00718	6	1000	Reject H_0 of no cointegration → possible cointegration

This test is especially useful when the model includes a mix of integrated variables (I(0) and I(1)). The p-value (0.007181) is less than the common significance levels 0.01 and 0.05, indicating strong evidence to reject the null hypothesis of no cointegration. An F-statistic of 4.6041 suggests that the test statistic exceeds the critical bounds. In summary, the results of ARDL bounds F-test provides strong evidence against the null hypothesis of no cointegration, suggesting that the variables move together in the long run.

The cointegration finding shows that financial sector, as presented by aggregate money supply and credit to the private sector paired with the control variables of school enrollment, population growth, trade openness, and government spending, has a long-term effect on Tanzania's economic growth. This coincides with the supply-leading hypothesis, which claims that a well-developed financial sector makes it easier to allocate resources, lowers transaction costs, and encourages investment, all of which help the economy thrive. The long-run association means that policies that help the financial sector grow, like making it easier to get credit or boosting the money supply, could have lasting positive effects on Tanzania’s GDP.

The F-statistic surpasses the upper critical limit at the 5% level, confirming a statistically significant cointegration connection among GDP, broad money supply, and private sector credit (as seen in the boundaries test findings in Table 5.1). A stable long-run equilibrium among these variables must exist, according to this. This confirms what Ghildiyal et al. (2015) and Kapaya (2021) who discover that there is a high correlation between financial development measures and economic growth in Tanzania and India, respectively. In addition, Maganya (2018) provides evidence of a long-term connection in

Tanzania using comparable financial proxies. This study's findings corroborate those of Pradhan (2010) and Tu and Qiao (2016), which find that expanded credit markets contribute to long-term economic development in other developing nations. It also supports the supply-leading concept.

5.3. ARDL Estimation Results

The research moves on to estimate the Autoregressive Distributed Lag Model when the bounds test confirms a long-run link among the variables . Both the short-term dynamics and the rate of system equilibrium recovery after a shock are captured by this model. If you want to know how strong the long-term adjustment process is and how financial deepening indicators, such broad money supply and private sector credit, affect GDP growth in the near term, the ARDL framework is your best bet.

Table 5.3. ARDL Estimation Results

Variable	Estimate	Std. Error	t value	p-value
(Intercept)	–0.02155	2.59922	–0.008	0.9935
M.t	–2.75534	2.81988	–0.977	0.3478
M.1	13.005	4.79905	2.71	0.0190 *
M.2	–9.85607	5.86039	–1.682	0.1184
C.t	–10.03444	12.42757	–0.807	0.4351
C.1	26.87819	12.4323	2.162	0.0515 ·
C.2	–16.75592	7.18748	–2.331	0.0380 *
T.t	1.02178	3.99427	0.256	0.8024
T.1	2.48042	4.47174	0.555	0.5893
T.2	–2.85421	2.59929	–1.098	0.2937
S.t	–0.15052	0.13127	–1.147	0.2739
S.1	0.09794	0.08977	1.091	0.2967
S.2	0.18074	0.14386	1.256	0.2329
G.t	–1.05578	3.28064	–0.322	0.7531
G.1	–15.84781	5.6121	–2.824	0.0153 *
G.2	21.44428	8.60011	2.493	0.0283 *
P.t	2.05099	1.02378	2.003	0.0683 ·
P.1	–4.08636	1.52756	–2.675	0.0202 *
P.2	1.66749	0.69593	2.396	0.0338 *
GDP_1	–1.35125	1.20315	–2.232	0.0455 *
Model Diagnostics				
Residual std. error (DF = 12)	0.4445			
Multiple R-squared	0.8787			
Adjusted R-squared	0.6868			
F-statistic (19, 12 DF)	4.577			0.004921
Significance Codes:	**0.001*** **	**0.01** **	**0.05***	

Table 5.3 illustrates that the model is robust with R-squared (0.8787), the model explains 87.87% of the variation in GDP, indicating a strong overall fit to the data. F-statistic (4.577, 19 and 12 DF, p-value = 0.004921) the model is statistically significant at the 1% level, confirming that the predictors collectively have a meaningful impact on GDP. Residuals range from -0.64311 to 0.59519, with a median of 0.00084, indicating that the model is generally unbiased. Residual standard error SE = 0.4445 indicates Moderate prediction error.

The results of the ARDL model indicate that financial deepening, as measured by money supply and credit to the private sector, has a positive effect on economic growth in Tanzania in the short term. The the first lag broad money supply (M.11) is positive and statistically significant at the 5% level (estimate = 13.00050, t = 2.710, p = 0.0190), implying that increases in the money supply have a delayed positive effect on the GDP growth. The first lag credit to the private sector (C.1) is marginally significant (t = 2.162, p = 0.0515), suggesting a positive delayed effect. These results are consistent with the findings of Byaro & Rwezaula (2024), Odhiambo (2011), and Ndiege et al. (2014), which identify short-run growth benefits resulting from financial deepening in Tanzania. However, these findings contradict that of Kapaya (2021) and Hungu (2023) whose results indicate negative or weak effects. The second lag of credit to the private sector (C.2) is negative and statistically significant (–16.75592, t = –2.331, p = 0.0380), which indicate that past credit expansions eventually see a corrective reversal in their impact on the GDP growth. This finding is supported by the findings of Adusei and Adebayo (2025) and Arcand et al. (2015), suggesting potential risks associated with over-leveraging in Tanzania's underdeveloped financial sector.

Additionally, government expenditure (G) exhibits mixed results, the first lag (G.1) is negative and significant (–15.87481, t = –2.824, p = 0.0153), while the second lag (G.2) is positive and also statistically significant (21.44428, t = 2.493, p = 0.0283). This pattern indicates a dynamic adjustment process, initially government spending reduces GDP growth afterward government spending positively impacts GDP growth. On the other hand, trade openness (T) and school enrollment (S) are statistically insignificant indicating that none of the variable's variations have the detectable dynamic short-run effect on GDP growth. Population Growth (P): While the current period's coefficient (P.t) is marginally significant (t = 2.003, p = 0.0683), the first and second lags show significant dynamics. The first lag is

negative (–4.08636, p = 0.0202) and the second lag is positive (1.66749, p = 0.0338), suggesting that population growth influences economic growth with a reversal in effects over time.

The lagged error correction term (ECT-1) is negative and statistically significant, according to Table 5.3, which means that the long-run relationship is stable and that the adjustment toward equilibrium is happening quickly. Consistent with the claim that access to credit encourages productive investment, the short-run coefficients show that private sector credit positively affects GDP during the present time. Contrarily, broad money supply (M) has a negative short-term impact but eventually becomes positive, indicating delayed monetary transmission effects.

These results are in line with those of Maganya (2018) and Kapaya (2021), who similarly discovered, in the short term, that private sector credit had a beneficial effect on production in Tanzania when utilizing the VECM and ARDL methods. This lag in monetary policy's impact is in line with what Pradhan (2010) found, namely that early absorption frictions can cause liquidity injections to take some time to show up as real sector growth. Even while short-term shocks might cause volatility, Sachsida (2001) stresses that long-term convergence is guaranteed by the corrective mechanism.

5.4. Unrestricted Error Correction Model UECM

In order to confirm and streamline the ARDL's results, the research calculates a Unrestricted Error Correction Model (UECM), which limits the long-term coefficients obtained from the ARDL estimate. Using the UECM framework, we can examine the time-dependent correction of long-run equilibrium deviations and the short- and long-term effects of financial deepening factors on GDP growth under more modest assumptions. Our conclusions about the finance-growth link are strengthened by this method.

Table 5.4. Unrestricted Error Correction Model UECM

Variable	Estimate	Std. Error	t value	p-value
(Intercept)	0.21002	1.36099	0.154	0.87891
L(GDP, 1)	–1.35125	0.64265	–2.103	0.04836 *
L(M, 1)	1.77683	1.83121	0.97	0.34349
L(C, 1)	14.95271	4.64792	3.217	0.00432 **
L(T, 1)	–0.49824	1.55009	–0.321	0.75122
S	0.02467	0.08279	0.298	0.7688
G	–2.92231	2.00212	–1.460	0.15993
P	–0.68474	0.32878	–2.083	0.05033 ·
d(M)	–2.76125	2.89518	–0.954	0.3516
d(C)	21.62147	4.78532	4.518	0.00021 ***
d(T)	–2.54835	3.22209	–0.791	0.43828
d(L(T, 1))	4.40956	2.42549	1.818	0.08407 ·
Model Diagnostics				
Residual std. error (DF = 20)	0.4858			
Multiple R-squared	0.8857			
Adjusted R-squared	0.8228			
F-statistic (11, 20 DF)	14.09			4.103 e-07
Significance Codes:	**0.001*** 0.01** 0.05***			

According to Table 5.4, the UECM results back up the previous findings: the error correction term is still negative and has a statistical significance, therefore it's clear that there is a stable long-run equilibrium. Along with these results, the model fits well (R2 = 0.8857, modified R2 = 0.8228). For GDP disparities, this accounts for 88.57 percent. All things considered, the model is statistically significant with an F-statistic of 14.09 (p = 4.103e-07). These figures demonstrate the validity of the findings and the usefulness of the UECM for this study.

A significant coefficient for delayed credit (L(C, 1)) calculated at 14.95271 (p = 0.00432), at the 1% level, suggests that financial deepening has a strong positive influence on Tanzania's economic development over the long run, according to the UECM. Emphasizing the crucial role of credit in fostering long-term development via the mobilization of savings, better allocation of resources, and facilitation of investments, a one-unit rise in delayed credit leads to a 14.95271-unit increase in GDP. This result is in agreement with earlier studies, such as those of Abu-Bader and Abu-Qarn (2005). Their findings provide credence to the theory that deeper financial markets, made possible by more readily available credit, boost investment and resource allocation, leading to longer-term

growth. According to Odhiambo (2008), there is a strong positive correlation between financial deepening (as measured by domestic loans to the private sector) and economic development in Kenya over the long term. Lagged GDP (L(GDP, 1)) indicates the error correction term (ECT), which has a significant coefficient of -1.35125 (p = 0.04836) at the 5% level. This finding is consistent with a rapid adjustment process, as it indicates that around 135.125 percent of any imbalance is resolved within one period.

Population growth has a marginally significant negative effect, indicated by a coefficient of -0.68474 (p = 0.05033). This suggests that increased population growth may lead to a reduction in GDP, potentially due to resource pressures or capital dilution, which carries important policy implications. Egbetunde (2009) emphasizes that rapid population growth may dilute per capita output and exert pressure on resources over time, a phenomenon pertinent to Tanzania and aligned with the UECM's findings.

In the short run, changes in credit availability demonstrate a strong and immediate positive impact on GDP, with a coefficient of 21.62147 (p = 0.00021) for differenced credit (d(C)), significant at the 1% level. A one-unit increase in credit change results in a 21.62147 unit increase in GDP, highlighting the role of credit expansion as an effective short-term growth driver. Ndiege (2013) investigates the role of financial institutions in Tanzania inand indicates that enhanced credit availability, especially via cooperative societies, significantly influences short-term economic growth by promoting investment and consumption.

Furthermore, lagged changes in trade openness (d(L(T, 1))) exhibit a marginally significant positive effect, with a coefficient of 4.40956 (p = 0.08407), suggesting that trade policy reforms may yield delayed yet advantageous outcomes for growth. Population growth exhibits a marginally significant negative short-run effect (coefficient = -0.68474, p = 0.05033), thereby reinforcing its long-run contractionary influence. The findings indicate that policies aimed at financial deepening can produce both immediate and long-term economic advantages in Tanzania, while the careful management of population growth is crucial to alleviate its negative impacts.

Finding a steady long-run association and considerable short-run adaptations in Tanzania utilizing ARDL and VECM techniques, our results are in line with those of Kapaya (2021) and Maganya (2018). Similarly, Ghildiyal et al. (2015) demonstrate that financial deepening aids India's long-term development and that the system swiftly restores

equilibrium when imbalanced. In emerging countries, financial variables show long-run cointegration with GDP and efficient error correction, as detailed in Sachsida (2001) and Wadud (2009). This powerful adjustment mechanism reflects these dynamics.

5.5. Restricted Error Correction Model (RECM)

The dynamic findings produced from the UECM and ARDL models are refined and validated by estimating the Restricted Error Correction Model (RECM). The RECM limits the long-term coefficients and gives a simpler version that takes into consideration long-term equilibrium behavior while putting greater emphasis on short-term changes. In the context of more constrained dynamics, this aids in determining the short-term sensitivity of economic growth to financial deepening determinants.

Table 5.5. Restricted Error Correction Model (RECM)

Variable	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0.21002	0.08032	2.615	0.0147**
d(M)	-2.76125	1.16873	-2.363	0.0259**
d(C)	21.62147	3.3893	6.379	9.32e07***
d(T)	-2.54835	1.87008	-1.363	0.1847
d(L(T, 1))	4.40956	1.82318	2.419	0.0229**
ect	-0.35125	0.20876	-6.473	7.35e07***
Model Diagnostics				
Residual std. error (DF = 20)	0.4261			
Multiple R-squared	0.8857			
Adjusted R-squared	0.8637			
F-statistic (11, 20 DF)	40.29			1.945e-11***
Significance Codes:	**0.001*** 0.01** 0.05***			

The RECM shows a robust overall fit, indicated by an adjusted R-squared of 0.8637, which signifies that 86% of the variability in economic growth is accounted for by the model. Additionally, the F-statistic of 40.29 ($p < 0.001$) confirms the joint significance of the predictors. The residual standard error of 0.4261 across 26 degrees of freedom indicates a satisfactory fit.

The findings from the Restricted Error Correction Model (RECM) indicate that an increase in financial deepening using credit to the private sector contributes positively to economic growth in Tanzania. The initial difference of credit, d(C), presents a notably

significant positive coefficient of 21.62147 (t = 6.379, p < 0.001), suggesting that a one-unit increase in credit change enhances economic growth by roughly 21.62 units. This highlights the crucial function of credit expansion as a catalyst for short-term growth, consistent with Levine (1997), who argues that financial development fosters growth by optimizing resource allocation. The initial difference of money supply, d(M), shows a notable negative coefficient of -2.76125 (t = -2.363, p = 0.0259), indicating a 2.76-unit decrease in growth for each unit increase in the change of money supply. The contractionary effect could arise from inflationary pressures or stringent monetary policies, a phenomenon noted in developing economies by De Gregorio (1993).

Trade openness reveals a complex scenario: the immediate change, d(T), shows no significant effect (-2.54835, t = -1.363, p = 0.1847), whereas the lagged difference, d(L(T,1)), indicates a positive and significant outcome (4.40956, t = 2.419, p = 0.0229), suggesting a delayed advantage in growth. This delay corresponds with the findings of Sachs and Warner (1995), who observe that the advantages of trade openness materialize gradually as economies adapt to global integration. The error correction term (ECT) of -1.35125 (t = -6.473, p < 0.001) serves as a fundamental component of the RECM, indicating a strong long-run relationship among the variables. The negative and highly significant value suggests that 135% of any deviation from the long-run equilibrium is rectified within a single period.

These results are in line with those of previous African research that used comparable time-series approaches to indicate that private sector lending had a large short-run impact on economic development in Tanzania Maganya, (2018); Kapaya, (2021). Similar to how monetary aggregates usually impact growth with a lag, Pradhan (2010) and Ghildiyal et al. (2015) discovered that the financial sector strongly contributes to short-run output volatility via credit channels. Sachsida (2001) found comparable convergence behavior in Brazil, thus the rapid rate of adjustment is in line with that.

5.6. Residual Autocorrelation and Heteroskedasticity Results

Verifying the validity of the classical regression assumptions is crucial for constructing robust and reliable error correction and ARDL models. Key diagnostic tests, such as the Breusch-Godfrey LM test for residual autocorrelation and the Breusch-Pagan-Godfrey test for heteroskedasticity, are presented in this section. The presence of serial

correlation or non-constant variance in the residuals, which might influence inference and bias standard errors, can be found out by doing these tests on the model.

Table 5.6. Residual Autocorrelation and Heteroskedasticity Results

Test	Statistic	Degrees of Freedom	p-value	Interpretation (α=0.05)
Breusch-Godfrey (AR1)	0.82824	df1=1, df2=6	0.3979	No autocorrelation
Ljung-Box	2.2403	df=1	0.1345	No autocorrelation
Breusch-Pagan	15.415	df=23	0.8791	Homoskedasticity

The Breusch-Godfrey Test for Autocorrelation shows that the LM test statistic is 0.82824 with 1 degree of freedom. The p-value of 0.398 is higher than the usual criterion of significance, which is 0.05. So, we can not reject the null hypothesis that there is no serial correlation, which means that there is not an evidence of autocorrelation in the residuals up to lag 1.

The Ljung-Box Test for Autocorrelation indicates that with a chi-squared statistic of 2.2403 with 1 degree of freedom and a p-value of 0.135 larger than 0.05, the Box-Ljung test does not reject the null hypothesis of no autocorrelation. This means that the residuals don't have any substantial autocorrelation at the 5% level. The Breusch-Pagan test for homoskedasticity shows that the test statistic (BP) is 15.415 with 23 degrees of freedom. The p-value of 0.879 is much higher than 0.05, thus we can not reject the null hypothesis of homoskedasticity.

5.7. Normality Test Results

Checking that the residuals are normally distributed is crucial. To do this, we use the Jarque-Bera (JB) test, which checks whether the residuals follow a normal distribution. Standard errors and the statistical significance of predicted coefficients in time-series regressions are based on the conventional assumption that the error components are normal. The robustness of model predictions and the reliability of hypothesis testing are both enhanced by checking that residuals follow a normal distribution.

Table 5.7. Normality Test Results

Normality Test	Test Statistic (W)	p-value	Interpretation (α=0.05)
Shapiro-Wilk	0.98487	0.9221	Residuals normally distributed

Table 5.7 presents the results of Shapiro-Wilk normality test, the findings indicate that the p-value of 0.9221 substantially exceeds 0.05, suggesting insufficient evidence to reject the null hypothesis of normality. Consequently, the residuals may be regarded as adhering to a normal distribution. The test was conducted on 32 residual observations covering time points 3 to 34, with a frequency of 1.

5.8. Stability Test Results

Stability diagnostics are necessary to guarantee that the estimated ARDL and Error Correction Models consistently and reliably deliver estimates throughout the sample duration. In order to identify structural instability in the model's parameters, the CUSUM and CUSUMSQ tests are used. These checks determine whether the coefficients show changes over time as a result of policy moves, economic shocks, or model misspecification, or if they stay constant. In macroeconomic time-series analysis, stability is of the utmost importance since projections and policy suggestions may be rendered useless by unstable parameters.

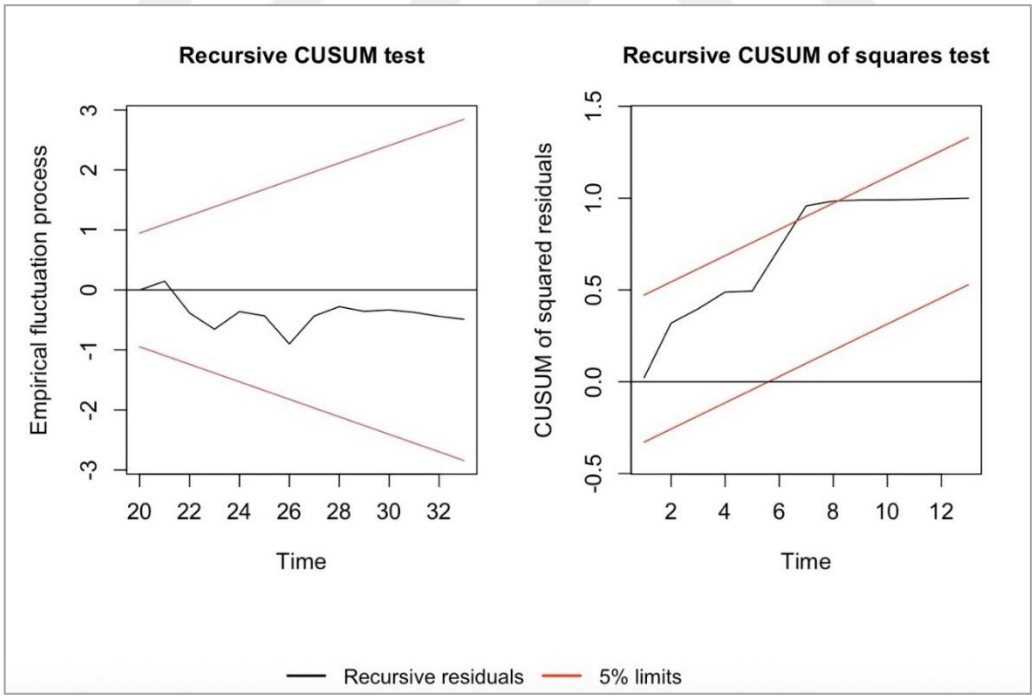


Figure 5.1. Stability Test Results

The figures above portray the results of Recursive CUSUM and Recursive CUSUM of Squares Tests conducted to examines the temporal stability of model parameters. The left

graph illustrates the empirical fluctuation process (black line) over time, with the 5% significance thresholds indicated by red lines. Should the black line continue within these red boundaries throughout the duration, it indicates that the model parameters are stable throughout time. The graph indicates that the recursive residuals remain within the 5% thresholds, implying the absence of a substantial structural break or model destabilization. The right graph displays the CUSUM of squared residuals. Similar to the CUSUM test for levels, if the black line continuously remains within the 5% control limits (red lines), it indicates that the variance remains stable during the sample time. The graph illustrates that the black line consistently remains inside the red bounds throughout time, suggesting no substantial changes in error variance.

5.9. Model Specification Results

The Ramsey RESET is used to perform a model specification test, which ensures that the estimated ARDL model is functionally accurate (Regression Equation Specification Error Test). This test is useful for finding model flaws such as missing variables, improper functional form, or missing specifications. In macroeconomic models in particular, where incorrect specification might result in misleading findings, it is very important to guarantee correct model specification in order to get consistent and impartial estimates.

Table 5.8. Model Specification Results

Specification Test	Test Statistic	df1	df2	p-value	Interpretation (α=0.05)
Ramsey RESET	0.46069	2	11	0.6425	Correctly specified

Table 5.8 displays the results of Ramsey RESET model specification test, the results shows that the test Statistic 0.46069 and a p-value of 0.643 greater than 0.05 implies that we do not reject the null hypothesis, this indicates that there is no evidence of functional form misspecification in the model that means the model is correctly specified.

6. DISCUSSION AND CONCLUSION

This study aimed to empirically examine the impact of financial deepening on economic growth in Tanzania from 1990 to 2023. This paper presents an estimated Autoregressive Distributed Lag Model (ARDL), Unrestricted and Restricted Error Correction Models that provides empirical insights into the dynamic interactions between GDP growth and significant indicators of financial deepening controlled by school enrollment, population growth, trade openness and government expenditure.

The overall results of the ARDL model supported by the results of ARDL bounds F-test provides strong evidence that financial deepening, as measured by money supply and credit to the private sector, has a positive effect on economic growth in Tanzania both in the short term and long-run. Moreover, the UECM indicates a substantial positive effect of financial deepening on economic growth in Tanzania over the long term, with the coefficient for lagged credit (L(C, 1)) estimated at 14.95271 ($p = 0.00432$), significant at the 1% level. A one-unit increase in lagged credit results in a 14.95271-unit increase in GDP, underscoring the essential function of credit in promoting long-term growth through the mobilization of savings, improved resource allocation, and investment facilitation. Additionally, the findings from the Restricted Error Correction Model (RECM) indicate that an increase in financial deepening using credit to the private sector contributes positively to economic growth in Tanzania. The initial difference of credit, d(C), presents a notably significant positive coefficient of 21.62147 ($t = 6.379$, $p < 0.001$), suggesting that a one-unit increase in credit change enhances economic growth by roughly 21.62 units.

However, the results of diagnostic tests show that the ARDL model complies with the theoretical presumptions of the traditional normal linear regression model, specifically, There is no serial correlation, according to the Breusch-Godfrey Test for Autocorrelation, and no functional form misspecification was found in the model, according to the Ramsey RESET model specification test., the results of Recursive CUSUM displays the absence of a substantial model destabilization and the results of Shapiro-Wilk normality test which shows that residuals may be regarded as adhering to a normal distribution.

The ARDL findings validate the supply-leading hypothesis and align with existing patterns in the literature: robust financial institutions promote growth by reducing transaction costs and directing savings towards productive investments. Schumpeter's (1911) argued that

banks and venture capitalists are crucial engines of innovation: effective banking systems finance new technologies and thereby power growth. Similarly, Richard Goldsmith (1969) and Gurley & Shaw (1955) emphasized the functional importance of financial markets in directing resources to productive use. McKinnon (1973) and Shaw (1973) developed the "financial repression" model: they argued that repressed financial policies (e.g. low interest-rate caps) distort savings and investment, so liberalization (higher real rates) would raise savings, capital formation and output. Levine's (2005) cross-country study is a recent example of empirical support that shows that financial systems speed up growth by lowering transaction costs and information asymmetry. Dernirguc-Kunt and Levine (2008) back this up by saying that there is "compelling evidence that financial development plays a crucial role.

Since the 1990s, Tanzania has made a lot of changes to its banking system. For example, the government has launched a number of sector-specific initiatives, such as the First- and Second-Generation Financial Sector Reforms Financial Sector Development Master Plan, (2020-2030), to show how important the financial sector is. By December 2018, there were 53 banks and financial institutions, up from 10 in the 1990s, insurance companies from 2 to 31, listed companies on the Dar es Salaam Stock Exchange (DSE) from 0 to 28, collective investment schemes from 0 to 9, microfinance institutions from 0 to 450, and Savings and Credit Cooperative Societies (SACCOS) from 4,770. This was due to the implementation of the First- and Second-Generation Financial Sector Reforms. Similarly, mobile money and digital monetary initiatives have significantly improved transaction services for the poor. These developments are consistent with national strategies: Tanzania's Vision 2050 clearly calls for "deeper, more inclusive" financial markets to further its objective of becoming a US$1 trillion economy Tanzania Development Vision (2050).

However there are still a lot of limitations. Despite advancements, Tanzania's financial system is still comparatively weak by global standards, with a sizable portion of the population lacking access to banking and substantial credit risks (and interest spreads). Only 22% of Tanzanian adults have access to banking services, as indicated by bank account ownership, according to the Annual Financial Inclusion Report (2023). This disparity implies that many households and small enterprises could not experience immediate benefits even if the banking industry expands. All things considered, the ARDL results demonstrate

that financial deepening is a feasible route for Tanzania's long-term change, but only if it is followed in concert with sensible institutional and macroeconomic policies.

There are a number of policy suggestions that are linked to each other that would help Tanzania's economy grow, markets thrive, and more people have access to financial services. Policymakers should make it a priority to increase access to both digital and physical financial services by building up rural telecom infrastructure and supporting vast networks of mobile money and banking agents. Making mobile internet more available in areas that don't have it, along with teaching people about digital finance, would make services easier to use and increase financial inclusion across the country. This strategy should be strengthened by giving cooperatives and microfinance institutions more power so that they may be useful links between rural people and formal financial systems. By improving the skills and management of SACCOS and farmer cooperatives and connecting them to banks through credit lines or guarantee schemes, it will be easier for those who live far away to get credit and save money.

It is really important to reach out to specific groups that don't get enough help, especially women and people who live in rural areas. Mobile money and banking companies need to actively reach out to these communities by training local agents and starting outreach initiatives to create trust and teach users about a wider range of financial services than just sending money. Governments may encourage more people to use digital banking by sending social payments and pensions through mobile wallets. This will make sure that the benefits of financial deepening are shared fairly.

Another important goal is to make sure that fiscal policy is in line with the growth of the financial market. For the market to have trust, there need to be clear and consistent rules around public debt and budgeting. For example, there should be a debt roadmap and a framework for medium-term spending. Governments should safeguard or boost public investments in high-yield areas like infrastructure and digitization, even if they have to cut total deficits. This plan helps bring in private investment and keep growth going. For example, Tanzania plans to double its budget for infrastructure to meet its 6% growth target. These efforts will be helped by clear information, such as mid-year evaluations and analyses of debt sustainability.

It is also important that cutting the budget deficit does not hurt economic growth. Tanzania should work to slowly lower its deficit by making spending more efficient and increasing revenues. For example, this could be done through better-targeted subsidies and major tax reforms. The East African Community's goal for fiscal convergence is to keep the deficit below 3% of GDP. This should be a long-term goal, and the Ministry of Finance should keep the market informed to keep their faith.

For digital financial services to keep growing quickly, it is important to create a fintech policy and regulatory framework. We need to create a balanced framework that encourages innovation while also protecting consumers and keeping the economy stable. This will encourage stakeholders to get involved and encourage ethical use of technology. Updating the rules that govern insurance will also be important for getting more people covered, especially those with low incomes. To reach the national goal of getting more people to get insurance, it will help to make the licensing procedure easier and promote microinsurance products.

Adding non-bank data, including mobile money transactions, to credit referencing systems will make them better and make it easier for people to get credit. The Bank of Tanzania should work with non-bank financial firms to make sure that data-sharing systems work well. It is also vital to deal with the problem of loans that aren't being paid back. Strengthening loan recovery techniques, enhancing credit risk management, and even setting up asset management organizations to deal with distressed assets will all help keep the financial system stable.

Another top aim is to grow the Dar es Salaam Stock Exchange. More businesses and investors will be interested if the listing standards are easier, the fees are lower, and there are tax breaks. Adding mobile platforms and real-time pricing information to trading infrastructure will make it easier for all investors, especially retail investors, to access it. Also, smart ways to handle debt should be used, such as issuing longer-term, marketable debt instruments and not relying too much on short-term or domestic bank borrowing. Countries like Turkey and Indonesia can teach us how to set up structured issuance calendars and debt management committees.

Another important issue is to make financial supervision stronger and the monetary policy framework more up-to-date. The Bank of Tanzania has to improve its ability to

supervise and put in place risk-based frameworks to quickly find and deal with institutional problems. Changing to an interest-rate-based monetary policy framework will make the financial markets deeper and the policies more effective.

Lastly, the corporate bond market should be made into a more diverse way to get money. Encouraging companies outside of banking to issue bonds, making it easier to issue bonds, encouraging credit rating agencies, and making it easier to use Islamic financing tools can all help make the financial system deeper and more stable. Changes to the rules that govern pension and mutual funds so that they can invest more in corporate bonds, together with changes to the rules that govern pension funds in general, will also help the market grow and give companies long-term sources of finance for growth.

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