INFLUENCE OF FINANCIAL DEEPENING ON ECONOMIC GROWTH IN KENYA (1990-2021)

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DECLARATION

Declaration by Candidate

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DEDICATION

I dedicate this research first to my wife Lydia who continuously encouraged me to pursue the research. Secondly, to my sons Elvin, Oliver, David, and daughter Stephanie who despite my absence from them for long periods during the research, persistently reminded me to complete the study. Thirdly, my mother Christine was a great inspiration especially when looking back at how she struggled to see her children go to school.

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ABSTRACT

Vision 2030 puts Kenya's growth target at an average of 10 percent per annum. However, the country's economic growth rate since 2009 has been an average of 4.9 percent with that of 2024 being 5.0 percent. Hence, achieving this growth target is ambitious considering that the financial deepening measures as percentage of GDP have been declining in the period 2021 to 2024. This study therefore examined the significance of financial deepening in stimulating real output within the economy over the period under study. The main objective of study was to assess the effect of financial deepening on economic growth in Kenya. The specific objectives were: to establish the effect of credit availability to the private sector, commercial bank deposits, broad money stock, lending interest rate, credit information and stock market capitalization on economic growth in Kenya. The study adopted explanatory research design that is quantitative. The study was guided by neoclassical endogenous growth theory. The major sources of data were national accounts data from the Kenya National Bureau of Statistics (KNBS) Economic Surveys, Statistical Abstracts and International Financial Statistics (IFS) site for the period 1990-2021. The study used a vector error correction model. The variables were first tested for unit root thereafter Johansen cointegration Technique was used to test the long run relationship of the variables. The study found that there were unit roots at levels but became stationary after first difference. All the assumptions of linear regression were tested and the data was found to follow normal distribution, no collinear relationship among the independent variables, data was homoscedastic and also no serial correlation found. Results showed that financial deepening variables employed had long run effects on the economic growth. Specifically, credit to private sector ($\beta = 0.444$, $p < 0.05$) and stock market capitalization ($\beta = 0.148$, $p < 0.05$) had positive and significant long-run relationship on economic growth, while commercial bank deposits ($\beta = - 0.368$, $p < 0.05$), broad money supply ($\beta = -0.358$ $p < 0.05$), depth of credit information ($\beta = -1.715$, $p < 0.05$) and lending interest rate ($\beta = -0.063$, $p < 0.05$) had negative and significant long run relationship on economic growth in Kenya. The study concluded by stating that financial deepening was key in promoting economic growth. First, the study recommends that policymakers and monetary authorities promote credit flow to productive sectors through supportive fiscal and monetary policies, including credit guarantee schemes and enhanced SME financing. Second, strengthening financial intermediation by incentivizing banks to lend for investment purposes, revising reserve requirements, and boosting efficiency is crucial. Third, the central bank should maintain prudent monetary policies to ensure liquidity growth supports output without triggering inflation. Fourth, improving credit information systems through expanded credit bureaus and transparent data-sharing will foster informed lending. Additionally, maintaining an optimal interest rate structure that encourages productive borrowing, and advancing stock market development through investor confidence, financial literacy, and technological innovation are vital for sustainable economic growth.

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LIST OF ABBREVIATIONS AND ACRONYMS

ADF:	Augmented Dickey Fuller test
ARDL:	Autoregressive Distributed Lag
ATMs:	Automatic Teller Machines
BMS:	Broad Money Stock (M3)
BSA:	Banking Sector Assets
CBD:	Commercial Bank Deposits
CBK:	Central Bank of Kenya
CBR:	Central Bank Rate
CIS:	Credit Information Sharing
CPI:	Consumer Price Index
CPS:	Credit to the Private Sector
CRB:	Credit Reference Bureau
DFIs:	Microfinance Institutions
DTM:	Deposit Taking Microfinance Institutions
EAC:	East African Community
EALA:	East African Legislative Assembly
ECM:	Error Correction Model
EU:	European Union
FDI:	Foreign Direct Investment
FSDK:	Financial Sector Deepening Kenya
GDP:	Gross Domestic Product
GDPGR:	Gross Domestic Product Growth Rate

GEMS:	Growth Enterprise Market Segment
GMM:	Generalized Method of Moments
GNI:	Gross National Income
GNP:	Gross National Product
IFS:	International Financial Statistics
IMF:	International Monetary Fund
KNBS:	Kenya National Bureau of Statistics
MENA:	Middle East and North America
MFIs:	Microfinance Institutions
MPAT:	Microfinance Poverty Tool
MPC:	Monetary Policy Committee
MRM:	Multiple Regression Model
MS:	Money Supply
NBFIs:	Non-Bank Financial Institutions
OECD:	Organization for Economic Cooperation and Development
OLS:	Ordinary Least Squares
PARCH:	Power Auto Regressive Conditional Heteroscedastic Model
ROSCAs:	Rotating Savings and Credit Associations
SACCOs:	Savings and Credit Cooperative Societies
SMC:	Stock Market Capitalization
UN:	United Nations
UNECA:	United Nations Economic Commission for Africa
USD:	United States Dollar

VAR: Vector Auto Regression

VECM: Vector Error Correction Model

WAEMU: West African Economic and Monetary Union

OPERATIONAL DEFINITIONS OF TERMS

Bank Credit comprises financial resources provided to private economic agents by financial corporations — chiefly loans, purchases of non-equity securities, trade credit, and other accounts receivable that create a claim for repayment — and normally excludes credit to government entities and central-bank lending (World Bank, 2024; International Monetary Fund [IMF], 2024).

Broad Money Stock- Broad Money Stock (BMS), commonly measured as the ratio of broad money to nominal GDP, serves as an indicator of the size and depth of a country's financial sector. A higher BMS-to-GDP ratio reflects a more developed financial system with greater intermediary capacity (World Bank, 2023; IMF, 2022). In this study, Broad Money Stock is represented by M3, an extended monetary aggregate that includes currency in circulation, demand deposits, time and savings deposits, foreign currency deposits, and other large liquid liabilities (IMF, 2023).

Commercial Bank Deposits (CBD) measured as the ratio of commercial bank deposits to nominal GDP, provides an indicator of banking-sector liquidity and the financial sector's ability to mobilize savings. Higher deposit levels signal greater resource mobilization and stronger intermediary capacity (World Bank, 2023; IMF, 2021). Commercial bank deposits typically comprise demand deposits alongside time and savings deposits held by the public (IMF, 2023).

Commercial–Central Bank Assets (CBA), defined as the ratio of commercial bank assets to total assets of both commercial banks and the central bank, reflects the degree of financial intermediation and the relative dominance of the commercial banking sector within the overall financial system (European Central Bank, 2020; IMF, 2022).

Depth of Credit Information Index assesses the extent, accessibility, and quality of credit information available through public credit registries and private credit bureaus. The index ranges from 0 to 9, with higher scores reflecting broader coverage, improved data quality, and greater accessibility of credit information to lenders—thereby enhancing credit risk assessment and lending decisions (World Bank, 2020; IMF, 2022).

Economic Growth denotes the long-term increase in the inflation-adjusted value of goods and services produced within an economy, commonly captured by changes in real GDP. It represents rising national income, expanded productive capacity, and higher levels of economic activity (OECD, 2021; World Bank, 2023).

Financial Deepening refers to the expansion and diversification of financial assets within an economy, reflecting the development and increased capacity of financial institutions to mobilize savings, allocate capital, and support economic activity. Contemporary literature views financial deepening as a process whereby financial assets grow more rapidly than non-financial assets and output, signaling a more efficient and responsive financial system (World Bank, 2023; IMF, 2021).

In this study, financial deepening is operationalized using key indicators that capture the breadth and functioning of the financial sector—namely credit availability to the private sector, commercial bank deposits, broad money stock, depth of credit information, lending interest rates, and stock market capitalization (OECD, 2020; IMF, 2022).

Lending Interest Rate refers to the cost of borrowing funds from financial institutions, and it represents the price charged by commercial banks on credit extended to borrowers. It is commonly measured using the commercial banks' weighted average lending rate, which reflects prevailing credit market conditions, risk assessments, and monetary policy influences (IMF, 2022; World Bank, 2023).

M3 refers to the broadest measure of money supply in an economy. It includes currency in circulation, demand deposits, savings and time deposits (components of M2), as well as large time deposits, institutional money market funds, foreign currency deposits, and other highly liquid financial instruments. As an extended monetary aggregate, M3 captures the overall liquidity available in the financial system and is widely used to assess financial depth and monetary conditions (IMF, 2023; OECD, 2021).

Stock Market Capitalization (SMC) represents the total value of all listed domestic shares on a country's stock exchange and is commonly expressed as a ratio to nominal GDP to indicate the relative size and depth of the stock market within the economy. Higher market capitalization reflects broader market participation and greater capacity for equity financing (World Bank, 2023; IMF, 2021).

CHAPTER ONE

INTRODUCTION

1.1 Introduction

This chapter introduces the concepts of economic growth and financial deepening, and also provides statement of the problem, objectives, hypotheses, research justification, scope of the study, limitations and delimitations of the study.

1.2 Economic Growth and Financial Deepening

Economic growth refers to the sustained increase in a country's capacity to produce goods and services over time, reflecting improvements in overall economic performance. It is commonly measured by the market value of all final goods and services produced within a specific period, encompassing consumption, government expenditure, investment, and net exports. The two key indicators used to assess economic growth are Gross Domestic Product (GDP) and Gross National Product (GNP). GDP measures the total value of goods and services produced within a country's borders, while GNP accounts for the total value of output produced by a nation's residents and businesses, both domestically and abroad. GDP can be expressed in nominal terms, which include inflation, or in real terms, adjusted for inflation. Short-term GDP growth reflects annual percentage changes in real output, whereas long-term GDP growth represents the increase in potential or trend output. To facilitate cross-country comparisons, GDP per capita is often used. According to the Organisation for Economic Co-operation and Development (OECD, 2023), GDP represents an aggregate measure of production equal to the sum of the gross values added of all resident units engaged in production, plus taxes and minus subsidies on products.

GNP, on the other hand, includes the value of goods and services produced by nationals abroad but excludes production by foreign entities within the country (OECD, 2023; World Bank, 2022).

The importance of economic growth in a country cannot be over-emphasized: its links with income, poverty eradication and economic development, among other things, are also well documented in the literature (Journal of African Economies, 2023). The primary focus of growth economics over the years has been to clearly identify major determinants of economic growth (Journal of African Economies, 2023).

Additional measures of economic growth extend beyond traditional output metrics to include the concept of financial deepening — the expansion and sophistication of a country's financial system. When the financial sector is better able to mobilize savings, channel funds to the private sector, and support investment rather than consumption, financial deepening has been shown to contribute positively to economic growth. For example, in Egypt a recent study found that indicators of financial deepening (such as bank deposits, loans and other intermediation metrics) had a positive and significant effect on growth, Mani *et al,* 2024.

According to Gogo, P. (2019), the financial sector in East Africa Community (EAC) is among the least developed among the economic blocs in Africa. This can largely be attributed to recessive policies in the past that extensively encouraged governments' control of the financial sector and political interference in the working of financial intermediaries. Initially, after EAC countries' independence, the governments believed that they could achieve their development agenda through the selective allocation of credit. However, this was not realized and in the late 1970s and 1980s marked a period of deterioration of the financial and economic conditions. With the advice from IMF through the structural adjustment programs as well as its own initiative, EAC governments embarked on policies to reduce controls and allow for liberalization of the financial markets. They instituted reforms such as granting autonomy to the central banks, privatization of state-owned financial institutions, and liberalization of interest rates as well as opening up the economy to international trade. Much of these reforms are still being pursued up to this day, however, financial intermediation is still slow and some measures have even reduced. For instance, the private sector's profit as a percentage of GDP has reduced from 15.4 in 2000 to 9.3 by the end of 2018 (UNECA,2019).

There have been increased economic activities in East Africa which have more effect on the economic growth of its economies such as the creation of East Africa passport which facilitates the movement of traders and their products to fetch market within the region at minimal tax. Trades in East Africa are largely supported by the modern standard gauge railway, tarmac roads, tourism, food produce among other industrial and manufacturing infrastructure. However, EAC has recorded sluggish economic growth. Economic growth in the EAC region averaged 5.9 percent in 2021, compared to an average of 2.3 percent in 2020. The strong regional economic growth in 2021 was largely supported by increased removal of COVID-19 related restrictions, public investments and strong performance in the productive sectors, EALA budget estimates 2022/23, Horvat *et al* (2021).

Kenya is a developing country, and consequently has a number of key development goals that it will need to achieve if the country is to become a “newly-industrializing, upper middle-income country providing high quality of life to all its citizens by 2030”, which is the overarching aim of the country's Vision 2030 agenda. In addition, in the medium term, the country seeks to meet a number of ambitious development plans across five key priority areas – agriculture, Micro Small and Medium Enterprises (MSMEs), affordable housing, digital and creative economy and universal healthcare. Collectively, this group of focus areas is known as the Bottom-Up Economic Transformation Agenda 2022-2027, (BETA). Kenya's capital markets have a role to play in meeting these development areas. The capital markets will be required to effectively channel the country's resources to its most critical development areas – including, amongst others, manufacturing, agriculture, the provision of infrastructure, housing, health care, and so on. If this is to be achieved, the linkages that connects the supply of and demand for capital must operate as effectively as possible, necessitating the development of the capital markets as a source of financing. In addition to this, as the country makes the investments necessary to sustain its long-term development, this will lead to the development of investable securities for both individual and institutional investors. Well-developed capital markets can contribute to the development of a savings and investment culture, growing the country's overall wealth over time. Overall, Kenya's capital markets will represent an important facilitator of economic development, growth and increased wealth for its citizens, (Capital Markets Authority, 2014).

Vision 2030, the Kenyan economic development blueprint, has set the goal of transforming the country into a newly industrialized, "upper-middle income country providing high quality of life to all its citizens by the year 2030". The Kenya government's vision is transforming the country into middle-income level and industrializing economy by the year 2030 and they have identified the financial sector as one of the areas that would help in attaining this critical target. The capital markets Authority of Kenya acknowledges that the Kenyan financial markets are at different stages of development. Whereas Kenya has a well-developed and liquid govern bond market, the equities market on the other hand is characterized by relatively few listings which are skewed towards financial companies, and low liquidity, (Capital Markets Authority, 2014).

Ambitious targets have been set for improvements in listings, liquidity and performance of new product areas in order to develop the Kenyan financial markets. First, is to improve the ratio of equity market capitalization to GDP which currently stands at 50 percent to 70 percent by the end of year 2023. Second target is the number of Growth Enterprise Market Segment (GEMS) listing, which reflect the supply of future main board listed companies, to increase by 3-4 annually. The Growth Enterprise Market Segment (GEMS) is a segment for Small and Medium Sized Companies. GEMS enable these firms to raise substantial capital and accelerate their growth within a regulatory environment designed specifically to meet their needs. The segment offers companies flexible listing requirements in recognition of the company's growth phase. The third target is to raise the ratio of corporate bonds outstanding to GDP to reach 40 percent by end of 2023 and lastly the value of outstanding exchange-traded derivative contracts to reach USD 200 billion by the end of 2023 which is an ambitious and achievable by comparison with other markets (Capital Markets Authority, 2014).

Kenya is one of the countries in the African continent having a well-developed financial system based on the ground. During the last two decades, several reforms translated by developments and innovations have taken place in Kenyan banking sector that have led to the increase in the sector. Specifically, the reduction of retention from 6 to 5.25 percent by the Central Bank of Kenya (CBK) made loans more affordable to the public: the transformation of Non-Bank Financial Institutions (NBFI) into commercial banks such as Equity and Family banks; and the introduction of new products and financial service delivery channels such as M-pesa, Islamic banking, mobile banking, agency banking and the integration of Automated Teller Machines (ATMs) by microfinance institutions, to name a few (Bakang, 2015).

The transformation entails doubling deposits mobilization from 44 percent to 80 percent of GDP and enhancing growth of savings channeled into productive investments from 14percent to over 30 percent. The financial sector that plays a pivotal role in the achievement of this goal hinges on three essential pillars: access, efficiency and stability. Kenya is one of the countries in the African continent having a well-developed financial system based on the ground that it has banking, insurance, capital markets, pension funds, quasi-banking crafted by Savings and Credit cooperative Societies (SACCOs), Microfinance institutions (MFIs), building societies, Development Finance Institutions (DFIs) and informal financial services such as Rotating Savings and Credit Associations (ROSCAs), Uddin, Sjö and Shahbaz (2013)).

The banking system, dominated by the banking sector, comprises of the central bank (the regulatory) authority, 43 commercial banks (out of which 31 are locally owned banks and 13, foreign owned banks) 1 mortgage finance company as at September 2014, Gikonyo, C. K. (2014). Other financial institutions in the banking system include pension funds, insurance companies, hire purchase companies and 9 micro-finance banks. During the last two decades, several reforms translated by developments and innovations have taken place in the Kenyan banking sector that have led to the increase in the sector's assets. Such developments are mainly been driven by financial innovations in the sector. Specifically, the reduction of the retention ratio from 6 to 5.25 percent by the Central Bank of Kenya (CBK) made loans more affordable to the public; the transformation of Non-Bank Financial Institutions (NBFI) into commercial banks(e.g. Equity and Family banks); and the introduction of new products and financial service delivery channels (such as M-pesa, Islamic banking, mobile banking, agency banking and the integration of Automated Teller Machines (ATMs) by micro finance institutions) to name a few, Gikonyo, C. K. (2014).

Mobile banking has also increased over time. The total number of commercial bank agents increased by around 29 per cent in the 2011 from an increase of 71 percent in the year 2010. Commercial bank agents receive small cash deposits and withdrawals of bank customers. As of 2020, commercial banks in Kenya had 72,617 agents, growing from 67,314 in the previous year. Agents are commercial entities that offer financial products and services on behalf of traditional banks. The agency banking model was rolled out in 2010 by the Central Bank of Kenya, and it allowed banks to extend their network without the need of increasing the number of branches, Musau, S. A. (2015).

Transactions undertaken through commercial bank agents in Kenya accumulated roughly 11.3 billion U.S. dollars in 2019. The value of mobile money transactions in Kenya increased by 63.2 per cent (Sh15.3 trillion) in 2021 compared to Sh9.392 trillion in 2020, as citizens continue to embrace digital payments as part of a measure to contain the spread of Covid-19, (Statistica 2023).

The relationship between financial development and economic growth has received considerable attention in both developed and developing economies. This concern about financial deepening and economic growth finds its justification in the policy implications that the relationship can bring about, as improved living standards for their citizens as well as increased economic growth rates are the goals sought by many governments. Moreover, recent research findings have indicated that countries with better developed financial systems tend to have a faster rate of economic growth. As a result, financial deepening has emerged as a strategy to enhance economic growth more so in developing nations such as Kenya, Bakang, M. L. N. (2015).

The literature on financial deepening and economic growth has mostly dealt with the causality issue between the two concepts with two main hypotheses: the first one, the supply-leading hypothesis argues that financial deepening drives economic growth through the presence of efficient markets while the second, the demand-leading hypothesis posits that economic growth is a response to the expansion of financial markets and progress. However, one thing that can be deducted from these different approaches is the positive contribution of financial development to the economic growth process, with an essential role played by financial intermediaries. The main view being that the increased availability of financial instruments and institutions reduces transaction and information costs in an economy. Bakang, M. L. N. (2015)

Empirical studies on financial deepening have been carried out with mixed results on its effects and impact on economic growth. These mixed results depend not only on countries stages of development but also on the data sets and the proxies used to measure financial deepening. In various studies, financial deepening has been measured using several indicators. For instance, the ratios M1/GDP, M2/GDP, M3/GDP or market capitalization/ GDP have been employed to measure the size of the financial sector. The activity of the financial sector has also been a proxy for financial deepening, using indicators such as credit to the private sector/GDP and /or value traded ratio, (Capital Markets Authority, 2014).

Financial deepening can also be measured in terms of the efficiency of the financial sector using indicators such as turnover ratio, banks overhead costs or net interest margins, (Capital Markets Authority, 2014).

1.3 Economic Growth and Financial Deepening in Kenya

Economic growth remains a central concern for policymakers globally, as it reflects improvements in productivity, income levels, and living standards. Over the past decade, most economies have emphasized strengthening financial systems to stimulate sustainable growth, recognizing that finance plays a pivotal role in supporting investment and innovation (World Bank, 2021). Empirical evidence suggests that economies with deep, efficient, and inclusive financial systems are better placed to mobilize resources and allocate them productively, thereby enhancing long-term development outcomes (IMF, 2022). This global perspective underscores the importance of understanding how different components of the financial system influence economic performance.

The relationship between financial deepening and economic growth has attracted renewed attention, particularly in the context of emerging and developing economies. Recent research shows that well-functioning financial markets enhance savings mobilization, facilitate credit allocation, and lower transaction costs, which collectively foster economic expansion (Agyapong & Tweneboah, 2020). Within the finance–growth nexus, variables such as credit access, deposit mobilization, money supply, information flows, and capital market depth are increasingly recognized as key determinants of macroeconomic stability and long-term growth outcomes (Nguyen & Doan, 2021).

In Africa, the financial sector has grown significantly, yet structural weaknesses persist, including limited access to credit, shallow capital markets, and information asymmetry. These challenges often constrain private-sector growth and limit the contribution of financial systems to overall economic performance (UNECA, 2020). Despite ongoing reforms, many African economies continue to experience volatility and slow growth due to insufficient financial intermediation and inadequate credit information frameworks (Bongomin & Munene, 2022). Consequently, the role of financial development indicators in explaining economic growth remains an important area of inquiry across the continent.

Kenya is widely regarded as one of the most financially developed economies in Sub-Saharan Africa, with notable progress in banking, fintech innovation, and capital market expansion. The financial sector’s contribution to GDP has continued to increase, largely driven by enhanced access to financial services and growing private-sector participation (CBK, 2022). However, fluctuations in growth rates, persistent credit constraints, varying deposit mobilization trends, and mixed performance of money supply indicators continue to shape Kenya’s macroeconomic outcomes (KNBS, 2023). These dynamics highlight the need to evaluate how financial-sector variables relate to the country's economic growth trajectory.

According to data from the IMF's World Economic Outlook, the world average economic growth rate from 1990 to 2023 was approximately 2.9% per year, with significant fluctuations depending on global events like the 2008 financial crisis and the COVID-19 pandemic. The average economic growth rate in Sub-Saharan Africa from 1990 to 2023 was estimated to be around 4.0% per year. (IMF, 2025)

While the financial sector is constantly expanding in Kenya, the economic performance of the country is inconsistent since independence. For the last decade, GDP growth rate has been highest in 2010 with 8.40 percent. Since then it has been fluctuating at below 6 percent, except for 2021 when it short to 7.52 percent, as can be seen in table 1.1 below.

Table 1. 1: Kenya's GDP growth rate (%) 2012- 2021

Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
GDP growth rate (%)	4.56	5.87	5.36	5.72	5.87	4.89	5.5	5.11	-0.2	7.52

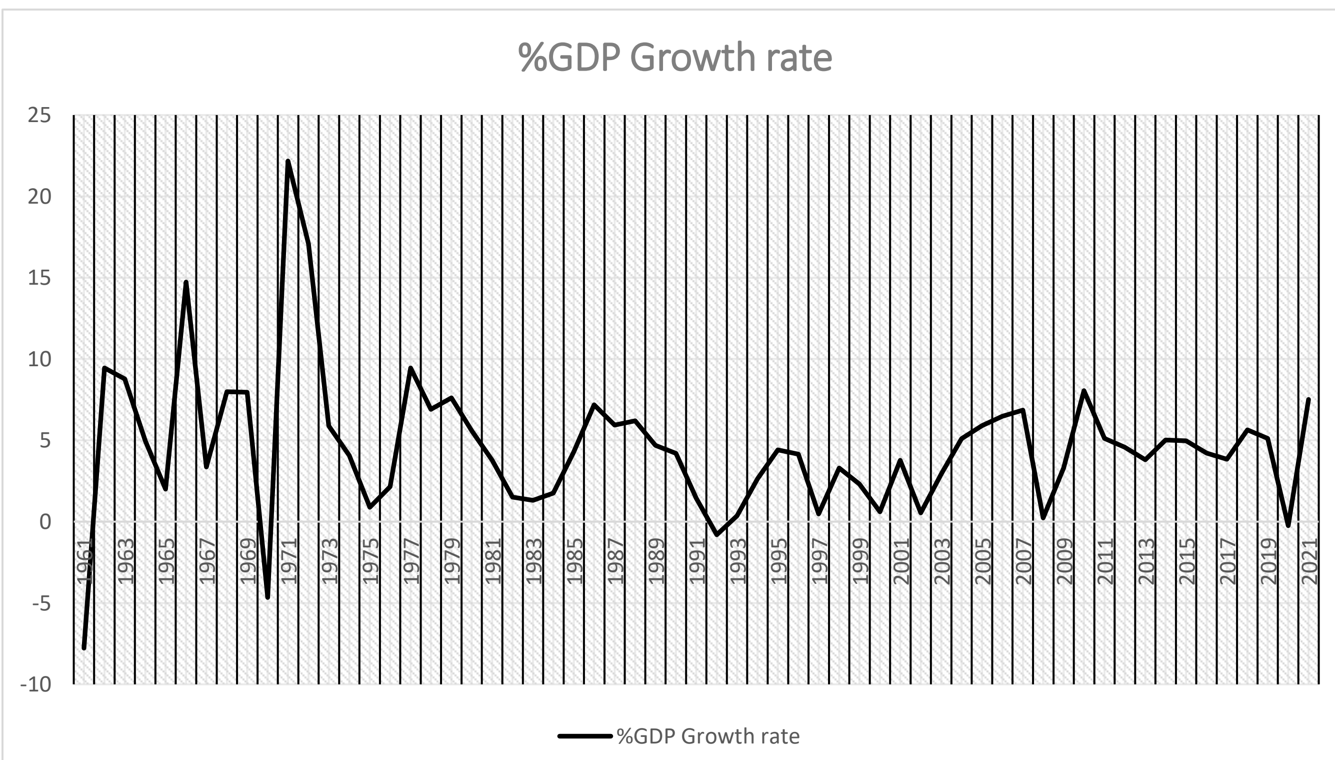
Source: World Bank (2022)

Kenya's long-term development blueprint, Vision 2030, aspires to raise annual GDP growth rates to 10 percent and sustain that performance through 2030. This goal is ambitious, but the government maintains confidence in the country's ability to meet it. Recent growth trends, however, underscore the scale of the challenge: Kenya's GDP expanded by 7.5 percent in 2021, yet historically the highest growth rate recorded over the last five decades was 9.4 percent in 1977, highlighting the level of structural transformation required to reach double-digit growth (Kenya National Bureau of Statistics [KNBS], 2023; World Bank, 2023). Achieving such growth will require addressing persistent constraints to productivity—particularly the need to maintain macroeconomic stability, which Kenya has largely upheld since the early 2000s (International Monetary Fund [IMF], 2024).

Another critical challenge is the persistently low national savings ratio, which continues to lag behind comparator economies and limits domestic resource mobilization for investment

(World Bank, 2022). Meeting the country's ambitious targets will therefore require strengthening financial deepening indicators such as credit access, deposit mobilization, and financial inclusion—areas where progress has been made through digital finance and bank-led innovations, but where significant gaps remain (Central Bank of Kenya [CBK], 2023). Equally important is the need to address Kenya's large informal economy, which accounts for approximately 75 percent of total employment. Formalizing productivity, improving enterprise capabilities, and widening the tax base will be essential in raising incomes, creating jobs, and increasing public revenues (International Labour Organization [ILO], 2023).

Figure1.1: Kenya's GDP growth rate (%) 1961-2021



Source: World Bank (2022)

In 2023, the global average bank credit to the private sector stood at approximately 49.9 percent of GDP. In contrast, the average for 36 African countries was around 22–23 percent, with significant regional variation: roughly 11 percent in Central Africa, 17 percent in West Africa, 21 percent in East Africa, and 37 percent in North Africa—but about 65 percent in Southern Africa due to the more mature financial sectors in countries like South Africa and Mauritius (The Global Economy, 2024).

In Kenya, private-sector credit extended through the banking system has grown, but remains modest: in 2023, monetary-sector credit to the private sector was only 31.64 percent of GDP. ([CEIC Data] [1]) Other non-bank institutions—including SACCOs, microfinance institutions, and finance companies—also provide credit, but their data is limited and less regularly reported (Cytonn, 2024).

Credit is vital for economic development: it supports new investments, housing, business expansion, and general consumption. While excessive credit can lead to financial instability, a higher private-sector credit-to-GDP ratio (for example, 70 percent or more) is often indicative of a well-developed financial system. In very advanced economies, credit-to-GDP ratios can even exceed 200 percent, whereas in less developed countries, they may remain below 15 percent (The Global Economy, 2024; Cytonn, 2024).

Table1. 2: Banks' CPS (% of GDP) 2017 -2020 selected countries.

Country	**2017**	**2018**	**2019**	**2020**
Australia	140.54%	139.95%	136.29%	142.29%
China	113.44%	117.77%	124.18%	124.57%
Cyprus	192.42%	136.55%	108.50%	110.23%
Denmark	161.81%	161.26%	160.89%	163.32%
Kenya	33.15%	31.20%	30.83%	32.15%
South Africa	127.24%	118.64%	118.22%	112.00%
U.A.E	81.75%	77.20%	78.30%	88.41%

Source: World Bank (2022)

Figure 1.2 illustrates the trend of bank credit to the private sector as a percentage of GDP in Kenya between 1961 and 2021. Over this period, the average ratio was 21.29 percent, with a minimum of 11.8 percent in 1962 and a peak of 36.70 percent in 2015 (World Bank, 2023). At the current level of 32.15 percent of GDP, Kenya's private-sector credit remains relatively low by international standards, especially when compared with more advanced financial systems. For instance, in South Africa, bank credit to the private sector stood at 112 percent of GDP in 2020, with a high of 142.42 percent in 2007 and a low of 50.08 percent in 1980, reflecting a substantially deeper and more mature financial system (International Monetary Fund [IMF], 2023; The Global Economy, 2024). These disparities highlight the structural differences in credit markets across countries and provide context for Table 1.2, which presents banks' credit-to-GDP ratios for selected economies for the period 2017–2020, demonstrating Kenya's position relative to regional and global benchmarks.

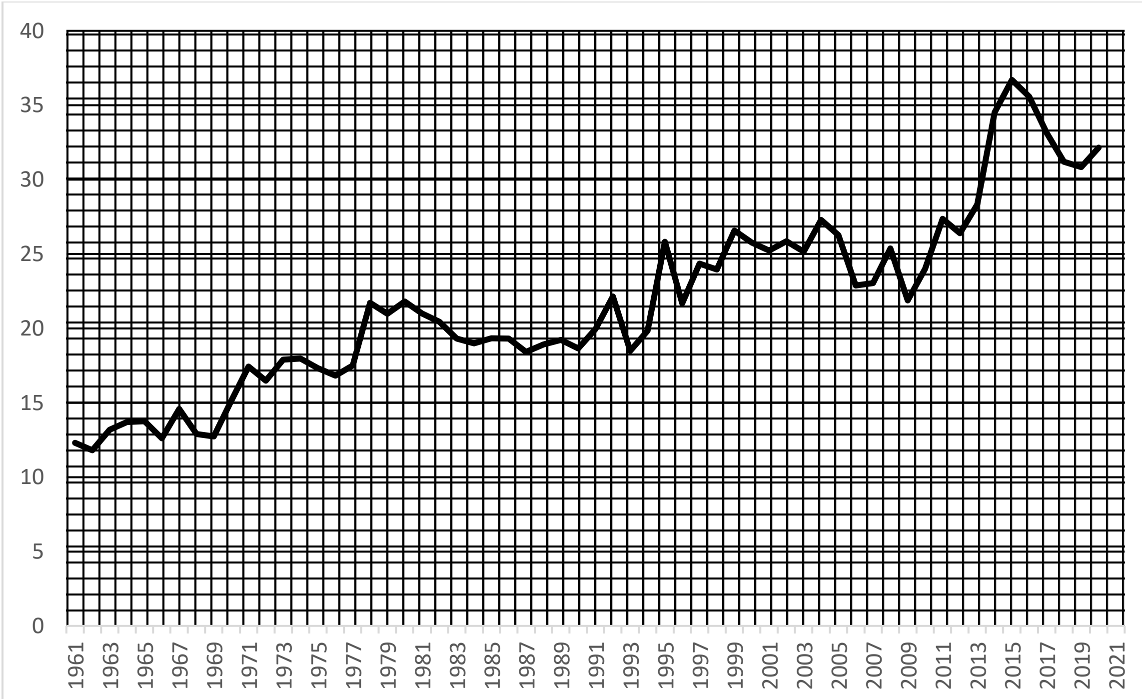


Figure1.2: Kenya's Bank CPS (% of GDP) 1961-2021

Source: World Bank (2022)

Domestic credit to the private sector by banks refers to financial resources extended to private sector entities by deposit-taking institutions—excluding central banks—through instruments such as loans, trade credit, and purchases of non-equity securities, thereby creating claims for repayment. In some cases, these claims also include credit to public enterprises (World Bank, 2023).

Credit availability to the private sector is widely viewed as a key driver of investment and production. Studies indicate that increased credit access stimulates business expansion, employment, and economic activity, particularly in developing economies (Otieno & Ochieng, 2021). Similarly, commercial bank deposits play an important role by providing banks with the liquidity necessary to extend loans and support productive activities (Muguro & Ngugi, 2020). Understanding how these two banking-sector indicators contribute to Kenya's economic growth is therefore essential, given the centrality of credit and deposit mobilization in the country's financial system.

Broad money supply (M3) influences growth by affecting liquidity levels, interest rates, and spending patterns within the economy. Recent evidence shows that optimal money supply expansion can stimulate growth, while excessive expansion may induce inflationary pressures and macroeconomic instability (Abdulahi & Sakyi, 2021).

Table1. 3: BMS (% of GDP) for selected countries 2017-2020

Country	**2017**	**2018**	**2019**	**2020**
Kenya	39.35%	39.36%	38.07%	41.20%
Singapore	122.40%	118.53%	123.49%	150.29%
South Africa	66.14%	66.20%	67.15%	74.60%
United Kingdom	144.27%	146.52%	139.34%	160.32%
USA	90.51%	89.36%	93.02%	111.52%
World	121.24%	122.44%	125.06%	143.46%

Source: World Bank (2022)

Empirical explanations for the relationship between financial intermediation and economic growth often focus on the direction of causality, suggesting that financial intermediation can act as a driver of economic activity. According to Bayoumi and Melander (2008), a 2.5% reduction in overall credit leads to an estimated 1.5% decline in GDP.

Broad money as a percentage of GDP in the world was reported at approximately 138% in 2023 (World Bank, 2025). In Sub-Saharan Africa, the average broad money stock as a percentage of GDP between 1990 and 2023 shows a gradual upward trend, averaging around 30%, though the specific figures vary by country and year (World Bank, 2025). In Kenya, broad money stood at 41.20% of GDP in 2020, compared with 74.60% in South Africa and a world average of 143.46% (World Bank, 2025).

Equally important is the depth of credit information, which reduces information asymmetry, strengthens credit risk assessment, and enhances lending efficiency. Enhanced credit information systems have been shown to increase credit access and improve financial stability in developing economies (Kusi & Agbloyor, 2020). Evaluating these indicators within Kenya is thus critical for understanding their macroeconomic effects.

The global average Depth of Credit Information Index is approximately 5.27 on a scale of 0 to 8, based on data from 185 economies in 2019 (World Bank, 2025). The index measures the extent, accessibility, and quality of credit information available through public or private registries.

In Kenya, Credit Information Sharing (CIS) involves the exchange of borrower information among licensed credit providers through Credit Reference Bureaus (CRBs), as outlined in the Credit Reference Bureau Regulations (CBK, 2020). CIS enables lenders to access borrowers' repayment histories and strengthens risk management practices, ultimately promoting credit access and financial stability (CBK, 2020).

Globally, lending interest rates vary significantly, with averages generally between 6–8% depending on a country's income level and macroeconomic conditions (World Bank, 2025). In Sub-Saharan Africa, the average lending rate is approximately 12–13%, while Kenya's lending rate averages around 16% (World Bank, 2023). Kenya's Bank Lending Rate has historically averaged 16.31% from 1991 to 2022, reaching a high of 32.28% in

1994 and a low of 11.75% in 2020 (World Bank, 2023). For comparison, lending rates in October–November 2022 were 9% in Mauritius, 10.5% in South Africa, 11.5% in Egypt, 13.95% in Tanzania, and 19.36% in Angola (World Bank, 2023).

Table 1.4: Lending Rates (%) selected countries 2014-2021

Country	2014	2015	2016	2017	2018	2019	2020	2021
Kenya	16.51	16.09	16.56	13.67	13.06	12.44	11.99	12.08
Fiji	5.76	5.79	5.85	5.74	5.68	6.03	6.18	5.94
Lesotho	10.34	10.57	11.58	11.58	11.35	11.33	8.98	8.21
South Africa	9.13	9.42	10.46	10.38	10.08	10.13	7.71	7.04

Source: World Bank 2023

Lending interest rates directly influence borrowing costs, affecting both consumption and investment decisions. High interest rates often suppress credit demand and slow economic activity, while lower rates can stimulate borrowing and growth (Mutuku & Koech, 2022). In addition, stock market capitalization—an indicator of capital market development—plays a vital role in mobilizing long-term investment funds and supporting corporate growth. Recent studies highlight that expanding stock markets enhance resource allocation efficiency and positively influence economic performance in emerging economies (Adeleke & Ezeani, 2021). These dynamics underscore the need to examine how interest rates and market capitalization shape economic outcomes in Kenya.

Interest rates are also shaped by international financial dynamics. When foreign investors supply additional loanable funds to a domestic economy, the increased capital availability can exert downward pressure on domestic interest rates (World Bank, 2024). Kenya's long-term development framework—Vision 2030—targets a sustained annual GDP growth rate of 10% supported by an investment rate of approximately 30%, much of which is expected to be financed through domestic savings (Government of Kenya, 2023). Although Kenya's financial sector is relatively diversified, it remains predominantly bank-based and has not sufficiently developed to provide long-term capital. Both equity and debt markets continue to exhibit limited depth, while development finance institutions have consistently underperformed (Capital Markets Authority, 2023). Achieving the investment levels envisioned under Vision 2030 therefore requires a financial sector capable of mobilizing adequate and appropriately structured long-term financing.

Globally, stock market capitalization has grown substantially between 1990 and 2025, increasing at an estimated compound annual growth rate of 8–10%. However, Sub-Saharan Africa continues to lag behind, with stock market capitalization (excluding South Africa) generally remaining below 20% of GDP, reflecting shallow and underdeveloped capital markets in the region (World Bank, 2025). Capital market development remains an essential driver of financial sector deepening, complementing the intermediation role of banks. Efficient capital markets facilitate price discovery, enhance liquidity, reduce transaction costs, and support risk transfer. They also lower information asymmetry by generating and disseminating firm-specific information, contributing to market efficiency where prices reflect available information (Yartey & Adjasi, 2007; Garcia & Liu, 1999). Liquid and efficient stock markets enable long-term project financing by providing investors with mechanisms to easily convert their investments into cash, thereby fostering economic growth.

Despite Kenya's progress in financial sector development, empirical findings on the relationship between key financial indicators and economic growth remain inconclusive, inconsistent, and context-specific. Moreover, limited studies combine banking sector variables, money supply indicators, credit information depth, and stock market performance within a single analytical framework. This gap necessitates a comprehensive investigation into how credit to private sector, commercial bank deposits, broad money supply, depth of credit information, lending interest rates, and stock market capitalization jointly affect economic growth in Kenya. By addressing this gap, the study provides evidence-based insights to guide financial policy, deepen financial markets, and support sustainable economic development.

1.4 Statement of the Problem

Economic growth remains a central pillar of Kenya's development agenda; however, the pace and consistency of this growth have continued to fluctuate despite substantial reforms aimed at deepening the financial sector. Contemporary studies emphasize that financial development should enhance economic performance through improved mobilization of savings, efficient credit allocation, and increased investment activity (World Bank, 2023; IMF, 2022). Yet in Kenya, the empirical linkage between financial deepening indicators and economic growth remains ambiguous and far from conclusive.

Despite major advancements—including expanded credit facilities, enhanced financial inclusion through digital finance, and gradual growth in capital markets—the anticipated transmission of these gains into sustained and robust economic growth has not materialized. For instance, although private-sector credit is theoretically expected to stimulate productive investment and innovation, access to credit—especially for small and medium-sized enterprises (SMEs)—remains constrained by high collateral demands, elevated lending costs, and persistent risk aversion within the banking sector (CBK, 2023). Similarly, while commercial bank deposits have expanded over time and form the basis for credit creation, it remains unclear whether these deposits are being effectively mobilized to support the most productive segments of the economy (National Treasury, 2022).

Broad money stock has grown substantially, reflecting increased liquidity and a deeper financial system. However, Kenya continues to grapple with structural bottlenecks, cyclical macroeconomic instability, and uneven sectoral performance, raising concerns about whether expanded money supply meaningfully drives output growth (World Bank, 2024). The depth of credit information infrastructure—intended to reduce information asymmetries and enhance credit risk assessment—has also improved with the presence of credit reference bureaus. Nevertheless, recent assessments indicate persistent gaps in data accuracy, coverage, and reliability, which continue to impede efficient credit allocation (FSD Kenya, 2022).

High lending interest rates—shaped by market inefficiencies, government borrowing pressures, and inflationary dynamics—remain a major constraint to private investment and long-term borrowing (IMF, 2022). Likewise, although Kenya's stock market has registered notable reforms, fluctuations in market capitalization and limited investor participation have weakened its contribution to real-sector growth (AfDB, 2023).

This persistent mismatch between financial sector expansion and economic performance raises a critical empirical and policy question: To what extent do key financial deepening indicators—such as private-sector credit, commercial bank deposits, broad money supply, credit information depth, lending interest rates, and stock market capitalization—contribute to economic growth in Kenya? Existing empirical evidence remains mixed, with some recent studies supporting a supply-leading dynamic and others emphasizing a demand-following relationship in which growth stimulates financial development (Otieno & Ochieng, 2021; Asongu & Odhiambo, 2020). Consequently, an updated and comprehensive empirical investigation is necessary to clarify these inconsistencies and provide evidence that reflects Kenya's current financial landscape

1.5 Research Objectives

Objective of this research has been categorized as general and specific objective. The general objective describes the overall effect of financial deepening on economic growth while specific objectives elaborate each of the variables on economic growth in Kenya.

1.5.1 General Objective

The study examined the effect of financial deepening on economic growth in Kenya.

1.5.2 Specific Objectives

The specific objectives of the study were: -

1. To establish the effect of credit availability to the private sector on economic growth in Kenya.
2. To investigate the influence of commercial bank deposits on economic growth in Kenya.
3. To determine the effect of broad money stock on economic growth in Kenya
4. To examine the effect of depth of credit information on economic growth in Kenya.

5. To evaluate the effect of lending interest rates on economic growth in Kenya.
6. To investigate the effect of stock market capitalization on economic growth in Kenya.

1.6 Research Hypotheses

The study had the following Hypotheses: -

Ho_1: Bank credit to the private sector does not significantly affect economic growth in Kenya.

Ho_2: Commercial bank deposits do not significantly influence economic growth in Kenya.

H_{03}: Broad money stock does not significantly affect economic growth in Kenya

H_{04}: Depth of credit information does not significantly influence economic growth in Kenya.

H_{05}: Lending interest rates does not significantly influence economic growth in Kenya.

H_{06}: Stock market capitalization does not significantly influence economic growth in Kenya.

1.7 Significance of the Study

This study is significant because it provides contemporary empirical evidence on the contribution of financial deepening to economic growth in Kenya—an issue central to current macroeconomic policy and development planning. In developing economies, recent studies underscore that financial sector development plays a pivotal role in enhancing productivity, supporting private investment, and strengthening long-term economic resilience (Asongu & Odhiambo, 2020; IMF, 2022; World Bank, 2023). By examining multiple dimensions of financial deepening, the study addresses ongoing policy debates on how financial systems can more effectively support Kenya's economic transformation agenda.

For the Government of Kenya, the findings offer critical insights that can support the implementation of Vision 2030, the Fourth Medium-Term Plan, and ongoing financial sector modernization efforts. Recent government documents and policy reviews highlight the need to expand credit access, deepen capital markets, and strengthen financial information infrastructure as pathways to achieving higher and more inclusive GDP growth (Government of Kenya, 2018; National Treasury, 2022; CBK, 2023). The evidence generated from this study is therefore instrumental for institutions such as the Central Bank of Kenya (CBK), the National Treasury, and the Capital Markets Authority (CMA) as they evaluate the effectiveness of reforms in the Financial Sector Development Strategy and digital financial inclusion frameworks.

For financial institutions—including commercial banks, microfinance institutions, SACCOs, fintech firms, and capital-market intermediaries—the study offers valuable empirical insights on how different financial deepening indicators influence economic activity. Recent sectoral reports affirm that credit expansion, deposit mobilization, and financial innovation are central to supporting Kenya's productive sectors and sustaining macroeconomic stability (CBK, 2023; FSD Kenya, 2022). The study's findings can assist financial institutions in refining credit allocation policies, improving risk management practices, and designing innovative financial products aligned with market dynamics and national development priorities.

For international development partners such as the World Bank, IMF, African Development Bank (AfDB), and other financial inclusion agencies, the study contributes to the ongoing discourse on the role of financial systems in supporting inclusive and resilient growth. Recent global assessments emphasize that robust financial systems are essential for mitigating vulnerabilities, expanding SME financing, and promoting broad-based development (IMF, 2022; World Bank, 2024; AfDB, 2023). The findings from this study can therefore inform the design and evaluation of development programs targeting financial access, digital financial infrastructure, and capital-market strengthening initiatives in Kenya.

Finally, the study holds significant value for contemporary scholars and researchers. By providing an up-to-date empirical analysis of Kenya's financial deepening indicators over an extended period, it enriches the modern literature on the finance–growth nexus and contributes to ongoing academic debates in the Sub-Saharan African context. The study also offers a methodological and conceptual foundation for future researchers seeking to test recent theoretical propositions or conduct comparative analyses across developing economies (Otieno & Ochieng, 2021).

1.8 Scope of the Study

This study focuses on assessing the role of financial deepening in promoting economic growth in Kenya. Geographically, the study is confined to Kenya due to the country's evolving financial landscape and the availability of consistent long-term macroeconomic data. Conceptually, the analysis is limited to key indicators of financial deepening and economic performance, specifically: gross domestic product growth rate (GDPGR), credit to the private sector (CPS), commercial bank deposits (CBD), broad money stock (BMS), depth of credit information (CINF), lending interest rates (INR), and stock market capitalization (SMC).

The temporal scope covers the period 1990 to 2021, a timeframe selected because it captures major financial sector reforms, structural adjustments, technological innovations, and policy transformations that have shaped Kenya's financial system. By restricting the study to these variables and this period, the research aims to provide a comprehensive and empirically grounded evaluation of how financial deepening has influenced Kenya's economic growth trajectory.

1.9 Limitations and Delimitations of the Study

This study was subject to several limitations and delimitations. The major limitation arises from the use of secondary annual data obtained from the Kenya National Bureau of Statistics (KNBS) Economic Surveys, Statistical Abstracts, and the International Financial Statistics (IFS) database. Although these sources are reliable, potential issues such as measurement errors, data revisions, and missing values—especially for the early 1990s—may have affected data accuracy (KNBS, 2022; International Monetary Fund [IMF], 2023). Additionally, the study covered a 32-year period (1990–2021), yielding a relatively small sample size for time-series analysis. According to Box and Tiao (1975), autoregressive integrated moving average (ARIMA) models generally require at least 50 observations for reliable estimation, suggesting that the limited data points may have constrained the statistical robustness of some tests. Furthermore, Kenya's financial sector has undergone several policy and structural changes over the study period, including interest rate capping between 2016 and 2019, credit information sharing reforms, and changes in monetary policy frameworks. These developments may have introduced structural breaks that could not be fully captured by the econometric models used.

The study was also limited by the exclusion of certain macroeconomic and institutional variables—such as fiscal policy, political stability, and foreign direct investment—that may influence economic growth. This exclusion was necessary to maintain model parsimony and focus on the core financial indicators. Moreover, external shocks, including the 2008 global financial crisis and the COVID-19 pandemic, may have temporarily distorted relationships among variables, thus influencing the estimated results. Forecasting limitations were also acknowledged, as time-series models assume that historical relationships persist into the future, yet unexpected structural or policy shifts could weaken predictive reliability.

Regarding delimitations, the study focused on six financial indicators—credit to the private sector, commercial bank deposits, broad money stock, depth of credit information, lending interest rate, and stock market capitalization—as proxies for financial development. Other indicators such as inflation, exchange rate, and trade openness were excluded because they fell outside the specific objectives of the study. The geographical scope was limited to Kenya, enabling a detailed assessment of its unique financial and institutional context, though this limits the generalizability of findings to other countries. The study period of 1990–2021 was deliberately chosen to capture the evolution of Kenya's financial sector reforms and economic cycles. Finally, the study employed time-series econometric techniques such as the autoregressive distributed lag (ARDL) and vector error correction model (VECM) frameworks, which are appropriate for identifying both short- and long-run dynamics in a single-country context. Other analytical approaches, such as panel data analysis or structural equation modeling, were beyond the scope of this research.

1.10 Organization of the Study

This study is organized into five chapters, each addressing a specific aspect of the research process in a logical and coherent manner.

Chapter One introduces the study and presents the background information, problem statement, research objectives, significance of the study, scope, limitations and delimitations of the study. It provides a general overview of the relationship between financial development indicators and economic growth in Kenya, thereby setting the foundation for the subsequent chapters.

Chapter Two reviews both theoretical and empirical literature related to the study variables. It discusses relevant financial and economic growth theories, presents findings from previous studies, identifies existing knowledge gaps, and develops the conceptual framework guiding the study.

Chapter Three outlines the research methodology employed to achieve the study objectives. It describes the research design, data sources, variable definitions, model specification, estimation techniques, diagnostic tests, and data analysis procedures. The chapter also highlights the justification for using time-series econometric methods, including the autoregressive distributed lag (ARDL) and vector error correction model (VECM) frameworks.

Chapter Four presents and interprets the empirical findings. It provides descriptive statistics, diagnostic test results, and both short-run and long-run estimations. The chapter further discusses the implications of the results in light of economic theory and previous research.

Chapter Five concludes the study by summarizing the key findings, drawing policy implications, and offering recommendations for policymakers, financial institutions, and researchers. It also suggests areas for further research to enhance understanding of the nexus between financial development and economic growth in Kenya.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a comprehensive review of literature related to financial deepening and economic growth. It begins by outlining the theoretical foundations that explain the finance–growth nexus, drawing on classical and contemporary perspectives that inform the study. The chapter further examines empirical studies conducted across global, regional, and Kenyan contexts to situate the present research within existing scholarly work. Through this review, the chapter highlights the key conceptual issues, methodological approaches, and findings reported in prior studies.

In addition, the chapter identifies inconsistencies, limitations, and unresolved questions within the existing body of knowledge, thereby establishing the knowledge gap that this study seeks to address. By contextualizing the current research within both theoretical and empirical frameworks, the chapter provides the justification for the selected variables, methodological choices, and the relevance of investigating the relationship between financial deepening and economic growth in Kenya.

2.2 Concept of Economic Growth

Economic growth refers to the sustained increase in an economy's capacity to produce goods and services over time, usually measured in real terms to account for inflation and accurately capture changes in productive performance. Contemporary definitions emphasize that growth reflects the expansion of inflation-adjusted economic output, most commonly assessed through the percentage change in real Gross Domestic Product (GDP) or real GDP per capita, which facilitates comparisons across countries of different population sizes (World Bank, 2023). GDP measures the value of production within a country's borders, while Gross National Product (GNP) accounts for the value of goods and services produced by a country's residents regardless of location, incorporating net factor income from abroad (OECD, 2023). Real measurements are preferred because they eliminate the distorting effects of price fluctuations and better represent the underlying trajectory of economic performance (IMF, 2022). In addition to output-based measures, broader indicators such as total factor productivity (TFP), technological progress, and the accumulation of human and physical capital are increasingly used to capture the structural drivers of long-term growth (Acemoglu & Restrepo, 2020). These dynamics are commonly described through production function frameworks in which capital and labor combine to generate output, guided by entrepreneurial decision-making and supported by technological and institutional development (World Bank, 2023).

2.3 Concept of Financial Deepening

Financial deepening refers to the availability of sufficient liquidity and the effective functioning of financial institutions in mobilizing savings and allocating them efficiently to deficit units within an economy. Well-developed financial markets promote productive investment by ensuring that financial resources are directed toward their most profitable uses. Conversely, shallow financial markets often leave significant resources outside the formal financial system, reducing their contribution to economic growth (Financial Sector Deepening Kenya [FSDK], 2011).

Recent studies affirm that financial deepening is a critical driver of economic development. Modern financial systems support economic activity by expanding credit access, increasing liquidity, and strengthening financial markets. For example, Wanjala and Gogo (2020) found that broad money, private sector credit, and stock market activity all had a positive and significant effect on economic growth in the East African Community.

More recent African evidence shows that financial deepening contributes to growth when supported by financial stability and institutional efficiency. A panel ARDL study by Aregbeshola (2025) demonstrated that financial depth and efficiency positively affect economic growth, though excessive liquidity and financial instability can undermine these gains. Similarly, in Kenya, increases in private sector credit, broad money, and bank deposits are associated with higher private investment in both the short and long run (Omondi et al., 2023).

Contemporary macro-financial assessments also indicate both opportunities and challenges. In Kenya, private sector credit growth has recently improved, though high government borrowing continues to crowd out private lending (Central Bank of Kenya [CBK], 2025; National Treasury, 2025). Research by Deloitte (2025) and Cytonn Investments (2024) shows that elevated lending rates and rising non-performing loans may constrain further deepening if not addressed. Nevertheless, the Kenyan banking sector remains well-capitalized, liquid, and technologically innovative, supporting continued intermediation (Kenya Bankers Association [KBA], 2024).

Overall, financial deepening remains a multi-dimensional process involving increased money supply, expanded credit to the private sector, and deepening of financial markets.

A well-functioning and stable financial sector is essential for translating financial deepening into sustainable economic growth, especially in developing economies.

2.4 Theoretical Literature Review

The relationship between financial development and economic growth has remained important issue of debate as considerable empirical studies conducted in different countries produce contrasting the results (Ginevičius, Dudzevičiūtė Schieg, & Peleckis, 2019). The study of the relationship between financial development and economic growth can be traced back in early 19th century by the work of Schumpeter (1911) who argued that financial services are dominant in promoting economic growth.

Contemporary empirical literature identifies several key theoretical perspectives that explain the relationship between financial development and economic growth. First, the supply-leading hypothesis posits that financial sector development plays a foundational role in stimulating economic performance by enhancing resource mobilization, reducing transaction costs, and facilitating efficient credit allocation, thereby enabling productive investment and innovation (Ajide & Raheem, 2020). In contrast, the demand-following hypothesis suggests that economic expansion generates the need for more sophisticated financial instruments and services, such that growth-induced demand drives the evolution of the financial system (Siaw & Lawer, 2021). Complementing these views, the financial intermediation theory emphasizes the role of financial institutions in mitigating informational asymmetries, lowering monitoring costs, and transforming savings into productive capital, which supports macroeconomic stability and long-term growth (Ngare & Mutuku, 2023). Together, these perspectives highlight the multifaceted channels through which financial systems may influence or respond to economic expansion, underscoring the importance of country-specific structural factors in shaping this relationship.

Recent empirical studies continue to explore the direction of causality between financial development and economic growth across diverse economic contexts. Using advanced time-series and panel causality frameworks, researchers have produced mixed but insightful findings. For instance, Adusei (2023) examined the nexus between financial sector depth and economic expansion in sub-Saharan Africa and found evidence supporting the supply-leading hypothesis, whereby increases in private sector credit and financial innovation stimulate long-run growth. Similarly, Bist and Bista (2020) applied a panel vector error correction model for South Asian economies and reported that financial development—captured through broad money supply, credit to the private sector, and financial openness—Granger-causes economic growth, reinforcing the argument that a well-functioning financial system enhances productive investment. In contrast, Akande and Ahmed (2022) analyzed Nigeria's financial system using a time-varying causality approach and documented demand-following dynamics, showing that periods of strong economic activity tend to drive increased financial service usage and deeper credit markets.

More recent country-specific evidence from Kenya by Mutuku and Ngare (2023) reveals that improvements in financial intermediation efficiency and digital financial inclusion have significant causal effects on economic growth, signalling a predominantly supply-driven relationship in the short and long run. Taken together, these findings suggest that while the causal relationship varies across regions, contemporary evidence generally aligns with the view that strengthening financial systems—through credit provision, innovation, and intermediation efficiency—remains critical for sustaining economic growth.

Contemporary empirical research continues to investigate the causal dynamics between financial development and economic growth, with findings varying across countries and methodologies. Ibrahim and Alagidede (2020) analyzed 27 African economies using a panel vector autoregression framework and found evidence of supply-leading causality, where improvements in private sector credit, financial openness, and banking sector depth significantly enhance economic growth. Similarly, Raza, Ali, and Khan (2022) employed a nonlinear autoregressive distributed lag (NARDL) model for Pakistan and documented asymmetric causal effects, showing that positive shocks to financial development indicators—particularly bank-based credit—Granger-cause economic growth, reinforcing the supply-leading hypothesis. Conversely, recent evidence from emerging Asian economies suggests mixed or demand-following patterns. For example, Widodo and Salim (2021) examined Indonesia using VECM and time-varying causality tests, finding that economic expansion often precedes financial deepening during periods of structural reform, consistent with the demand-following hypothesis.

A more recent study by Adusei (2023) using dynamic heterogeneous panel estimations reported that financial sector depth and market-based indicators Granger-cause long-run economic growth in sub-Saharan Africa, further validating the supply-leading position. However, Akande and Ahmed (2022) demonstrated that in Nigeria the causality direction fluctuates over time, with phases of both supply-leading and demand-following dynamics depending on economic cycles and institutional conditions. Overall, the emerging body of literature points to a context-dependent causal relationship, but recent evidence predominantly supports the view that financial development—particularly through credit provision, intermediation efficiency, and market expansion—plays a crucial role in promoting economic growth.

Kamalu *et al*., (2019) assessed the direction of causality between financial development, financial inclusion and economic growth in Nigeria using the Gregory and Hansen cointegration and Toda and Yamamoto tests. The study period was from 1970 to 2018 and utilized the variables of financial development for depth, access and efficiency, foreign direct investment; and economic growth. The findings showed that there exists a bidirectional causality between financial development and economic growth while a unidirectional causality was found between financial inclusion and economic growth.

Odo *et al*., (2020) analyzed the relationship between financial development and economic growth in Nigeria and South Africa from 1980 to 2014. They applied the VECM and Granger causality and used the ratios of broad money supply and domestic credit to private sector to GDP, real interest rate and economic growth. The study established a unidirectional causality for Nigeria and a bidirectional causality for South Africa.

The existence of a relationship between finance and growth seems incontestable as many researchers have worked on the issue and positively confirmed it. What is debatable is the direction of causality between finance and growth. The direction of causality has been described by Patrick (1966) as supply-leading and demand-following theories. This postulation was reinforced by Mckinnon (1988).

When causal relationship runs from financial development to growth, it is termed supply-leading because it is believed that the activities of the financial institution increase the supply of financial services which creates economic growth. Similarly, when the growth within the economy results in increase in the demand for financial services and this subsequently motivates financial development, then it is termed demand-following theory.

2.4.1 The Supply-Led Hypothesis (Guiding Theory)

The present study is underpinned by the Supply-Leading Hypothesis, which asserts that financial sector development precedes and stimulates economic growth by mobilizing savings, enhancing capital allocation, and expanding investment. Recent literature reaffirms this view, demonstrating that financial institutions such as commercial banks, microfinance institutions, and capital markets continue to function as engines of growth by deepening financial intermediation and increasing credit access (Riley & Nowak, 2020; Sassi & Goaied, 2021).

The supply-leading perspective emphasizes that expanding financial resources and improving access to credit encourage entrepreneurship and productive investment, thereby driving long-run economic growth. Contemporary studies show that financial deepening supports technological innovation, strengthens capital productivity, and facilitates structural transformation in developing economies (Agyemang-Badu et al., 2022; Chikalipah & Ngwenya, 2022). In Kenya, where private sector activity contributes substantially to GDP, the availability of credit, growth of deposits, and development of capital markets remain central to investment financing and productive capacity expansion (Wamalwa & Mutuku, 2021; Mbaabu, 2024).

Kenya’s financial reforms—including digital banking expansion, credit information sharing, and modern monetary policy frameworks—continue to align with supply-leading principles by improving efficiency, lowering transaction costs, and widening access to financial services (Central Bank of Kenya, 2021; Mbaabu, 2024). These reforms were designed to strengthen financial depth and reinforce the role of financial institutions in allocating resources toward productivity-enhancing sectors.

Recent literature strongly supports the argument that well-functioning financial systems accelerate economic growth by improving capital accumulation, expanding liquidity, and encouraging savings (Adebayo *et al*., 2021; Musa & Ibrahim, 2022). Countries with more efficient banking systems, stronger institutions, and improved credit infrastructure tend to experience faster growth, confirming the supply-leading hypothesis in modern contexts.

The supply-leading view also highlights the effectiveness of financial deepening mechanisms—such as credit expansion, broader monetary aggregates, and enhanced credit rationing—in fostering economic activity. Empirical evidence shows that monetary policy continues to influence macroeconomic outcomes by shaping credit conditions, interest rates, and liquidity, especially in emerging economies (Banda & Ngoma, 2021).

In Kenya, monetary policy plays a vital role in shaping credit allocation and deepening the financial system. Recent reports reveal that deposit-taking institutions increasingly use digital credit transfer systems, risk-based lending, and capital-market-linked financing mechanisms to expand access to credit for the real sector (Central Bank of Kenya, 2022). However, implementation challenges such as inconsistent policy signals, liquidity constraints, and volatility in interest rate frameworks occasionally hinder financial deepening and restrict access to finance for productive sectors (Were & Ngugi, 2020).

Recent cross-country studies confirm the causality patterns proposed by the supply-leading hypothesis. Evidence shows that financial development leads economic growth in developing and emerging economies, validating the theory's relevance in modern financial systems (Sahay *et al*., 2020; Agyemang-Badu et al., 2022). More recent time-series studies from African and Asian economies also find that financial deepening indicators such as credit to the private sector, broad money supply, and deposit mobilization significantly promote growth (Osei & Frimpong, 2022; Mwangi & Wanjiru, 2023).

Although some newer studies report mixed results, often due to institutional weaknesses or inefficient credit allocation, the collective evidence still supports the assertion that financial development leads economic growth where financial systems are efficient and well-regulated (Drehmann & Juselius, 2020; Ali & Hussain, 2021).

Given these contemporary perspectives, this study adopts the Supply-Leading Hypothesis as its guiding theoretical framework. The theory provides a robust foundation for examining how key financial indicators—credit to the private sector, commercial bank deposits, broad money stock, credit information depth, lending interest rates, and stock market capitalization—affect Kenya's economic growth. Modern empirical research validates the continued relevance of the supply-leading framework in explaining how financial deepening drives macroeconomic expansion, particularly in emerging economies undergoing financial transformation.

2.4.2 Demand-Following Hypothesis

The Demand-Following Hypothesis, originally attributed to Robinson (1952), argues that financial development evolves as a response to economic growth rather than serving as its driver. While the hypothesis is historically rooted in the work of Robinson and later discussed by Patrick (1966), recent literature has revisited and empirically tested this proposition using modern data and advanced econometric techniques.

According to the demand-following view, as real output expands, firms and households generate higher demand for financial services—such as savings facilities, credit access, payment systems, and investment instruments—which stimulates the growth and sophistication of the financial system (Kim & Lin, 2021). Economic expansion therefore creates new markets and greater transaction volumes, prompting financial institutions to innovate and expand their services in response to rising macroeconomic activity (Edo, Osadolor, & Ogbuagu, 2020).

In the Kenyan context, financial development has often followed periods of economic expansion, reflected in the growth of mobile money, increased banking penetration, and broader participation in capital markets during years of rapid GDP growth (Ngugi & Wambui, 2023). These patterns illustrate the core demand-following premise—economic progress triggers demand for complex financial services, which subsequently deepens the financial system.

Recent studies increasingly validate this position. For instance, Adusei (2022) finds that in Sub-Saharan Africa, growth dynamics exert a stronger influence on financial sector expansion than the reverse. Similarly, Brown and Ekeocha (2021) report that financial development responds significantly to improvements in real economic activity, especially in lower-income economies where financial markets are still evolving. In another study, Ghosh and Vinayagathasan (2021) observe that financial deepening in emerging Asian economies is largely demand-driven, with output growth preceding expansions in credit and monetary aggregates.

The demand-following hypothesis also aligns with contemporary evidence that early investment in deep financial markets—before adequate real sector development—may produce inefficiencies or underutilized financial structures (Ndlovu & Mutize, 2020). From this perspective, prioritizing real sector growth creates a natural and sustainable foundation on which financial markets can develop.

A growing body of modern literature also suggests that the relationship may change over time. For example, Sarpong, Biekpe, and Ofori-Sasu (2022) show that economic growth tends to drive financial development in early and middle stages of development, while at advanced stages, finance begins to play a more active growth-enhancing role. These findings align with the broader stage-development view found in the recent finance–growth literature.

While much contemporary research supports the growth-led financial deepening narrative, there is also rising evidence of bidirectional causality in many regions. Studies such as Huang and Ma (2020) find mutual reinforcement between finance and growth, indicating that neither the supply-leading nor demand-following hypothesis alone fully captures the complexity of financial development. Nonetheless, the demand-following hypothesis remains a critical theoretical lens, especially for developing economies where the financial system tends to evolve in response to real sector needs rather than leading economic activity.

2.4.3 Financial Intermediation Theory

The Financial Intermediation Theory complements both the supply-leading and demand-following perspectives by explaining the crucial role financial institutions play in facilitating economic activity. While classical theorists such as Gurley and Shaw (1960) and Goldsmith (1969) introduced the foundational concepts, recent scholarship continues to refine how intermediation supports financial deepening and economic growth. Modern studies emphasize that financial intermediaries reduce transaction costs, address information asymmetries, and improve the efficiency of capital allocation—ultimately transforming savings into productive investments that stimulate growth (Gizaw, 2024; Mbatha & Moyo, 2022).

Financial intermediaries—such as banks, microfinance institutions, SACCOs, and capital markets—mobilize deposits from surplus economic units and channel them toward deficit units, thereby supporting investment and economic expansion (Agyapong & Adam, 2021). Their ability to manage information asymmetries, monitor borrowers, diversify risks, and perform maturity transformation is central to maintaining a stable and efficient financial system (Chen & Lin, 2020). In developing economies, financial markets remain largely bank-based, these institutions play an even more dominant role in shaping the depth and efficiency of financial intermediation.

In Kenya, financial intermediation has expanded significantly over the last decade, driven by the growth of mobile banking, enhanced credit information systems, and improved regulatory oversight. Recent evidence shows that increased access to digital finance and stronger credit information infrastructure have enhanced credit allocation efficiency and supported private sector growth (Cytonn Investments, 2025; Mukiibi & Mutinda, 2022).

However, constraints such as high lending interest rates, collateral requirements, and limited access for SMEs continue to hinder optimal intermediation (Ndungu & Wambua, 2021).

Modern empirical studies consistently demonstrate that effective financial intermediation is positively associated with economic growth. For example, Adusei (2022) finds that improved intermediation efficiency significantly boosts growth across African economies. Similarly, Ofori-Sasu and Biekpe (2021) report that financial intermediation deepens capital formation and accelerates output expansion in emerging markets. Recent evidence from Asia also confirms that banking-sector intermediation enhances productive investment, especially in credit-constrained environments (Rahman & Huang, 2020).

At its core, financial intermediation theory underscores that economies grow more rapidly when savings and investment move together through efficient channels. High intermediation efficiency reflects a well-functioning financial sector capable of mobilizing domestic resources, enhancing liquidity, and allocating resources to productive uses (Casiraghi *et al*., 2023). Banks, by overcoming market imperfections, remain essential in imperfect markets where savers and borrowers lack perfect information.

Recent research also highlights the role of intermediaries in mitigating informational asymmetries. Modern extensions of the theory emphasize that financial intermediaries, through screening and monitoring mechanisms, help reduce adverse selection and moral hazard, thereby improving loan performance and investment outcomes (Cheng, Kim & Vo, 2022). Their role in liquidity creation—long recognized theoretically—has also been reaffirmed empirically as crucial for sustaining economic activity and managing financial shocks (Gorton & Winton, 2020).

In summary, contemporary literature confirms that financial intermediation remains a key driver of economic growth. Efficient intermediaries mobilize savings, reduce transaction and information costs, manage risk, and direct financial resources toward productive investments. The extent to which financial intermediation enhances economic performance depends significantly on institutional quality, regulatory frameworks, and access to credit—especially in developing economies.

2.4.4 Theoretical Justification

This study is anchored on the Supply-Leading Hypothesis because it best explains Kenya's financial–growth relationship within the context of policy-driven financial reforms and deliberate credit expansion strategies. The hypothesis provides the conceptual foundation for analyzing how financial development indicators—credit availability, money supply, deposits, and market capitalization—serve as channels through which finance stimulates economic activity. While the Demand-Following and Financial Intermediation theories offer valuable complementary insights, the supply-leading framework most appropriately aligns with Kenya's experience, where financial deepening and innovation have historically preceded and stimulated economic growth.

2.5 Empirical Literature Review

The relationship between financial sector development and economic growth has attracted extensive scholarly attention across different economies. A well-developed financial system supports economic activity by mobilizing savings, allocating resources efficiently, reducing information asymmetry, and facilitating capital formation (Levine, 2020). While these linkages are widely acknowledged, empirical findings remain inconsistent across countries and financial development indicators. This section reviews empirical literature relevant to credit availability to the private sector, commercial bank deposits, broad money stock, depth of credit information, lending interest rates, and stock market capitalization and their influence on economic with emphasis on Kenya.

2.5.1 Credit to Private Sector and Economic Growth

Credit to the private sector is considered one of the most direct channels through which the financial sector supports economic activity. Private sector credit enhances firms' ability to invest in capital, expand output, and innovate, thereby stimulating economic growth. Recent empirical evidence shows that credit constraints remain a major barrier to private sector expansion and productivity in Sub-Saharan Africa, limiting the ability of firms to scale and adopt new technologies (African Development Bank, 2021; Asongu & Odhiambo, 2020). In Kenya, fluctuations in private sector credit growth—particularly since 2015—have influenced investment levels and sectoral productivity, with tightening credit conditions often linked to subdued economic performance (Central Bank of Kenya, 2023). Contemporary empirical studies on Kenya show mixed findings, with some confirming a positive effect of credit availability on growth and others reporting weak or insignificant results due to risk-averse lending practices and structural inefficiencies in credit allocation (Otieno & Kithinji, 2023; Wamalwa & Were, 2022).

Recent evidence from emerging economies underscores that financial deepening continues to play a critical role in fostering long-term economic growth. Studies focusing on India confirm that enhanced financial inclusion, broader credit access, and deeper capital markets significantly stimulate economic development in both the short and long run (Kumar & Mishra, 2020; Bist & Narayan, 2021; Sahoo & Sahu, 2022; Sharma & Yadav, 2023). These findings emphasize the need for strengthened private-sector credit provision, improved financial penetration, and capital market development to sustain growth.

In Kenya, recent empirical research affirms that financial deepening continues to support long-term economic expansion. Domestic credit to the private sector, broad money growth, and efficient credit allocation have all been shown to positively influence GDP growth (Mulwa & Kosimbei, 2020; Njoroge & Kamau, 2021; Otieno & Kithinji, 2023). Similar conclusions are echoed in other developing economies, where financial sector improvements enhance capital formation, productivity, and overall economic performance (Wamalwa & Were, 2022).

The quality of financial intermediation is increasingly recognized as more critical than the sheer volume of credit supplied. Recent studies show that efficient credit allocation, sound regulatory frameworks, and improved financial-sector governance drive stronger and more sustainable growth outcomes (Ahamed & Mallick, 2019; Barajas et al., 2020; Greenwood & Scharfstein, 2023). These studies affirm that prudent intermediation reduces credit risk, enhances investment efficiency, and strengthens long-run economic resilience.

In the Ethiopian context, recent studies indicate that financial inclusion, credit expansion, and regulatory reforms significantly enhance economic growth (Gebremariam, 2020; Kedir & Berhanu, 2021; Teshome & Rao, 2022; Yilmaz & Demir, 2023). Short-run evidence shows that domestic credit to the private sector, trade openness, and government expenditure are particularly important drivers of growth. Long-run effects are generally positive when financial sector reforms improve intermediation efficiency.

For Nigeria, recent studies consistently find that credit expansion, agricultural financing, and broader financial deepening contribute significantly to economic growth, provided macroeconomic stability and institutional frameworks are supportive (Adewuyi & Adedokun, 2019; Ejem & Ogbonna, 2021; Okoye & Nwakoby, 2022). The growth-enhancing effects of private sector credit, however, continue to be constrained by institutional weaknesses, high levels of non-performing loans, and financial repression (Afolabi & Olagunju, 2020; Oyetade & Ayinde, 2021; Nwogwugwu & Atoi, 2022).

Concerns about excessive credit growth have also been highlighted in recent literature. Rapid financial deepening can undermine macroeconomic stability where credit expands beyond the absorptive capacity of the real economy, heightening crisis risks and reducing growth efficiency (Demirgüç-Kunt *et al*., 2020; Sahay et al., 2020; Akinboade & Makina, 2021). These findings support the growing view that financial development must be accompanied by sound regulatory oversight to avoid destabilizing outcomes.

Recent studies on Nigeria also show that private sector credit remains a strong driver of output growth where credit markets are deepening and allocation mechanisms are improving (Adegboye & Osabohien, 2019; Ajayi & Olatunji, 2021; Nwakoby & Okoye, 2022). Structural-break analyses confirm that private sector credit continues to exert significant positive effects on output even after accounting for shifts in macroeconomic conditions (Adeleke & Olanrewaju, 2021; Eze & Nwali, 2022; Okoye *et al*., 2023).

In Kenya, recent studies confirm that excessive government domestic borrowing crowds out private investment and constrains credit availability, while deeper private-sector credit markets support investment and productivity (Mwangi & Ngugi, 2021; Akoto & Senadza, 2023). These findings are consistent with current evidence across African economies showing that domestic debt often reduces credit available for private investment (Osei & Adams, 2021).

In Nigeria, updated evidence shows that credit remains a key driver of economic growth, especially when supported by monetary stability and financial reforms (Ojo & Adebayo, 2020; Eze & Nwani, 2021; Okoye, Nwakoby, & Eze, 2023). Institutional quality and macroeconomic stability significantly shape the growth-enhancing capacity of credit (Adegboye & Osabohien, 2019; Ajayi & Olatunji, 2021).

Similarly, recent findings indicate that banking-sector credit has a stronger growth impact than insurance-sector development in many developing economies, where the insurance sector often exhibits muted or delayed growth effects (Adebayo & Olanrewaju, 2020; Okorie & Nwosu, 2021; Mensah & Amponsah, 2023).

In small island economies such as The Bahamas, recent evidence shows that expansions in economic activity tend to coincide with growth in private sector credit, underscoring the strong complementarity between credit expansion and fiscal activity in supporting output growth (Smith & Walters, 2020; Henry & Simmons, 2021; Clarke & Thomas, 2023).

Across BRICS and other emerging economies, recent studies demonstrate that private credit shocks can generate positive spillover effects through trade and financial linkages, amplifying growth impacts across countries (Adedeji & Alagidede, 2020; Lee & Huang, 2022; Sahoo & Acharya, 2023).

In Cameroon and other SSA countries, financial development indicators such as broad money, bank deposits, and private sector credit continue to show positive long-run effects on economic growth (Iyoboyi & Pedro, 2021; Meniago & Asongu, 2024). These findings highlight the sustained contribution of financial deepening to long-term economic performance.

In Pakistan and other lower-income developing economies, recent studies confirm that complementarities between stock market development and banking sector credit enhance investment efficiency and long-run growth (Adusei, 2021; Mensah & Abor, 2023).

In Ethiopia and other East African economies, updated empirical evidence shows that private-sector credit is a key driver of capital accumulation, resource allocation efficiency, and long-run economic growth (Tekle & Gebremariam, 2020; Abebe & Worku, 2022). Inflation and government spending continue to exhibit negative long-run effects on economic growth, consistent with recent findings in developing economies (Owusu & Odhiambo, 2020).

Sector-specific evidence from Kenya indicates that while credit access boosts sectoral productivity, its impact is moderated by structural and efficiency-related constraints (Chege, 2023).

2.5.2 Commercial Bank Deposits (CBD) and Economic Growth

Commercial bank deposits constitute a primary source of loanable funds for the banking sector. Higher deposit mobilization strengthens banks' liquidity positions and enhances their ability to extend credit to households and firms. Recent evidence from Kenya shows that deposit growth remains strongly associated with increased credit issuance, although macroeconomic uncertainty can weaken this relationship (FSD Kenya, 2022; Central Bank of Kenya, 2023). International empirical literature similarly confirms that bank deposits support economic growth by expanding credit supply and lowering financing costs, especially where financial intermediation is efficient and regulatory frameworks are stable (Levine, 2020; Barajas, Čihák, & Yousefi, 2022).

Recent empirical studies from emerging economies reinforce the role of deposit mobilization in promoting long-term economic activity. For example, contemporary research in India demonstrates that expanding deposit mobilization—particularly in rural and underbanked regions—significantly enhances financial resource allocation and stimulates economic growth (Sethi & Acharya, 2020; Sharma & Yadav, 2023). These findings align with growing evidence that inclusive financial participation remains central to sustainable economic development across developing economies.

In Nigeria, recent studies show that increases in deposit liabilities continue to promote investment and economic expansion. Empirical evidence indicates that total deposit liabilities significantly enhance gross fixed capital formation and stimulate economic performance (Abubakar & Yahaya, 2020; Emecheta & Ibe, 2019; Okoye & Nwosu, 2021). More recent research further demonstrates that strengthened deposit-mobilization capacity—especially following banking sector consolidation reforms—supports long-run growth outcomes by improving liquidity, financial stability, and intermediation efficiency (Adegboye & Oseni, 2023).

Evidence from Kenya also highlights the evolving nature of financial development. Although earlier studies found weak links between bank-based financial development and economic growth, more recent evidence suggests that market-based financial deepening—particularly through digital financial innovation—significantly enhances long-run growth (Misati, Osoro, & Odongo, 2022; Kithandi, Moragwa, & Mutunga, 2023). Cross-country research similarly finds that growth effects are strongest when financial development is supported by deeper and more efficient market mechanisms (Fengju, 2024).

Contemporary findings from Nigeria indicate that financial deepening indicators such as broad money, private sector credit, and deposit mobilization remain strongly associated with long-term output expansion (Nwosu & Okafor, 2022; Adeniyi & Adedeji, 2023). These studies emphasize the role of banking-sector deposits as a key channel through which financial development supports economic growth, while the insurance sector's contribution remains limited unless backed by robust regulatory reforms and capitalization.

In the Kenyan context, recent evidence continues to support the positive relationship between deposit mobilization, credit access, and GDP growth. Studies show that innovations in financial intermediation—such as mobile banking, digital savings platforms, and improved payment systems—have enhanced deposit mobilization, thereby strengthening banks' lending capacity and stimulating long-run economic growth (Misati, 2024; Moreka, Chepng'eno, & Mose, 2025). Additional research finds that financial deepening promotes SME development and productivity growth, which collectively enhance macroeconomic performance (Gachiengo, 2024).

In Ethiopia, updated empirical studies reveal that deposit volume, liquidity, and asset quality play central roles in shaping lending behavior and credit availability (Zeleke, 2021; Abatneh Tibebu, 2024). Liquidity ratios, in particular, have been shown to exert significant influence on lending rates and credit pricing, underscoring the importance of deposits as a determinant of loanable funds and financial stability.

In South Africa, recent work shows that financial development—measured through broad money growth, credit depth, and liquidity—continues to support both short-run and long-run economic expansion (McHardy, 2022). Financial cycle dynamics, including deposit-driven liquidity buffers, also play a vital role in maintaining macro-financial stability (Magubane, 2025).

Across Sub-Saharan Africa, empirical evidence consistently indicates that financial deepening supports economic growth, particularly where deposit mobilization and credit access are expanding. Recent research in Kenya finds that broad money growth, deposits, and private sector credit significantly drive long-run output (Ngugi & Wambua, 2023; Ochieng & Muturi, 2022). Cross-country studies similarly confirm that improvements in financial inclusion, regulatory quality, and deposit mobilization promote sustained economic growth in the region (Adusei & Boateng, 2024).

Sectoral evidence further highlights the importance of deposit-driven credit expansion. Recent analyses show that sectoral credit supply responds to economic expectations and enhances productivity in key economic sectors such as manufacturing, trade, and agriculture (Kariuki & Tiriongo, 2021; Kenya Economic Report, 2024).

Globally, new empirical studies in advanced and emerging economies indicate that financial development—supported by deposit growth, improved bank capitalization, and reductions in nonperforming loans—remains a major determinant of economic performance (Göktan & Zare, 2020; Ductor & Grechyna, 2023; Barajas, Čihák, & Yousefi, 2022).

Furthermore, updated cross-country research highlights that corruption, institutional quality, and governance significantly influence the effectiveness with which deposits are mobilized and transformed into productive credit. Recent studies show that corruption elevates credit risk and undermines financial stability, though these adverse impacts are mitigated in environments with stronger institutional frameworks and financial inclusion (Hasan & Ashfaq, 2021; Omankhanlen & Aburime, 2023; Ullah, Zaman, & Atta, 2024).

Recent Nigerian and East African evidence also show that private sector credit and money supply—both of which are closely linked to depositor behavior—continue to have strong positive long-run effects on economic growth (Okey *et al.*, 2022; Ozili, 2023; Manasseh, Logan, & Ede, 2025). These findings underscore the centrality of deposit mobilization in the finance–growth relationship.

Empirical evidence from Jordan and other developing countries similarly demonstrates that financial deepening—including deposit growth—positively affects long-run economic growth, even when short-run effects appear weak (Alrabadi *et al.*, 2020; Aljarrah, 2021).

Recent cross-country studies continue to confirm that enhanced deposit mobilization strengthens financial resource allocation and supports sustainable output growth.

Finally, contemporary findings in countries such as Ethiopia, Nigeria, and South Africa indicate that while rising interest margins and higher lending rates may suppress credit access, improvements in deposit mobilization and liquidity can counter these effects by ensuring adequate loanable funds for productive sectors (Kahsay, 2020; Abdulahi & Yusuff, 2020; Fanta & Makina, 2022).

2.5.3 Broad Money Stock and Economic Growth

Broad money supply—typically measured as M2 or M3—represents the total liquidity circulating within an economy, incorporating cash, demand deposits, savings, and quasi-money. Modern monetary and macroeconomic theories maintain that changes in broad money influence economic activity through credit expansion, interest-rate adjustments, and aggregate demand channels. In Kenya, broad money growth has historically aligned with increased credit availability and real output expansion, though episodes of monetary surges have occasionally corresponded with inflationary pressures (KNBS, 2023). The contemporary empirical literature generally concludes that broad money exerts a positive long-run impact on economic growth, although its effectiveness depends on the level of financial development, efficiency of transmission mechanisms, and macroeconomic stability.

Recent African studies provide consistent evidence supporting the growth-enhancing role of broad money. For instance, recent empirical analyses indicate that monetary aggregates significantly stimulate economic output when supported by sound financial sector reforms and effective monetary policy frameworks. In Nigeria, Okoro and Eze (2021) found that broad money positively affects economic growth, particularly when financial reforms enhance the efficiency of the banking sector. Similarly, in Ghana, Mensah et al. (2021) reported that increases in money supply contribute to long-term economic performance, especially in contexts of stable inflation. Within East Africa, Teshome and Mulugeta (2022) demonstrated that broad money expansion remains a key driver of Ethiopia's economic growth, contingent upon effective inflation control and macroeconomic stability.

In South Asia, recent studies continue to emphasize the importance of monetary aggregates in driving real economic activity. Khan and Siddique (2021) provided evidence of strong long-run relationships between broad money and output across emerging Asian economies. Similarly, Siddiqui and Akhtar (2022) found that broad money expansion in India fosters investment and long-run economic growth, particularly when inflation expectations are well-anchored. In Bangladesh, more recent empirical work by Rahman and Hossain (2021) demonstrated that broad money significantly influences per-capita GDP growth within a Vector Error Correction Model (VECM) framework, highlighting the role of monetary policy in stabilizing and supporting long-term economic performance.

Cross-country evidence offers further support. Fanta and Makina (2022) found that financial-market deepening—particularly wider monetary aggregates—contributes substantially to long-run economic growth in developing countries. Likewise, Barajas *et al*. (2022) demonstrated that improvements in liquidity management and reductions in intermediation costs strengthen the positive impact of broad money on growth across low- and middle-income economies. A related global empirical analysis by Mishra *et al*. (2022)

concluded that broad money expansion enhances economic activity when supported by strong institutions and sound monetary policy frameworks.

Despite the predominantly positive findings, several recent studies highlight mixed or even adverse effects. Gatawa *et al*. (2019) established a negative long-run association between broad money and output in Nigeria, attributing is to inflationary pressure and weak transmission mechanisms. Ehigiamusoe and Lean (2019) similarly found that in many Sub-Saharan African economies, money market development—including broad money—had only a limited impact on real-sector outcomes. Evidence from Pakistan by Ihsan and Anjum (2020) suggested that the short-run influence of money supply on economic growth was statistically insignificant.

Mutuku and Koech (2021) demonstrated that broad money positively affects real GDP, although its magnitude is sensitive to interest-rate and exchange-rate movements. Ochieng and Muturi (2022) reported that financial depth—especially broad money and private-sector credit—significantly stimulates long-run growth in Kenya. Ngugi and Wambua (2023) further confirmed that broad money expansion enhances long-term GDP performance, though short-run effects depend on inflation stability. Most recently, Moreka *et al*. (2025) found that both M2 and M3 significantly shape Kenya's economic performance, with stronger effects observed when monetary expansion is complemented by credit growth and digital financial innovations.

Overall, the contemporary literature reveals that the impact of broad money on economic growth remains context-specific, shaped by institutional quality, financial structure, inflation dynamics, and monetary policy credibility. Nevertheless, a growing body of recent evidence suggests that broad money contributes positively to long-run economic growth across developing economies when supported by efficient financial systems, stable macroeconomic environments, and effective monetary transmission mechanisms.

2.5.4 Depth of Credit Information and Economic Growth

The depth of credit information—measured through credit bureau coverage, data quality, and the extent of information shared among lenders—is a critical determinant of credit market efficiency and economic performance. Credit information systems reduce information asymmetry, enhance borrower screening, and enable lenders to price risk more accurately, thereby improving credit allocation and reducing default rates. Recent empirical evidence demonstrates that well-functioning credit information systems are strongly associated with financial stability, increased credit access, and long-run economic growth in developing economies (World Bank, 2022; Aboagye & Osei, 2020; Muriu & Mweru, 2021).

In Kenya, the expansion of Credit Information Sharing (CIS) frameworks—particularly through licensed Credit Reference Bureaus (CRBs)—has been instrumental in improving transparency in lending markets. Updated data from Kenya shows that credit information sharing has broadened credit inclusion and strengthened risk assessment, especially as digital lenders and non-bank institutions increasingly report borrower data (FSD Kenya, CIS Kenya, & Creditinfo CRB, 2024). Regulatory reforms introduced in 2022 require lenders to move away from punitive reliance on negative listings and instead adopt risk-based pricing models that incorporate full borrower profiles (Cytonn Investments, 2022).

These reforms aim to improve credit market efficiency and ensure that credit information contributes positively to economic performance.

Empirical studies in Kenya confirm that deeper credit information significantly improves loan performance and lowers non-performing loan (NPL) ratios. For instance, asymmetric information between borrowers and lenders has been shown to contribute strongly to loan default, whereas credit bureau functions such as credit scoring and historical reporting significantly enhance bank risk assessment and reduce credit losses (Kirui, Wepukhulu, & Oluoch, 2024; Nyakundi, 2023; Saruni & Koori, 2020). Additionally, emerging evidence indicates that detailed credit histories—including repayment periods, loan cycles, and digital credit behaviour—are increasingly important predictors of borrower default, reinforcing the value of comprehensive credit reporting (Odanga, 2024).

African-wide evidence also supports this relationship. Enhanced credit information sharing significantly lowers bank credit risk by improving screening efficiency and reducing moral hazard, with private credit bureaus found to be more effective than public credit registries due to better coverage, timeliness, and data accuracy (Gulamhussen & Oziegbe, 2023; Ngugi & Olweny, 2022). Recent analyses show that countries with robust private credit bureaus experience lower default rates and higher credit growth compared to those relying solely on public registries (World Bank, 2022; FSD Kenya *et al.*, 2024). These findings underscore the importance of strengthening private credit bureau systems across Sub-Saharan Africa to improve lending efficiency and support sustainable financial development.

At the enterprise level, recent studies show that improved credit information reduces reliance on trade credit by facilitating access to formal finance, supporting the substitution hypothesis. Firms shift from supplier credit to bank credit when information asymmetry declines, given that transparent credit systems lower borrowing constraints and improve the allocation of formal credit (Gulamhussen & Oziegbe, 2023; Obeng & Blay, 2021). Financial deepening therefore interacts with credit information systems to expand firms' financing options and stimulate productive investment.

Finally, evidence on macroeconomic implications suggests that deeper credit information systems support financial stability and long-run growth. Recent cross-country assessments demonstrate that greater depth of credit information reduces financial fragility, mitigates the negative effects of credit booms, and contributes to higher-quality bank lending portfolios (World Bank, 2022; Aboagye & Osei, 2020). Updated panel studies further confirm that improved credit information infrastructure enhances the efficiency of financial intermediation, expands access to finance, and positively influences economic growth trajectories in developing economies (Ojo & Alege, 2023; Olanrewaju & Aremo, 2021).

Overall, recent evidence indicates that the depth of credit information is an essential component of financial sector development. By reducing information frictions, enhancing credit allocation efficiency, and lowering credit risk, credit information systems play a central role in supporting financial stability and fostering long-run economic growth in Kenya and other developing economies.

2.5.5 Lending Interest Rate and Economic growth

Lending interest rates are a central macroeconomic variable influencing borrowing costs, investment decisions, and the overall pace of economic activity. High or volatile lending rates generally suppress credit uptake by raising the cost of borrowing, thereby constraining private investment, consumption, and long-term economic growth (Mwangi & Murinde, 2020; Osei & Frimpong, 2022). In Kenya, lending rates have exhibited considerable volatility over the past decade, shaped by regulatory changes such as interest rate caps implemented between 2016 and 2019, global financial shocks, and recent monetary tightening to contain inflationary pressures (Central Bank of Kenya [CBK], 2023; IMF, 2023).

Recent empirical studies in developing economies consistently document that elevated lending rates negatively influence private sector credit flows, with adverse implications for GDP growth. For instance, Kinyua and Muthoni (2021) find that high lending rates significantly suppress investment levels in Kenya, while stable and moderate rates support productive sector expansion. Similar results from Mwangi and Wanjiru (2023) show that lower and predictable lending rates enhance borrowing capacity, stimulate capital formation, and improve long-term growth outcomes.

Cross-country evidence reinforces these findings. Osei and Frimpong (2022), examining panel data across Sub-Saharan Africa, report that lending rate rigidity and high-risk premiums reduce private credit elasticity, slowing economic performance. In Asian emerging markets, Harswari and Hamza (2021) demonstrate that rising lending rates exert a negative and statistically significant effect on GDP growth, particularly in economies with underdeveloped financial sectors and limited credit access.

Interest rate reforms remain central to monetary policy operations across developing economies. Recent analyses highlight that effective monetary policy transmission depends on the responsiveness of bank lending rates to policy signals—a challenge in many African and Asian banking markets. Mugume and Nampala (2020) show that structural rigidities and high operational costs weaken the pass-through of policy rates to lending rates, thereby reducing the effectiveness of monetary policy in supporting growth. Similar findings by Kihara (2022) in the Kenyan context reveal that while the Central Bank Rate (CBR) influences lending behaviour, the adjustment process remains sluggish, partly due to credit risk concerns and heavy reliance on government securities.

Interest rate capping, implemented in Kenya between 2016 and 2019, has attracted significant empirical scrutiny. Recent evidence suggests that although caps temporarily lowered lending rates, they produced significant unintended consequences, including reduced credit to SMEs, weakened monetary policy transmission, and increased risk aversion among banks (CBK, 2020; IMF, 2023). Updated analyses confirm that caps led to credit rationing and a slowdown in private sector growth, prompting their eventual repeal in 2019. Following the repeal, lending rates have been more responsive to macroeconomic conditions, but concerns about affordability and credit access persist (FSD Kenya, 2022).

Interest rate uncertainty also plays a vital role in shaping credit behaviour. Recent work by Hamdi and Hassen (2021) demonstrates that economic policy uncertainty raises credit risk, reduces loan sizes, and weakens banking performance, particularly among state-owned banks. These findings are echoed in East African studies showing that uncertainty leads to tighter lending conditions and reduced credit flows to productive sectors (Odongo & Were, 2023).

Financial sector characteristics further influence the relationship between lending rates and growth. Strong competition in banking systems tends to lower lending margins, improve credit access, and enhance economic performance (Maniraguha, 2020; Ngugi & Kirimi, 2021). Conversely, dominance by large banks and inadequate credit information systems increase risk premiums and widen lending rate spreads, limiting credit availability to SMEs.

Overall, recent empirical research points to a predominantly negative relationship between high lending interest rates and economic growth in developing economies. The magnitude of this relationship depends on the efficiency of the financial system, the strength of monetary policy transmission, macroeconomic stability, and regulatory design. Lower, stable, and predictable lending rates are therefore critical for promoting private investment, expanding credit to productive sectors, and supporting sustained economic growth.

2.5.6 Stock Market Capitalization and Economic Growth.

Stock market capitalization refers to the total market value of a company's outstanding shares and serves as the primary indicator of stock market size. At the macroeconomic level, stock market capitalization—often measured as the ratio of market value of listed shares to GDP—reflects the depth, size, and capacity of a country's capital market to mobilize long-term investment resources (Nairobi Securities Exchange [NSE], 2023). Larger and more efficient stock markets improve resource allocation, enhance risk-sharing, and facilitate long-term financing for firms, thereby supporting economic growth through increased investment and productivity.

In advanced economies, empirical evidence consistently shows a positive and significant linkage between stock market size and long-run economic growth (Arestis & Demetriades, 2020; Bumann & Lensink, 2022). However, findings in developing economies—particularly Sub-Saharan Africa—remain mixed due to shallow markets, low liquidity, limited investor participation, and dominance of a few large firms (Wambui & Muthoga, 2021; Musau & Mutiso, 2023). In the Kenyan context, although the NSE has undergone substantial reform and technological modernization, market capitalization remains concentrated among a small number of firms, limiting its influence on aggregate economic activity (NSE, 2023; CMA Kenya, 2022).

Recent studies in East Africa provide evidence of a positive long-term association between stock market development and economic growth. Nyanaro and Elly (2019) found that market capitalization and stock market liquidity significantly influence GDP growth for East African Community (EAC) countries. Their findings align with subsequent research showing that improvements in market depth and trading activity increase financing opportunities for firms and enhance macroeconomic performance (Omondi & Oluoch, 2021; Mugo & Kinuthia, 2022).

In Kenya, recent evidence indicates that stock market capitalization contributes positively to economic growth, though the magnitude of the impact is relatively modest due to limited market depth. Ikikii and Nzomoi (2020) found that market capitalization and trade volume strongly predict GDP growth, collectively explaining a significant proportion of economic performance. Similarly, Nyamongo *et al*. (2021) demonstrate that market capitalization and liquidity positively influence economic expansion, though external factors such as foreign direct investment and human capital development remain stronger determinants of long-term growth.

Studies from other emerging markets further reinforce the growth-enhancing potential of stock market capitalization. Nazir *et al*. (2019) show that market capitalization significantly predicts economic growth in Pakistan, with market size exerting a stronger influence than liquidity measures. Wild and Lebdaoui (2020), using quarterly data from Morocco, find a long-term positive relationship between stock market performance indicators—including market capitalization—and GDP growth. However, they observe no short-term effects, suggesting that stock market development contributes more to long-run than short-run growth.

More recent cross-country evidence highlights that stock market size enhances economic growth when accompanied by strong regulatory frameworks, transparency, and investor protection. Kiptoo (2020), using dynamic panel data from developing economies, finds that although market capitalization exerts a positive impact on economic growth, the effect is often statistically weak in small or shallow markets. Conversely, liquidity indicators such as turnover ratio and total traded value exhibit stronger growth effects, suggesting that the efficiency of trading activities may be a more relevant driver of economic performance than market size alone in emerging economies.

The overall empirical consensus from recent studies indicates that stock market capitalization is a significant but not always dominant determinant of economic growth in developing economies. Its contribution depends on several structural factors, including market liquidity, investor confidence, regulatory quality, macroeconomic stability, and the capacity of firms to access capital markets for financing. In Kenya and comparable economies, enhancing market depth, improving transparency, broadening firm listings, and strengthening investor protection frameworks remain essential to ensuring that stock market capitalization plays a more pronounced role in driving long-term economic growth.

2.6 Summary of the Literature Review

Recent empirical studies continue to demonstrate that key dimensions of financial deepening—such as money supply growth, credit to the private sector, and market liquidity—play an important role in promoting economic growth. Contemporary evidence from developing economies confirms that an expansion in broad money supply (M3) and improved financial intermediation enhances economic performance by supporting investment, easing liquidity constraints, and improving the efficiency of financial markets. For instance, recent findings show that increases in money supply stimulate output growth by expanding credit availability and facilitating economic transactions (Adebayo *et al.*, 2021; Musa & Ibrahim, 2022).

With respect to credit to the private sector, recent studies provide mixed results. Some researchers find that private sector credit strongly promotes growth by financing productive activities and driving private investment (Kinyua & Muthoni, 2021; Osei & Frimpong, 2022). However, other findings show that credit expansion does not always translate into economic growth, especially when credit is misallocated or when the financial sector is shallow or inefficient (Mwangi & Wanjiru, 2023). Emerging evidence also suggests that excessive credit—particularly when private credit exceeds sustainable thresholds—may generate financial instability that offsets growth benefits (Drehmann & Juselius, 2020;

Sahay *et al*., 2020). This modern view aligns with the argument that "more finance is not always better."

Studies on financial sector depth and market liquidity similarly show that while improved liquidity supports investment and growth, the benefits depend heavily on institutional quality and the efficiency of the financial system. Recent analyses confirm that liquidity and market development enhance growth, but only where governance structures ensure efficient resource allocation (Agyemang-Badu *et al*., 2022; Ali & Hussain, 2021).

The modern literature strongly emphasizes the quality and efficiency of financial intermediation rather than the volume of financial activity. Recent research shows that efficient banking systems—characterized by strong regulation, transparency, and effective credit allocation—exert a stronger positive effect on growth than mere expansion in credit volumes (Chikalipah & Ngwenya, 2022). Likewise, evidence from emerging markets indicates that financial deepening fosters economic growth only where financial resources are channelled into productive sectors rather than consumption or speculative activities.

In conclusion, although earlier studies identified mixed effects of financial deepening on economic growth, recent empirical work consistently highlights two major themes: first, financial deepening generally supports long-run economic growth, particularly through increased money supply, credit expansion, and market development.

Second, the efficiency and quality of financial systems matter more than sheer size. Financial development promotes growth only when financial institutions allocate funds to productive sectors, manage risk effectively, and maintain macroeconomic stability.

Thus, exploring the drivers of financial deepening and their impact on growth remains essential for designing policies that support sustainable economic development.

2.7 Research Gaps

Although the literature linking financial sector development to economic growth is extensive, important empirical and policy-relevant gaps remain when the relationship is disaggregated into specific financial channels in the Kenyan context. First, aggregate measures (e.g., composite financial development indices) dominate prior work, which masks the heterogeneous roles that distinct financial indicators—credit to the private sector, commercial bank deposits, broad money, credit information depth, lending interest rates, and stock market capitalization—may play in shaping growth outcomes (Ogola, 2016; Were, Nzomoi, & Rutto, 2018). This study addresses that fragmentation by estimating the distinct effect of each channel on Kenya's economic growth, using recent data and robust time-series/econometric techniques. Empirically, Kenya's domestic credit to the private sector has been volatile and comparatively low relative to advanced economies, and recent evidence points to a contraction in private-sector credit that could materially affect investment and output—a dynamic that is not yet fully reconciled in the empirical growth literature for Kenya (Cytonn, 2025). Second, while commercial bank deposits are frequently treated as a passive aggregate in macro studies, Kenyan banking-sector reports show important structural shifts in deposit growth and composition across 2020–2021 that likely alter the transmission of finance to productive investment; these subtleties have received limited attention in growth regressions for Kenya (Mbaabu, 2024). Third, the monetary aggregates (broad money/M3) that underpin liquidity and credit creation have experienced recent swings tied to policy and macro conditions; cross-country work suggests such swings materially affect growth, but country-specific, up-to-date estimates for Kenya—controlling for other financial channels—are scarce (Asongo, Akiri, & Ahemen, 2024). Fourth, institutional reforms in credit information sharing (CIS) and the regulatory framework for credit reference bureaus have been strengthened only recently, yet the literature has not conclusively measured how improvements in the depth and quality of credit information translate into aggregate lending, risk pricing, and growth (Cytonn, 2025). Fifth, lending interest rates and the policy environment affecting them (including the period of interest-rate capping and the later legal/policy changes) have had ambiguous effects on growth in prior studies; recent work that uncovers asymmetric effects of lending rates on Kenya's growth is only just emerging (Asymmetric Impact of Interest Rate on Economic Growth in Kenya, 2024). Finally, although the Nairobi Securities Exchange has grown in depth and capitalization, empirical work that quantifies the stock market's contribution to Kenya's aggregate growth—separate from banking and monetary channels—is sparse or dated. In sum, this study addresses three intertwined gaps: First, the need for disaggregated, channel-specific estimates of finance-growth linkages in Kenya; second, the incorporation of recent structural and policy shifts (post-2015 interest-rate interventions, CIS regulatory changes, recent broad money and deposit dynamics) into empirical models; and thirdly, the joint assessment of banking-sector variables and capital-market indicators to determine their relative contributions to growth. By using updated Kenyan data and robust econometric methods that allow for structural breaks and endogeneity, the paper provides policy-relevant evidence on which financial levers most effectively support sustainable economic growth in Kenya.

2.8 Conceptual Framework

The study is anchored on the Supply-Leading Hypothesis, which posits that financial deepening

acts as a driving force for economic growth. According to Patrick (1966), the financial sector facilitates economic expansion by mobilizing savings, channeling credit toward productive investments, and promoting efficient capital allocation. In this perspective, a well-functioning financial system supplies the resources necessary for industrial expansion, innovation, and entrepreneurship, thereby stimulating overall growth in the economy.

This framework conceptualizes economic growth (measured by GDP growth rate) as the dependent variable influenced by six key dimensions of financial development: credit to the private sector (CPS), commercial bank deposits (CBD), broad money stock (BMS), depth of credit information (CINF), lending interest rate (INR), and stock market capitalization (SMC). These indicators jointly represent the depth, accessibility, efficiency, and cost of Kenya's financial system.

Credit to the private sector reflects the extent to which financial institutions provide loans to businesses and households for productive purposes. Increased credit availability enhances investment, output, and employment, thereby fostering economic growth (King & Levine, 1993). In Kenya, greater access to credit through commercial banks and microfinance institutions enables private enterprises to expand operations, adopt new technologies, and contribute to GDP growth (Were, Nzomoi, & Rutto, 2018).

Commercial bank deposits represent the mobilization of financial savings by banks. A rise in deposits increases the liquidity available for lending and investment in the economy (Levine, 2004). Mobilized savings are transformed into productive capital through the financial intermediation process, stimulating business activity and aggregate demand. In Kenya, innovations such as agency banking and mobile deposit platforms have significantly boosted deposit mobilization, supporting credit creation and economic growth (Ngugi & Wambui, 2023).

Broad money (M3) measures the overall liquidity in the economy. According to the supply-leading view, an increase in money supply enhances investment and consumption by improving credit availability and market liquidity (Sassi & Gasmi, 2020). A deeper and more liquid financial system reduces transaction costs and promotes efficiency in capital allocation. In Kenya, the expansion of broad money has supported growth through improved credit access and financial inclusion (Mbaabu, 2024).

The depth of credit information index captures the extent to which lenders and borrowers can access reliable credit histories. Improved information sharing through credit bureaus minimizes information asymmetry, lowers default risk, and promotes responsible lending (Beck, Demirgüç-Kunt, & Levine, 2000). In Kenya, the operationalization of the Credit Reference Bureau (CRB) system has enhanced transparency and supported the expansion of private-sector credit, consistent with the supply-leading argument (Cytonn Investments, 2025).

The lending interest rate represents the cost of borrowing. Lower interest rates reduce the cost of capital, encouraging investment and expansion in the real sector. Conversely, high lending rates discourage borrowing, investment, and consumption, thereby slowing economic growth (Fengju, 2024). In Kenya, variations in lending rates—especially during periods of interest-rate capping—have influenced the ability of firms to access credit, thus affecting growth.

Stock market capitalization measures the total value of listed companies' shares and serves as a proxy for capital-market development. A vibrant stock market mobilizes long-term funds, diversifies investment risk, and facilitates efficient pricing of financial assets (Levine, 2004). In Kenya, the Nairobi Securities Exchange (NSE) contributes to economic growth by enabling firms to raise capital for expansion and innovation (Mbaabu, 2024).

The conceptual framework assumes a unidirectional causal relationship running from financial deepening (the independent variables) to economic growth (the dependent variable), consistent with the Supply-Leading Hypothesis. Improved financial sector performance—through increased credit, deeper deposit mobilization, higher money supply, enhanced credit information, and efficient capital markets—is expected to stimulate real economic activity and GDP growth.

Conversely, inefficiencies such as high lending interest rates or inadequate credit information are hypothesized to hinder the growth process.

In diagrammatic form, the conceptual framework can be presented as follows:

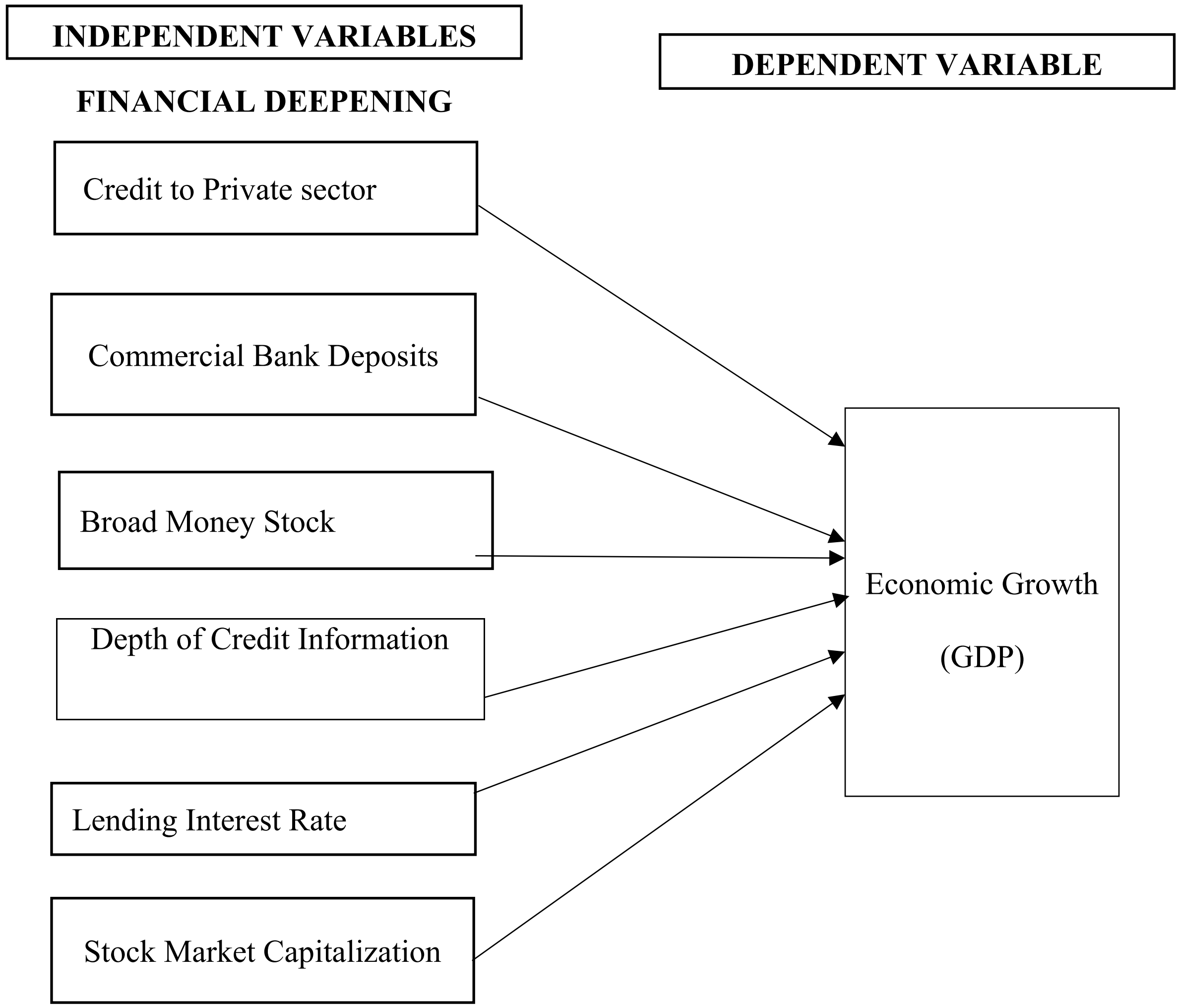


Figure 2.1: Conceptual Framework
Source: Researcher (2022)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the methodological framework adopted to achieve the objectives of the study. It presents and justifies the research design, specifies the empirical model, and describes the data sources, data collection procedures, and analytical techniques employed. In addition, the chapter details the measurement of variables used in the study. The methodological approach was structured to ensure that the specific hypothesis are addressed rigorously, systematically, and in a manner consistent with established empirical standards in economic and financial research.

3.2 Philosophical Paradigm

A philosophical paradigm provides the foundational worldview upon which a scientific inquiry is constructed, shaping the assumptions that guide knowledge generation and methodological choices (Creamer, 2021). Contemporary social science research commonly contrasts two dominant paradigms: positivism and interpretivism (Saunders *et al*., 2019). Positivism emphasizes the investigation of observable, measurable phenomena and adopts an objective stance aimed at establishing causal explanations. Interpretivism, by contrast, is grounded in subjectivism and focuses on understanding socially constructed meanings rather than explaining causal relationships (Creswell & Creswell, 2023; Saunders et al., 2019). Given that this study seeks to objectively examine hypothesized causal relationships, it is anchored within a positivist philosophical orientation.

From an epistemological perspective, positivism positions the researcher as a neutral, value-free observer whose role is to discover generalizable causal laws (Creswell & Creswell, 2023). Positivist studies are typically replicable due to their structured, systematic designs, contrasting with interpretivist research, which prioritizes contextual understanding. Ontologically, the study adopts a realist view, assuming that an objective reality exists independent of human perception. Epistemologically, it is concerned with identifying valid procedures through which knowledge about that reality is generated (Kaushik & Walsh, 2019). In essence, epistemology—concerned with the creation and justification of knowledge—clarifies how researchers come to understand the external realities described by ontology. Precisely, epistemology, which is also at times referred to as 'winssenschaftslehre', is concerned with creation of knowledge, that is, explains how knowledge is produced.

3.3 Research Design

Research design refers to the structured plan that guides the procedures for collecting, analyzing, and interpreting data in order to establish credible evidence regarding the relationships among variables under investigation (Creswell & Creswell, 2023). It functions as a methodological "blueprint" that ensures coherence between the research problem, objectives, and analytical techniques (Saunders *et al*., 2019).

This study adopted an explanatory (causal) research design, which is appropriate for examining hypothesized causal relationships and determining the extent to which variations in independent variables account for changes in the dependent variable. Explanatory designs typically rely on quantitative approaches and statistical modelling to test theory-driven predictions (Hair *et al*., 2020; Kline, 2023). Accordingly, the study employed quantitative methods, including multiple regression analysis, to empirically quantify the direction and magnitude of the relationships among the variables.

The explanatory design was justified because the study sought to identify cause–effect linkages, facilitate comparisons, and enable the use of statistical techniques suited for hypothesis testing (Saunders *et al*., 2019). Its emphasis on objectivity, replicability, and numerical analysis made it appropriate for generating valid and generalizable findings.

3.4 Study Area

This study focused on the Kenyan economy over the period 1990–2021. Kenya provides an appropriate context for examining the relationship between financial deepening and economic growth due to its evolving financial system, ongoing reforms in the banking sector, and steady expansion of credit markets. The study period was selected to capture significant structural and policy changes, including financial liberalization, technological advancements in financial services, and regulatory developments that have shaped the country's financial landscape. By concentrating on Kenya, the study provides insights into how financial deepening influences economic performance within an emerging market economy.

3.5 Data Collection

This study utilized annual data for the period 1990–2021, covering key macroeconomic indicators: gross domestic product growth rate (GDPGR), credit to the private sector (CPS), commercial bank deposits (CBD), broad money stock (BMS), depth of credit information (CINF), lending interest rate (INR), and stock market capitalization (SMC).

These variables were selected to capture the multidimensional aspects of financial deepening and their potential influence on economic growth.

The primary sources of data included the Kenya National Bureau of Statistics (KNBS)—specifically the Economic Surveys and Statistical Abstracts—as well as the International Monetary Fund's International Financial Statistics (IFS) database. These sources are widely recognized for producing reliable, consistent, and methodologically standardized macroeconomic series.

Time series analysis was adopted because it enables the examination of long-run trends, cyclical patterns, and dynamic interactions between variables, thus supporting more accurate forecasting and empirical inference (Hyndman & Athanasopoulos, 2023). The required number of observations for effective time series modelling varies with the analytical technique; however, contemporary methodological guidelines suggest that larger datasets enhance model robustness, particularly for autoregressive and integrated models (Shumway & Stoffer, 2019). In practice, datasets exceeding 30 annual observations—such as the 32-year span used in this study—provide a sufficient basis for estimating stable time series and econometric models.

3.6 Pre-Estimation Tests

Pre-estimation analysis in econometrics refers to a set of techniques used before estimating a model's parameters. These methods help researchers assess the suitability of their chosen model and diagnose potential issues like heteroscedasticity, multicollinearity, autocorrrelation and non-stationarity.

3.6.1 Tests for the Stationarity

The first step in any longitudinal data or time series analysis is to obtain the time series plots or graphs for each univariate data set. The curves were used to indicate the nature of the Data Generating Process (DGP). All data in DGP exhibit three types of graphs according to the stochastic process that happens by chance, that is, drift, trending and both trending with drift. The next step is to conduct the presence of unit root test in every data used to check for properties of stationarity. There are several tests used to determine the stationarity. In this study two tests were used; Augmented Dickey Fuller and Phillip and Perron tests.

3.6.1.1 Testing Stationarity using Augmented Dickey and Fuller (ADF)

This test was carried out on nested time series model to accommodate serial autocorrelation, auto covariance and covariance. The model estimated was as follows.

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^{p} \propto_i \Delta Y_{t-1} + \varepsilon_t \text{ ……………………………..……..…...3.10}$$

Where ΔY_t: Represents first difference of each variable β_1: Represents the intercept $\beta_2 t$: Represents the time trend; δ-Represents the co-efficient of the lagged variable. The p represents the Optimum lag length and was elected by; AIC selection criteria and SBIC selection criteria. Its null hypothesis was that the series contain unit root (non-stationary). Therefore, if $\delta > \delta_t$, null hypothesis was rejected and concluded that the series are stationary.

3.6.1.2 Testing Stationarity using Phillips Perron Test

This test modified the ADF test to accommodate serial correlation. The null hypothesis was that the data contains unit root against the hypothesis that the data was stationary. The model form estimated was as follows.

$Y_t = \delta_t + \gamma Y_{t-1} + \gamma_1 \Delta Y_{t-2} + \cdots + \gamma_p \Delta Y_{t-p} + \varepsilon_t$……………………………………3.11

Where;Y_t: represents the current value. δ_t: represents the intercept.γ: represents the co-efficient of the lagged variable.ε: represents the stochastic error term (white noise process) and p represents the optimum lag length selected by AIC and SBIC.

If the variables exhibited non stationarity properties, then the next step is to difference each univariate series. The differenced variables are plotted to see if they had become stationary. After plotting, each stationarity test was carried out on differenced variables. If it is confirmed that the differenced variables have achieved stationary property, the process of differencing is stopped and concluded that the variables have achieved the integration property of any order.

3.6.1.3 Testing Unit Root with Structural Breaks

A typical assumption when performing analysis of a standard longitudinal data is the stationarity of the series, meaning that the mean, the variance and the covariance do not change over specified time interval or that they change within certain range. That is, the series satisfies the following conditions;

$E\,[y_t] = \mu_y$ ……………………………………………………………… 3.12

$Var\,[y_t] = E\,[(y_t - \mu_y)^2] = \delta_y^2$………………………………………………… 3.13

$Cov[y_t, y_{t+k}] = E\,[(y_t - \mu_y)\,(y_{t+k} - \mu_y)] = \gamma_k$ 3.14

The issue is that, when structural breaks are present then these conditions do not hold; either, there is a change in the mean or variance or both at a point in time(s). This would influence the inference analysis and forecasting. Therefore, to overcome this scenario, the following test below was employed to check the presence of unit roots with major structural breaks by using STATA statistical software. The Clement Montanes and Reyes test proposed by Clemente Montañés & Reyes (1998) were used.T he model is as follows;

3.6.1.4 Clemente Montañés and Reyes Test with Two Structural Breaks

The Clemente Montañés and Reyes Test was suggested by Clemente-Montañés-Reyes (1998). This test tests unit roots when many structural breaks are present unlike Zivot Andrew test which considers only major structural break present. The representation of the null hypothesis is as follows H_0 against alternative that is H_1 :

$H_0 : Y_t = Y_{t-p} + \psi_1 DTB_{1t} + \psi_2 DTB_{2t} + \varepsilon_t$ 3.15

$H_1 : Y_t = \mu + \omega_1 DU_{1t} + \omega_2 DTB_{2t} + \varepsilon_t$ 3.16

In equation (3.15) and equation (3.16), DTB_{it} is referred to as the pulse or dummy variable and it is equivalent to 1 if $t = TB_i$+1 and 0 otherwise. Furthermore, $DU_{it} = 1\ if\ TB_i < t\ (t = 1,2\ldots)$ and 0 if this assumption violated. The time periods TB_1 and TB_2 represents the modification of the mean. It can be simplified further with the assumption that $TB_i = \Psi_i T\,(i=1,2)$ where $1 > \Psi > 0$ while $\Psi_1 < \Psi_2$ Clemente Montañés and Reyes (1998).

The following equation 3.17is performed for test of unit root in the case where an innovative outlier contained two structural breaks.

$$Y_t = \mu + \xi Y_{t-p} + d_1 DTB_{1t} + d_2\, DTB_{2t} + d_3 DU_{1t} + d_4 DU_{2t} + \sum_{i=1}^{p} C_j \Delta Y_{t-p} + \varepsilon_t \text{ …………..} \quad 3.17$$

This equation is normally used to estimate through simulated t-ratio minimum value. In the identification of all the breaks points, the simulated t-ratio value was used if the autoregressive parameter is constrained to unity (1)

The estimate of asymptotic distribution according to Clemente Montanes & Reyes (1998) is derived when $\Psi_2 > \Psi_1 > 0 : 1 > \Psi_2 \; -1 > \Psi_0 : \Psi_1$ and Ψ_2 obtained interval values that is, $[(t+2)/T, (T-1)/T]$ by appointing the largest window size. Furthermore, $\Psi_1 < \Psi_2 + 1$ is used to show purged repeated periods where break points existed. To test the unit root hypothesis, a two-step approach was used to explain additive outliers in a situation where shifts are in a good position. In the first step, the following equation was used for estimation when the deterministic variable is eliminated.

$$Y_t = \mu + d_5 DU_{1t} + d_6 DU_{2t} + \hat{Y} \text{ …………………………………………………..…… } \quad 3.18$$

Furthermore, the search for a minimum t-ratio is done in the second stage and the $\Psi = 1$ hypothesis is tested with the following equation:

$$\hat{Y}_t = \sum_{i=1}^{T} \phi_{1i} DTB_{1t-1} + \sum_{i=1}^{T} \phi_{2i} DTB_{2t-1} + \psi \hat{Y}_{t-1} + \sum_{i=1}^{T} C_i \Delta \hat{Y}_{t-1} + \varepsilon_t \text{ …………..……..……..} \quad 3.19$$

To ensure that the minimum $MIN\, t^{i0}_{\psi\ t}(\Psi_1, \Psi_2)$ converged, a dummy variable is included in the estimated equation for estimation:

$$MIN\, t^{i0}_{\psi\ t}(\Psi_1, \Psi_2) \rightarrow \inf_{\gamma} = \wedge H / [\Psi_1 (\Psi_2 - \Psi_1)^{0.5}\, T^{0.5} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{3.20}$$

3.7 Measurement of Variables

This study has utilized six different proxies for financial deepening to analyze their impact on GDP growth rate, which serves as an indicator of economic growth

This study used six variables to determine different aspects of financial deepening on economic growth, since each measure captures different information on the role of the financial deepening on economic growth. The financial deepening drivers for this study were financial deepening proxied by credit to private sector (CPS), commercial bank deposits (CBD), broad money stock (BMS), depth of credit information (CINF), lending interest rate (INR) and stock market capitalization (SMC).

It is important to note that all variables were converted to natural logarithms before analysis to address the issue of heteroscedasticity in the error terms; thus, the coefficients on level variables represent elasticities. As all variables were identified as non-stationary after they were differenced once. The estimated parameters from the first differences of the natural logarithms provided approximate growth rates for the variables.

3.7.1 Economic Growth

Economic Growth was measured by annual GDP growth rate. This study makes use of GDP growth rate as the dependent variable. The choice of the dependent variable is in line with the works of Ohwofasa and Aiyedogbon (2013).

3.7.2 Credit to Private Sector

The first proxy of financial deepening used was the ratio of domestic credit to the private sector relative to GDP (DCP/GDP). This metric is a key indicator of financial intermediary development, highlighting the financial sector's role in financing the economy. It is believed that credit extended to the private sector fosters greater investment and productivity improvements compared to credit provided to the public sector.

Credit to the Private sector was measured by the ratio of credit to the Private Sector (CPS) to nominal GDP. This ratio indicates the level of financial services and is employed to measure all private resources used to finance the private sector. It is the most important measure of financial intermediary development, (Levine and Zervos (1998) and Yartey (2007)) as it captures the channeling of funds from savers to investors in the private sector (Ang, 2007). This indicator excludes credit to government, government agencies and public enterprises as well as credit issued by the Central Bank (Levine, *et al* 2000).

3.7.3 Commercial Bank Deposits

The second proxy of financial deepening used in this study was the ratio of bank deposits to GDP (BD/GDP). This measure offers direct insight into the level of financial intermediation, which involves transferring funds from surplus agents to deficit agents. It represents the process through which savings are matched with borrowing needs.

Bank and Lawrenz (2013) explained that deposits are funds transferred from one entity to another for safekeeping. For this arrangement to work smoothly and avoid disputes, both parties involved must have a mutual agreement. When an individual deposits money in a bank, they can access it at their convenience and transfer it to another account, though transaction fees may apply. To activate an account, banks typically require an initial deposit. Banks play a significant role in economic growth by allowing individuals and businesses to deposit and invest money. They then lend these funds to others, generating profits through interest and fees. This lending activity helps start new businesses and expand existing ones, thereby promoting economic development. By converting liabilities into long-term loan investments, banks are able to achieve profitability (Sharma, 2016).

Commercial Bank Deposits (CBD) was measured by the ratio of commercial banks deposits to nominal GDP. This ratio shows the liquidity of the banking sector (Levine and Zervos, 1998) as quoted by Waiyaki (2013) and Bakang (2015). Commercial bank deposits equal demand deposits plus time and saving deposits. The indicator provides an alternative measure to a broad money ratio, especially for developing countries, where a large component of the broad money stock is held outside the banking system (Kar and Pentecost, 2000).

3.7.4 Broad Money Stock

The third proxy of financial deepening was the ratio of broad money (M3) to GDP (M3/GDP), a conventional measure of financial development. M3 includes M2 plus foreign currency deposits held by private sector entities, nonfinancial public enterprises, and nonbank financial institutions with commercial banks. Often referred to as liquid liabilities, M3 reflects the real size of the financial sector. This ratio is expected to rise if the financial sector grows faster than the real economy and to fall if it grows more slowly

Broad Money Stock was measured by the ratio of Broad Money Stock (BMS), M3, to nominal GDP. This ratio provides a measure of the size of the financial intermediaries. The size of financial sector is a measure of its depth, Bakang (2015). This study therefore considered Broad Money Stock mainly as M3, which is an extended monetization measure including foreign reserves and other large demand deposits and monetary deposits.

3.7.5 Depth of Credit Information

The fourth proxy of financial deepening was Depth of Credit Information and was measured by depth of credit information index. This is a measure of adherence to rules affecting the scope, accessibility, and quality of credit information available through public or private credit registries. The index ranges from 0 to 9, with higher values indicating the availability of more credit information, from either a public registry or a private bureau, to facilitate lending decisions.

3.7.6 Lending Interest Rate

The fifth proxy of financial deepening was Lending Interest Rate and was measured by the commercial banks weighted average lending interest rate. The rate is the cost of borrowing money or conversely the income earned from lending money.

3.7.7 Stock Market Capitalization

Stock Market Capitalization was measured by the ratio of the value of listed domestic shares in Nairobi stock exchange market divided by GDP. Stock Market Capitalization (SMC) measures the size of the stock market. According to Levine and Zervos (1998) as quoted by Odhiambo (2015), overall stock market size is positively correlated with the ability to mobilize capital and diversify risk on an economy-wide basis

3.8 Determination of Optimum Lag Length

Optimum lags determination was done because using more than optimum lag lengths reduces the degree of freedom, moreover, using fewer than optimum lags introduces auto correlation and multicollinearity. Using the AIC or SBIC, the model form was estimated as follows.

$$IC_P = \ln\left(\frac{\varepsilon^1\varepsilon}{T-P_{max+k^X}}\right) + \left(P + K^X\left(\frac{A^X}{T-P_{max-k^X}}\right)\right) \quad \text{3.21}$$

Where;

When, X=1, $K^X$is the random walk with Trend: X=2, is the random walk with trending drift: X=3, it represents the random walk with drift: A^X Is for AIC: $\ln(T - P_{max-k^x})$is for SBIC

3.9 Vector Autoregressive Model (VAR)

A VAR is model of K variables specified as a linear function p of their own lags, p lags of other $K-1$ variables. Other possible exogeneous variables maybe added. Mathematically, p order VAR model written as $VAR(p)$, with the exogeneous variable X_t is given by.

$$y_t = v + A_1 y_{t-1} + \cdots A_p y_{t-p} + B_0 x_t + B_1 x_{t-1} + \cdots B_s x_{t-s} + u_t, \quad \text{3.22}$$

For t$\in \{-\infty, \infty\}$

Where:

$y_t = (y_{it} \ldots . y_{kt})'$ is a $K \times 1$ random vector, $A_1 \ldots A_p$ are $K \times K$ matrices of parameter. x_t is an $M \times 1$ vector of exogeneous variables, $B_0 \ldots B_s$ are $K \times M$ matrices of coefficients, v is a $K \times 1$ vector of parameters and μ_t is assumed to be white noise and that

$$\mathrm{E}[\mu_t] = 0, \qquad \text{3.23}$$

$$\mathrm{E}[\mu_t \mu_t'] \qquad \text{3.24}$$

$$\mathrm{E}[\mu_t \mu_s'] = 0 \text{ for } t \neq s \qquad \text{3.25}$$

If μ_t form a zero mean, *iid* vector process and y_t and x_t are covariance stationary and are not correlated with the μ_t, consistent and efficient estimates of the B_i and A_i and v are obtained by seemingly unrelated regression, yielding estimators that are asymptotically normally distributed.

The joint distribution of y_t is determined by the distribution of x_t and μ_t, and the parameters v, B_i and A_i. Estimating the parameters in VAR requires that the variables in y_t and x_t be covariance stationary, meaning that their first two moments exist and are time invariant. If y_t are not covariance stationary, but their first difference is stationary, a Vector Error Correction Model can be used.

3.9.1 Vector Error Correction Model (VECM)

VEC fits a type of VAR in which some of the variables are cointegrated by using Johansen's (1995) maximum likelihood method. $VECM$ are used to model stationarity relationships between multiple time series that contain unit roots. VEC estimates the parameters for $VECM$ that can be written as.

$\Delta y_t = \alpha\beta' y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + v + \delta_t + w_1 s_1 \ldots + w_m s_m + \varepsilon_t$……………………...3.26

Where

y_t is a $K \times 1$ vector endogenous variables, α is $K \times r$ matrix of parameters,

β is $K \times r$ matrices of parameters, $\Gamma_1 \ldots \Gamma_{p-1}$ are $K \times K$ matrices of parameters,

v is a $K \times 1$ vector of parameters, δ is a $K \times 1$ vector of trend coefficients, t is a linear time trend, $s_1 \ldots . s_m$ are orthogonalized seasonal indicators and $w_1 \ldots \ldots w_m$ are $K \times 1$ vector of coefficients on the orthogonalized seasonal indicators.

3.10 Evaluation of Estimates

This process involves assessing whether the parameter estimates of an economic model are theoretically sound and satisfactory. According to Koutsoyinnis (2003), the evaluation of results from econometric model estimation is based on three criteria: a priori criteria, which involves theoretical expectations; statistical criteria, which includes first-order tests; and econometric criteria, which encompasses second-order tests.

This involves deciding on whether the parameter estimates of the economic relationship or model are theoretically meaningful or satisfactory. Koutsoyinnis (2003) opined that the estimates or results obtained from the estimation of an econometric model are evaluated on the basis of the following three criteria stated as apriori criteria, statistical criteria; first order test, and the econometric criteria; second order test.

3.10.1 Statistical Criteria: First order tests

This criterion assesses the statistical reliability of the model's parameter estimates using various metrics. These include F-statistics, t-statistics, the coefficient of determination (R^2), adjusted R^2, and the standard error (SE).

The coefficient of determination, R^2, measures how well the independent variables explain the variation in the dependent variable. It represents the percentage of variance in the dependent variable that is accounted for by the independent variables. A higher R^2 indicates a better fit of the model, as it shows a greater proportion of the variance in the dependent variable is explained by the model. If R^2 equals 1, it means a perfect fit, where the independent variables explain 100% of the variance. Conversely, an R^2 of 0 means that the independent variables explain none of the variance in the dependent variable. The same interpretation applies to the adjusted R^2.

The F-statistic tests the overall significance of the regression model. If the calculated F-statistic exceeds the critical value from the F-distribution table, it indicates a significant relationship between the dependent and independent variables. If the calculated F-statistic is lower than the table value, it suggests no significant relationship.

The t-test evaluates the significance of each individual coefficient in the model. Each coefficient's absolute t-value is compared to 1.96. If the t-value exceeds 1.96, the coefficient is considered statistically significant and reliable for making inferences and predictions.

3.10.2 Diagnostic Tests

These diagnostic tests aim at investigating whether the assumptions of econometric method employed are satisfied or not. They determine the reliability of any statistical criteria and establish whether the estimates have desirable properties of unbiasedness and consistency.

3.10.2.1 Test for Normality

Non-normality of Errors: If the assumption that ***e*** is distributed normally is called into question we cannot use any of the t-test, F-tests or R-square because these tests assume that *e* is distributed normally. The results of these tests become meaningless. Indication of Non-normal Distribution: Histogram of residuals does not look normal. (Formal test Jarque-Bera Test)

$$JB = T\left[\frac{b_1^2}{6} + \frac{(b_2-3)^2}{24}\right] \qquad \text{3.29}$$

Where, b_1 is a coefficient of skewness, b_2 is coefficient of kurtosis and T is sample size. If the JB stat is smaller than a Chi-square with 2 degrees of freedom (0.05 significance level) then error term follows a normal distribution. If not, get more data or transform the dependent variable. Log(y), Square Y, Square Root of Y, 1/Y etc.

3.10.2.2 Test for Autocorrelation

The test for autocorrelation used is the Durbin-Watson (D-W) test. Test for autocorrelation (DW)is appropriate for the test of first order autocorrelation and it has the following criteria. If d* is approximately equal 2(d*=2) we accept that there is no auto correlation in the function. If d*= 0, there exist perfect positive autocorrelation. Furthermore, if 0< d*<2, that is, if d* is less than 2 but greater than zero denotes that there is some degree of positive autocorrelation which is stronger the closer d* is to zero.

If d* is equal to 4(d*=4), there exist a perfect negative auto-correlation, and if d* is less than four but greater than 2 (2< d*<4), it means that there exists some degree of negative auto correlation, which is stronger the closer the value of d* is to four.

3.10.2.3 Test for Multicollinearity

Multicollinearity occurs when explanatory variables in a regression model are not independent of each other. If variables are perfectly orthogonal, adding or removing one variable will not affect the coefficients of the other variables. However, in the case of perfect multicollinearity, the (X^1X) matrix cannot be inverted because it lacks full rank. While high multicollinearity does not violate any Classical Linear Regression Model (CLRM) assumptions, and Ordinary Least Squares (OLS) estimates remain Best Linear Unbiased Estimators (BLUE), it can lead to larger variances and standard errors for these estimates, which is undesirable.

Multicollinearity can arise from variables that are lagged versions of each other, share a common time trend, or measure similar concepts. Detecting multicollinearity can be challenging. One approach is to use a correlation matrix, but identifying multicollinearity becomes difficult with more complex relationships among variables. Detection methods include examining pair wise correlation coefficients between variables or using Variance Inflation Factors (VIFs). The pair wise correlation method calculates the correlation between two independent variables, $x_k$and $x_j$to assess their degree of collinearity.

$$r_{kj} = \frac{s_{kj}}{s_j s_k} \qquad \text{....3.27}$$

As a rule of thumb, correlation coefficients around 0.8 or above may signal a multicollinearity problem. Other evidence you should also check include insignificant *t*-statistics, sensitive coefficient estimates, and nonsensical coefficient signs and values.

Note the pair wise correlation coefficients only identify the linear relationship of two variables. It does not check linear relationship among more than two variables.

Auxiliary regression and the variance inflation factor (VIF). A VIF for any given independent variable is calculated by

$$VIF_k = \frac{1}{1-R_k^2} \qquad 3.28$$

Where, R_k^2 is the R-squared value obtained by regressing independent variable x_k on all the other independent variables in the model. VIFs greater than 10 signal a highly likely multicollinearity problem, and VIFs between 5 and 10 signal a somewhat likely multicollinearity issue. Remember to check also other evidence of multicollinearity (insignificant *t*-statistics, sensitive or nonsensical coefficient estimates, and nonsensical coefficient signs and values). A high VIF is only an indicator of potential multicollinearity, but it may not result in a large variance for the estimator if the variance of the independent variable is also large. This study will use VIF I detection of multicollinearity.

The consequences of ignoring near multicollinearity include: first, R^2 was high but the individual coefficients will have high standard errors, so that the regression "looks good" as a whole, but the individual variables are not significant. This arises in the context of very closely related explanatory variables as a consequence of the difficulty in observing the individual contribution of each variable to the overall fit of the regression.

Second, the regression becomes very sensitive to small changes in the specification, so that adding or removing an explanatory variable leads to large changes in the coefficient values or significance of the other variables. The intuition is that, if the independent variables are highly collinear, the estimates must emphasize small differences in the variables in order to assign an independent effect to each of them. Third, nonsensical coefficient signs and magnitudes. With higher multicollinearity, the variance of the estimated coefficients increases, which in turn increases the chances of obtaining coefficient estimates with extreme values.

Finally, near multicollinearity will thus make confidence intervals for the parameters very wide, and significance tests might therefore give inappropriate conclusions, and so make it difficult to draw sharp inferences. A number of alternative estimation techniques have been proposed that are valid in the presence of multicollinearity – for example, ridge regression, or principal components.

This research will use first-differencing to remedy multicollinearity. Its use is limited to models utilizing time-series or panel data.

3.11 Model Specification

The theoretical framework for this study is based on the endogenous growth model, which is commonly used to analyze the relationship between financial development and economic growth. This model operates on the premise that financial intermediation plays a crucial role in promoting economic growth. According to the endogenous growth theory, growth is driven by internal factors rather than external ones. This theory assumes increasing returns to scale, making it particularly useful for examining long-term growth rate differences between countries.

Several studies have applied the endogenous growth model to explore how financial development influences economic growth. For instance, Greenwood and Jovanovic (1990) argued that economic growth is linked to financial development. They suggested that in the early stages of development, economic growth is slow due to an underdeveloped financial structure. As growth progresses and income increases, the financial structure improves. Eventually, in the later stages of development, when economic growth is sustained and income levels stabilize, the financial structure becomes fully developed. Bencivenga and Smith (1991) demonstrated that financial intermediation contributes to economic growth by facilitating savings and investments. Financial intermediaries help allocate resources by directing savings into productive investments. Pagano (1993) utilized the endogenous growth model to show that financial intermediation, along with other factors, is crucial for economic growth. The model highlights how financial development leads to growth by enhancing savings for investment, influencing the marginal productivity of capital, and affecting savings rates.

This study followed the steps of Jalil, Wahid and Shahbaz (2010) and Waiyaki (2013) and adopted the endogenous growth model. Proponents of the endogenous growth models such as Pagano, (1993), hold that capital accumulation can increase the long run trend rate of economic growth. However, to permit capital accumulation it is necessary to increase the savings ratios. Thus, a well-functioning financial system encourages investment, promotes technological innovation that ultimately leads to economic growth through savings. To capture the potential effects of financial deepening on economic growth, consider the simplest endogenous growth model: the “AK” model, where aggregate output is a linear function of the aggregate capital stock

$$Y_t = AK_t \text{..} 3.1$$

Where, Y_t is output at time t, A is total factor productivity and $K_t$is the measure of real capital stock. The AK model can be derived assuming that the population is stationary and that only capital stock is subject to constant returns to scale. Conventionally to estimate the capital stock, K_t is measured as the previous period amount of capital (K_{t-1}) corrected for depreciation plus gross investment in current period(I_t). Thus, with capital depreciating at the rate δ, the gross investment becomes:

$$I_t = K_{t+1} - (1-\delta)K_t \text{...} 3.2$$

In a closed economy with no government, capital market equilibrium requires that Savings equals investment. However, Pagano (1993) assumes that a proportion of 1- θ is lost during the process of financial intermediation and thus the fraction (θ) of total savings can be used to finance investment. Therefore, the savings-investment relationship can be written as:

$$\theta S_t = I_t \text{..} 3.3$$

From equation (1), we introduce the growth rate at time *t+1* which is

$$g_{t+1} = \frac{Y_{t+1}}{Y_t} - 1 = \frac{K_{t+1}}{K_t} - 1 \text{..} 3.4$$

Using eq. (2) and dropping the time subscripts, the steady-state growth rate can be written as, the steady state growth rate of output becomes:

$$g_y = \frac{AI}{y} - \delta = A\theta S \text{...} 3.5$$

The capital market equilibrium condition (3.3) has been used and denoted the gross saving rate S or $\frac{S_t}{Y_t}$. Thus,

$$S = \frac{S_t}{Y_t} = \frac{S_t}{AK_t} \quad \text{...3.6}$$

Equation 3.5 expresses that economic growth depends on the total factor productivity (*A*), the efficiency of financial intermediation (θ), and the rate of savings(*S*). Financial deepening is assumed to affect growth through the amount of savings put in investment. Wurgler (2000) as quoted by Ngugi, Amanja and Maana (2012) shows that even if financial development does not lead to higher levels of investment, it allocates existing investment better and therefore promotes economic growth. Importantly, when the rate of depreciation is assumed to be constant, economic growth depends on financial deepening. From the above $Y_t$can be expressed as follows:

$$Y_t = \beta_0 + \beta_1 \frac{S_t}{Y_t} + \varepsilon_t \quad \text{..3.7}$$

Where, Y_t is the natural logarithm of real GDP of Kenya and $\frac{S_t}{Y_t}$ the natural logarithm of savings to nominal GDP that proxies financial deepening ($\frac{S_t}{Y_t} = FD$). $\beta_0$is the intercept, β_1 is the coefficient that gives the effects of financial development on economic growth while ε_t is the error term. Equation 3.7 can be rewritten as:

$$GDP = \beta_0 + \beta_1 FD_t + \varepsilon_t \text{..3.8}$$

In equation (3.8), FD was extended to include each alternative measure namely: Ratio of private sector credit to GDP (CPS), ratio of commercial bank deposits to GDP (CBD), ratio of broad money stock to GDP (BMS), depth of credit information (CINF), lending interest rate (INR) and the ratio of stock market capitalization to GDP (SMC).

The ordinary least square (OLS) regression is the estimation technique employed in this study. The choice of ordinary least square method was due to its simplicity. The researcher however adopted a model by Ohwofasa and Aiyedogbon (2013), which was modified by the researcher to suit the present research.

In order to establish the effect of financial deepening on economic growth in Kenya, the study attempts to isolate key variables underpinning the study. The dependent variable is Gross Domestic Product Growth rate and five covariates: bank credit to the private sector; commercial bank deposits; Broad money stock; banking sector assets and stock market capitalization.

$Y = f(x_1, x_2, x_3, x_4, x_5)$

Where Y is GDP growth rate, andx_i,$i = 1, 2, 3, 4, 5$ represent the covariates bank credit to the private sector; commercial bank deposits; Broad money stock; depth of credit information, lending interest and stock market capitalization

The model is as specified below:

$$GDPGR_t = a_0 + a_1CPS_t + a_2CBD_t + a_3BMS_t + a_4CINF_t + a_5SMC_t + a_6INR_t + U_t \qquad 3.9$$

Where: GDPGR is Gross Domestic Product Growth Rate, CPS is Ratio of private sector credit to GDP, CBD is ratio of commercial bank deposits to GDP, BMS is ratio of broad money stock to GDP, CINF is the depth of credit information, INR is the lending interest rate and SMC is the ratio of stock market capitalization to GDP. U is Error term and a subscript ‘**t**’ for time series.

3.12 Post-Estimation Tests

Post-estimation diagnostic tests were conducted to ensure the validity, reliability, and robustness of the estimated econometric model. These tests are essential for confirming whether the underlying assumptions of the classical linear regression framework hold, thereby safeguarding the accuracy of statistical inference. The study assessed the presence of autocorrelation using the Breusch–Godfrey LM test, heteroscedasticity through the Breusch–Pagan and White tests, and normality of residuals via the Jarque–Bera test. In addition, the Ramsey RESET test was applied to evaluate potential model misspecification, while multicollinearity was examined through the Variance Inflation Factor. Finally, parameter stability over the study period was assessed using the CUSUM and CUSUMSQ tests. Collectively, these post-estimation procedures confirmed that the model was appropriately specified and its coefficients remained stable, thereby enhancing confidence in the empirical findings and the conclusions drawn from them.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter presents the empirical findings of the study on the relationship between financial deepening and economic growth in Kenya using annual data from 1990 to 2021. The analyses include descriptive statistics, correlation patterns, stationarity tests, lag length selection, cointegration analysis, Vector Error Correction Model (VECM) estimation, post-estimation diagnostics, and the gradient analysis of the objective function. The results provide insights into the long-run and short-run dynamics between financial deepening indicators and economic growth, as well as the robustness and stability of the estimated model.

4.2 Descriptive Statistics

The study presents the results using a measure of central tendency, the mean and a measure of dispersion, the standard deviation. According to (Cohen, 2014), descriptive statistics is important in analysis because it allows the presentation of raw data in a meaningful manner. It gives the general overview of the sample and to simplify large data set in sensible manner. The mean measures the concentration of the observations while the standard deviation determines the spread of the observations away from the mean in the dataset. The minimum and maximum values of the variables within the period 1990 to 2021 were included for easy understanding of the range of the datasets. Table 4.1 presents the summary of descriptive statistics of the sample data.

Table 4. 1: Univariate Descriptive Statistics

Variable	Obs	Mean	Std.Dev	Minimum	Maximum
Year	32	2005.5	9.361	1990	2021
GDP	32	3.59e+10	2.97e+10	0.575e+09	9.55e+10
CPS	32	26.886	5.509	18.5	40.15
CBD	32	75.592	8.266	59.92	93
BMS	32	37.581	3.051	29.58	43.25
CINF	32	8.219	0.890	6	9
INR	32	19.004	6.800	12.44	36.24
SMC	32	24.094	9.753	8.05	44.06

Source: Researcher, 2022

The results in table 4.1 showed that from 1990-2021; Kenya GDP has been averaged at 35.9 billion USD with a minimum value of 5.75 billion USD and a maximum value of 95.5 billion dollars. The percentage of credit to private sector to GDP had an average of 26.89 percent with its minimum percentage of 18.5 and 40.15 percent as maximum value. The percentage of commercial bank deposits (CBD) to GDP had a mean of 75.59 percent and standard deviation of 8.27, a minimum value of 59.92 and a maximum value of 93 percent. This small standard deviation shows that the values were around the mean. Credit information was measured by the depth of credit information index and showed an average of 8.22 with its standard deviation of 0.89, with a minimum value of 6 and a maximum value of 9. Lending interest rates were averaged 19.00 and standard deviation of 6.80 and Stock market capitalization (SMC) had a mean percent of 24.09 with standard deviation of 9.75, a minimum value of 8.05 and a maximum of 44.06 percent.

4.2.1 Gross Domestic Product

Figure 4.1 shows the trend of Kenya's economic growth in terms of GDP.

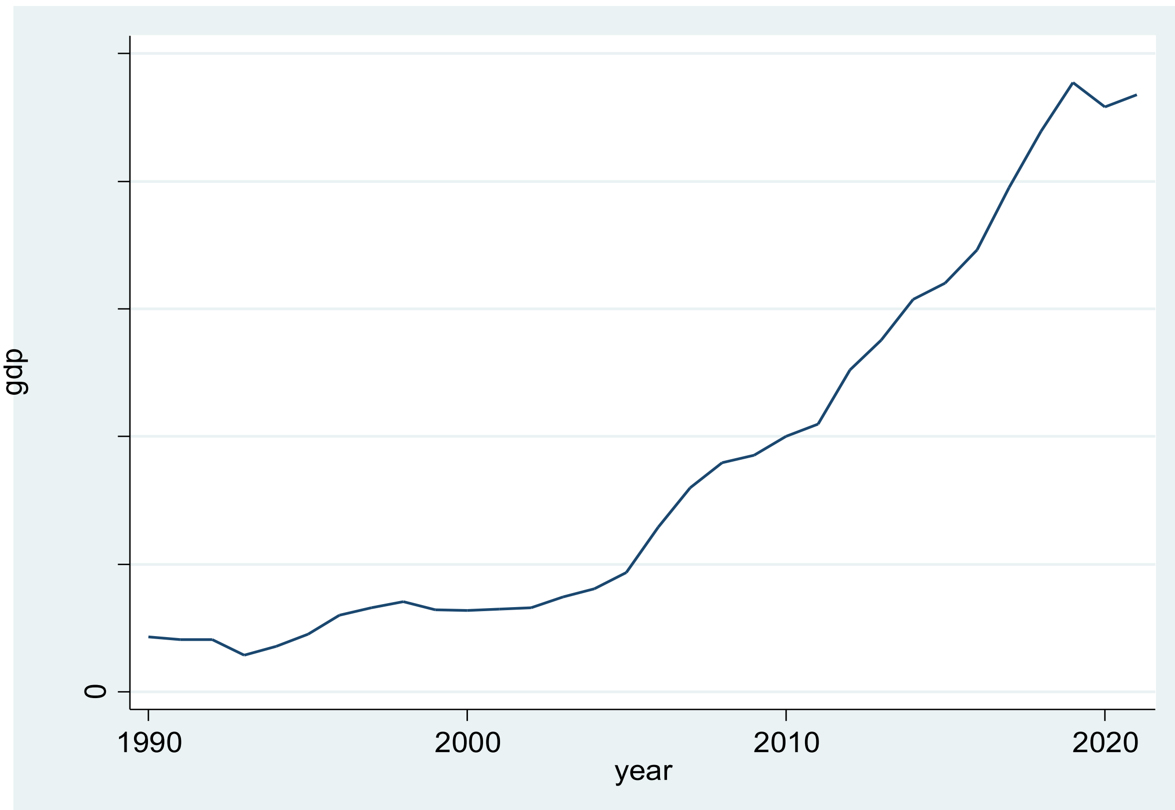


Figure 4. 1: Trends of Gross Domestic Product

Source: Researcher, (2022)

The results in figure 4.1 indicated that over the years Kenya had been on improving trend and had made significant economic, structural, and political reforms that had driven and sustained its economic growth. Kenya had been having a positive trend (trend line having a positive gradient) but there were some years it had experienced shocks. In 2010, Kenya had ushered in a new political and economic governance system with the promulgation of new constitution in 2010 that introduced a bicameral legislative house, devolved governance. A sharp decline in 2019-2020 was due to covid-19 pandemic.

4.2.2 Credit to Private Sector

Figure 4.2 presents trending of the amount of credit to private sector in relation to GDP.

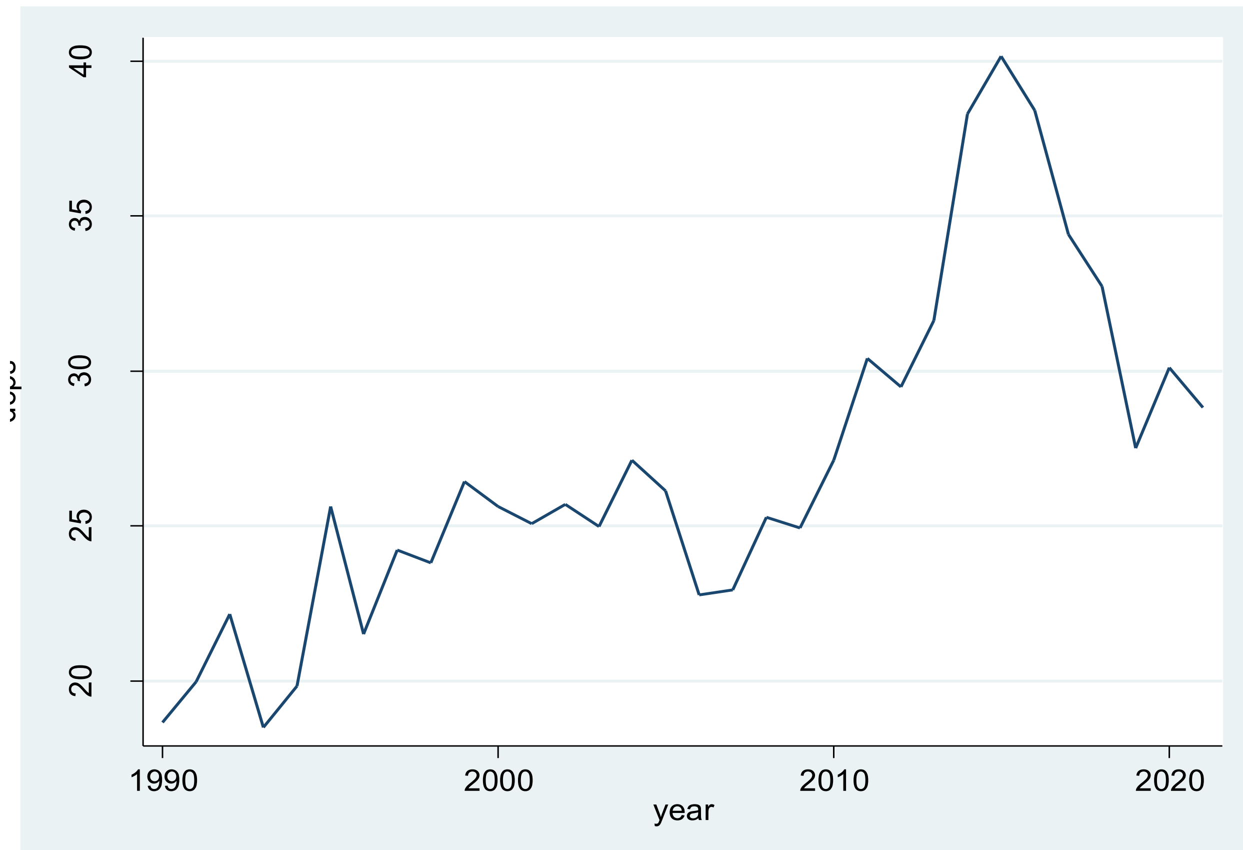


Figure 4. 2: Trends of Credit to Private Sector

Source: Researcher, (2022)

Credit to private sector measured using ratio of total credit to the private sector (CPS) relative to nominal GDP indicated the level of financial services and was employed to measure all private resources used to finance the private sector.

The findings illustrated in Figure 4.2 indicate that between 1990 and 2021, credit to the private sector as a percentage of GDP averaged 26.89 percent, with a minimum of 18.5 percent and a maximum of 40.15 percent. Credit to the private sector (CPS) remains one of the most critical indicators of financial intermediary development because it reflects the extent to which financial institutions channel funds from savers to private investors. Recent empirical studies reaffirm this view, emphasizing that higher CPS levels enhance private investment, productivity, and overall economic performance (Nguyen & Su, 2021; Sahoo *et al*., 2020). Consistent with established definitions, this indicator excludes credit extended to the government, public enterprises, and central bank operations, thereby providing a more accurate reflection of credit available to the productive private sector (World Bank, 2022).

4.2.3 Commercial Bank Deposits

Figure 4.3 presents trending of the amount of commercial deposits in relation to GDP.

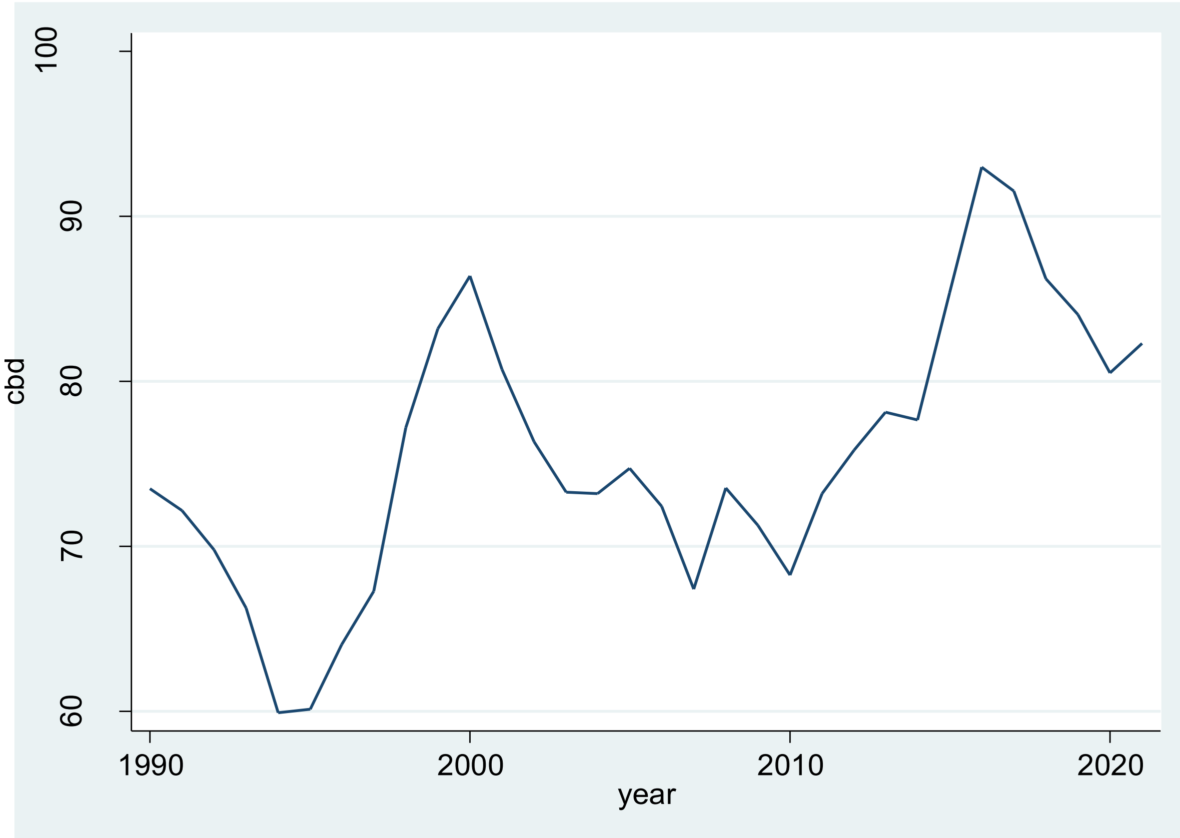


Figure 4. 3: Trends of Commercial Bank Deposits

Source: Researcher, (2022)

The results in Figure 4.3 indicate that commercial bank deposits (CBD) recorded a mean of 75.59 percent and a standard deviation of 8.27, suggesting that the values were closely clustered around the mean. Commercial bank deposits were measured as the ratio of total deposits mobilized by commercial banks to nominal GDP, an indicator widely used to assess the liquidity, depth, and resource-mobilization capacity of the banking sector. Recent empirical studies reaffirm that higher levels of bank deposits enhance the stability of financial institutions and expand credit creation, thereby strengthening financial intermediation and supporting long-term economic growth (Efobi et al., 2022; Ibrahim & Alagidede, 2018). CBD typically comprises demand deposits as well as time and savings deposits, and it provides a more reliable measure of banking liquidity than broad money in developing economies, where large proportions of money often circulate outside the formal banking system (World Bank, 2022).

4.2.4 Broad Money Stock

The results for broad money stock are presented in figure 4.4.

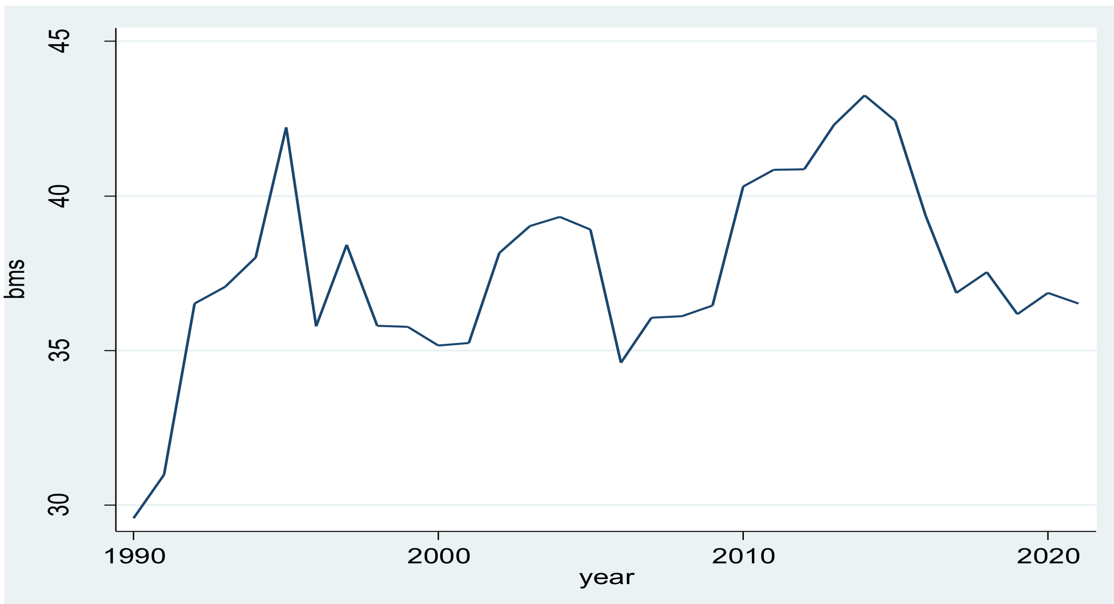


Figure 4. 4: Trends of Broad Money Stock

Source: Researcher, (2022)

Figure 4.4 presents broad money stock to GDP was at 37.58 and the standard deviation of 3.05. According to Bakang (2015), broad money stock measured as the ratio of broad money stock to nominal GDP (BMS) provides a measure of the size of the financial intermediaries. The size of financial sector is a measure of its depth. This study considered broad money stock mainly consist M3, which is an extended monetization measure including foreign reserves and other large demand deposits and monetary deposits.

4.2.5 Credit Information

The results for the trends of credit information are shown in figure 4.5.

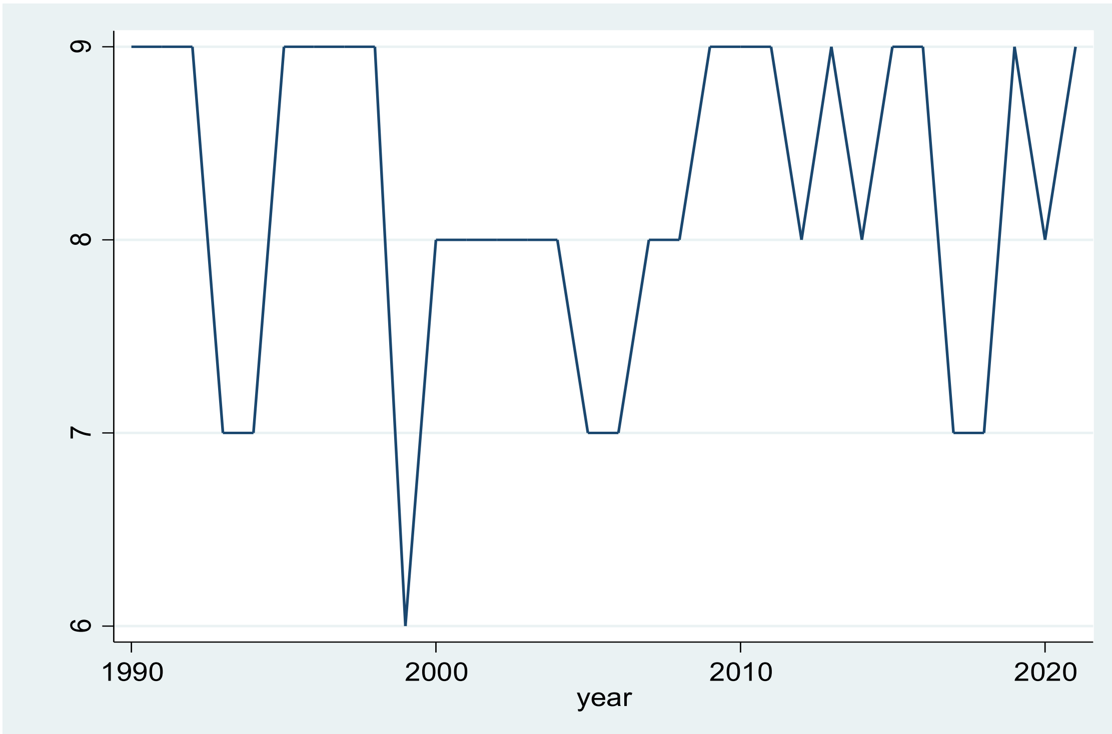


Figure 4. 5: Trends of Depth of Credit Information

Source: Researcher, (2022)

The results in figure 4.5 depicted that credit information was measured as the depth of credit information index showed an average of 8.22 with its standard deviation of 0.89. This small standard deviation signifies that the values are around its mean also, a minimum index value of 6 and a maximum depth index of 9 is another evidence that the depth of credit information between 6 and 9.

The findings revealed that the score of credit information was higher, indicating that the depth of credit information was sufficient enough and it is a significant determinant of economic growth in Kenya.

4.2.6 Lending Interest Rate

The results for trends on lending interest rate are presented in figure 4.6.

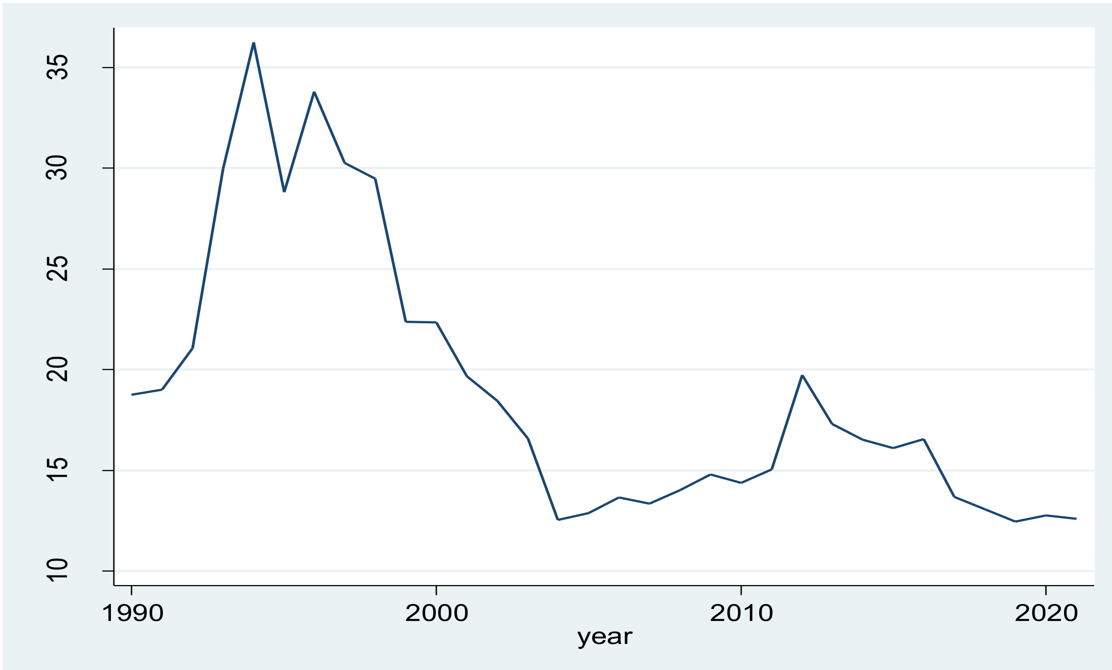


Figure 4. 6: Trends of Lending Interest Rates

Source: Researcher, (2022)

This study found that lending interest rates was averaged 19.00 and standard deviation of 6.80. Figure 4.6 indicates that there was a decline trending in lending interest rates by banks in Kenya. Lending interest rate is the amount charged by lenders for a certain period as a percentage of the amount lent. The total interest on the amount or the principal sum is determined by the duration of time over which the amount is deposited or lent. Most loans use simple interest.

4.2.7 Stock Market Capitalization

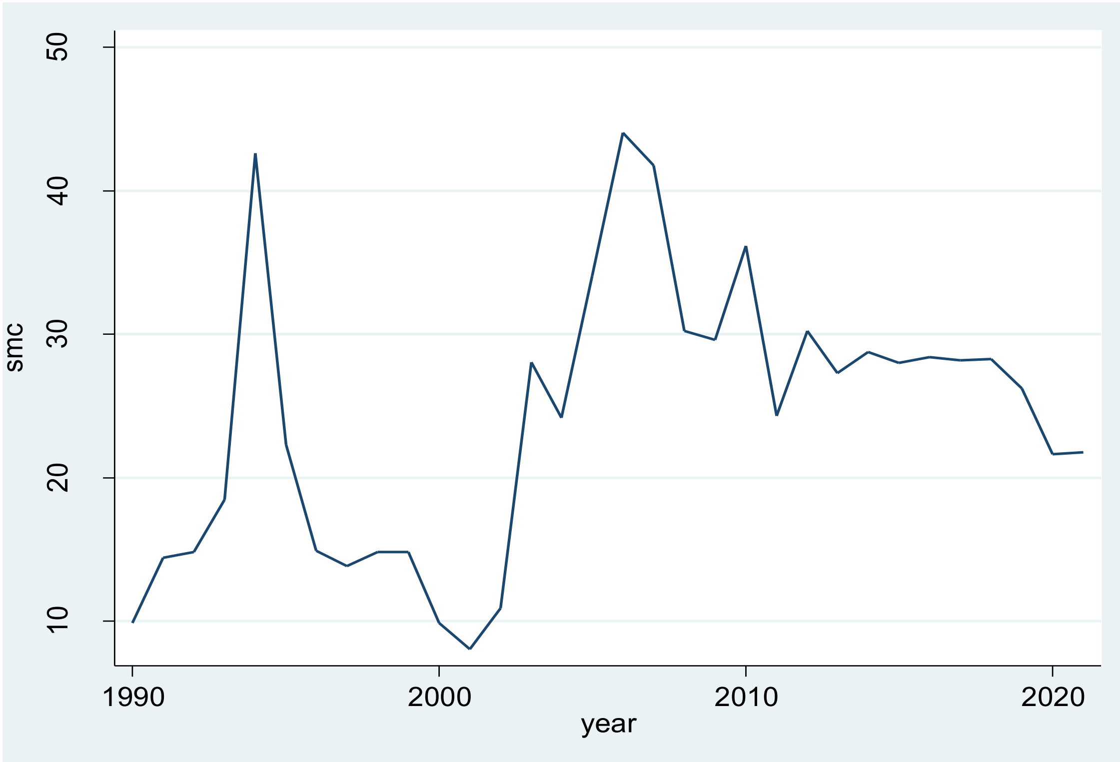


Figure 4. 7: Trends of Stock Market Capitalization

Source: Researcher, (2022)

Figure 4.7 showed positive and negative trends of stock market capitalization. From 1995-2000 this was the period of negative stocks whereas from 2000-2010 had an upward trend. Stock market capitalization (SMC) had a mean percent of 24.09 with standard deviation of 8.05 and a maximum of 44.06 percent. Stock market capitalization measures the size of the stock market and equals the value of listed domestic shares on domestic exchanges divided by GDP. According to Levine and Zervos (1998) as quoted by Odhiambo (2015), overall market size is positively correlated with the ability to mobilize capital and diversify risk on an economy-wide basis. Al-Kandari, Al-Roumi, & Al-Roomy (2020) who contended that stock markets are critical to the economy of a country because they effectively mediate among both surplus and deficit components to produce new factors of production that are meant to add to, as well as new possibilities and commodities that engage explicitly or implicitly in growth of the economy.

4.3 Unit Root Test

Unit root tests were conducted for all the variables used in assessing economic growth in Kenya to ascertain their stationarity properties before model estimation. Establishing stationarity is essential in time-series analysis to avoid spurious regressions and to ensure that the estimated relationships among variables are reliable. In this study, both the Augmented Dickey–Fuller (ADF) test and the Phillips–Perron (PP) test were employed, as these are widely recognized for their robustness in detecting unit roots under different error structures. The ADF test accounts for higher-order serial correlation by incorporating lagged difference terms, while the PP test corrects for serial correlation and heteroscedasticity in the error terms without the need for lag selection. Using both tests provides greater confidence in determining the integration order of each variable, thereby informing the appropriate econometric techniques for subsequent analysis.

4.3.1 Augmented Dickey Fuller

The test had the null hypothesis that the variable was not stationary (presence of unit root), against an alternative hypothesis that there was no unit root (stationary). If the test statistic is greater than the 5-percentage critical value, then the null hypothesis is not rejected and infers the absence of a unit root, that is, when $p < 0.05$, then we reject the null hypothesis and accept that there is stationarity. When a unit root is present, then there is to remove it, the first difference is taken.

Augmented Dickey-Fuller test for stationarity is presented in Table 4.2. The results showed that economic growth (GDP), credit to private sector (CPS), commercial bank deposits (CBD), lending interest rates (LINR) and stock market capitalization (SMC) were all non-stationary at levels. The critical reference value for this was 5 percent.

Table 4. 2 : Stationarity using Augmented Dickey Fuller

	ADF test statistic		Critical values			Conclusion
Variable	**T**	**P**	**1%**	**5%**	**10%**	
GDP	2.412	.9990	-3.709	-2.983	-2.623	Nonstationary
CPS	-1.822	.3698	-3.709	-2.983	-2.623	Nonstationary
CBD	-1.363	.6006	-3.709	-2.983	-2.623	Nonstationary
BMS	-3.399	.0110	-3.709	-2.983	-2.623	Stationary
CINF	-4.545	.0002	-3.709	-2.983	-2.623	Stationary
LINR	-1.181	.6817	-3.709	-2.983	-2.623	Nonstationary
SMC	-2.757	.0647	-3.709	-2.983	-2.623	Nonstationary
			First difference			
Variable	**T**	**P**	**1%**	**5%**	**10%**	
GDP	-3.225	.0186	-3.716	-2.986	-2.624	Stationary
CPS	-5.660	.0000	-3.716	-2.986	-2.624	Stationary
CBD	-3.589	.0060	-3.716	-2.986	-2.624	Stationary
BMS	-7.297	.0000	-3.716	-2.986	-2.624	Stationary
CINF	-6.247	.0000	-3.716	-2.986	-2.624	Stationary
LINR	-5.509	.0000	-3.716	-2.986	-2.624	Stationary
SMC	-6.346	.0000	-3.716	-2.986	-2.624	Stationary

Note: the Mackinnon critical values at levels **1%=**-3.709, **5%=**-2.983 and **10%=** -2.623
Mackinnon critical values at first difference **1%=**-3.716, **5%=**-2.986 and **10%=** -2.624

Source: Researcher (2022)

All the absolute Mackinnon $Z\,(t)$ values were less than absolute critical values of 5 percent. Broad money stock (BMS) and credit information (CINF) were stationary at levels. However, it is observed that on first difference all the variables (GDP, CPS, CBD, LINR, and SMC) achieved stationarity. This is indicated by its critical values which were greater than Mackinnon $Z\,(t)$ values at 5 percent, and their p-values were less than 5 percent significance level implying rejection of the null hypothesis of unit root.

4.3.2 Philip Perron

The Phillips–Perron (PP) test is a refinement of the Dickey–Fuller approach that provides robustness against serial correlation and heteroscedasticity in time-series error structures. It evaluates the null hypothesis that a series contains a unit root against the alternative of stationarity. Recent econometric studies emphasize that failure to correct for serial correlation in ordinary least squares (OLS) estimation may lead to biased inference in time-series regressions (Apergis & Lau, 2023; Hou & Wang, 2022). The PP methodology addresses this by applying a heteroscedasticity- and autocorrelation-consistent (HAC) covariance estimator, allowing the test statistic to remain valid even when the error terms exhibit complex dependence patterns. Contemporary applications continue to rely on the PP test because of its robustness and its ability to complement the Augmented Dickey–Fuller test in establishing the integration properties of macroeconomic variables (Kim & Lee, 2021). The results of the Phillips–Perron unit root tests are presented in Table 4.3.

Table 4. 3: Stationarity Using Philip and Perron

	ADF test statistic		**Critical values**			**Conclusion**
Variable	**T**	**P**	**1%**	**5%**	**10%**	
GDP	2.030	0.9987	-3.709	-2.983	-2.623	Nonstationary
CPS	-1.839	0.3613	-3.709	-2.983	-2.623	Nonstationary
CBD	-1.752	0.4047	-3.709	-2.983	-2.623	Nonstationary
BMS	-3.418	0.0103	-3.709	-2.983	-2.623	Stationary
CINF	-4.466	0.0002	-3.709	-2.983	-2.623	Stationary
LINR	-1.343	0.6091	-3.709	-2.983	-2.623	Nonstationary
SMC	-2.750	0.0658	-3.709	-2.983	-2.623	Nonstationary
			First difference			
Variable	**T**	**P**	**1%**	**5%**	**10%**	
GDP	-.3147	0.0233	-3.716	-2.986	-2.624	Stationary
CPS	-5.660	0.0000	-3.716	-2.986	-2.624	Stationary
CBD	-3.526	0.0073	-3.716	-2.986	-2.624	Stationary
BMS	-6.202	0.0000	-3.716	-2.986	-2.624	Stationary
CINF	-8.310	0.0000	-3.716	-2.986	-2.624	Stationary
LINR	-5.517	0.0000	-3.716	-2.986	-2.624	Stationary
SMC	-6.522	0.0000	-3.716	-2.986	-2.624	Stationary

Note: the Mackinnon critical values at levels **1%=**-3.709, **5%=**-2.983 and **10%=** -2.623
Mackinnon critical values at first difference **1%=**-3.716, **5%=**-2.986 and **10%=** -2.624
Source: Researcher, (2022)

The study employed the Phillips–Perron (PP) test to examine the stationarity properties of the variables used to analyse the influence of financial deepening on economic growth in Kenya. As presented in Table 4.3, the results indicate that at levels, the variables Broad Money Supply (BMS) and Credit Information (CINF) were stationary, as their test statistics were more negative than the critical values at the 5% significance level. This suggests that these two indicators of financial deepening are integrated of order zero, I(0). On the other hand, the variables Gross Domestic Product (GDP), Credit to the Private Sector (CPS), Credit by Deposit Banks (CBD), Lending Interest Rate (LINR), and Stock Market Capitalization (SMC) were found to be nonstationary at levels, implying the presence of unit roots and hence the need for differencing.

Upon taking the first difference, all variables—including those initially nonstationary—became stationary, as indicated by statistically significant PP test statistics and p-values less than 0.05. This confirms that these variables are integrated of order one, I(1). Therefore, the findings reveal that while BMS and CINF are stationary at levels (I(0)), the remaining variables attain stationarity after first differencing (I(1)).

The presence of a combination of I(0) and I(1) variables implies that the data series are suitable for estimation using the Autoregressive Distributed Lag (ARDL) bounds testing approach to cointegration, which can effectively handle variables of mixed integration orders. This provides a robust statistical foundation for examining the long-run and short-run dynamics between financial deepening indicators and economic growth in Kenya.

The results in table 4.3 indicated that like the previous ADF results, both broad money stock and depth of credit information were stationary at levels while the rest had unit root. Upon first difference, all the variables were stationary.

4.3.3 Structural Breaks

First generation unit root tests, such as the Dickey–Fuller, Augmented Dickey–Fuller and Phillips–Perron tests have been shown to have relatively low power to reject their null hypothesis: that the series is non-stationary or integrated of order one (I(1)) rather than stationary integrated of order zero (I(0)). In particular, any sort of structural break in the series is likely to cause a failure to reject, even if the series is stationary before and after the structural break. The study employed the use of clement-Montane and Reyes and the results presented in table 4.4.

Table 4. 4: Clement-Montane- Reyes Structural Breaks

Variables	Coefficient	T	P	Optimal break year
GDP	1.5672	9.331	0.000	2009
CPS	9.1191	6.815	0.000	2011
CBD	12.1360	4.952	0.000	2012
BMS	2.3816	2.165	0.042	2004
CINF	0.0409	1.321	0.197	2008
LINR	-11.5055	-7.749	0.000	2000
SMC	12.4795	4.669	0.000	2004

Source: Researcher, (2022)

The study employed the Clemente–Montañés–Reyes (CMR) structural break unit root test to identify potential structural breaks in the data series for the period under review. This test extends the traditional unit root analysis by accounting for one or more structural breaks that may occur due to significant economic or policy changes, which, if ignored, could lead to misleading conclusions about stationarity. The results presented in Table 4.4 show the estimated coefficients, t-statistics, p-values, and the corresponding optimal break years for each variable.

The findings indicate that most variables exhibit statistically significant structural breaks, as reflected by p-values less than 0.05. Specifically, GDP recorded a significant break in 2009, a period associated with the global financial crisis that adversely affected economic growth in Kenya and many other developing economies. Credit to the Private Sector (CPS) and Credit by Deposit Banks (CBD) show significant breaks in 2011 and 2012, respectively, which coincide with major financial sector reforms and increased credit expansion following the implementation of Kenya's Vision 2030 economic blueprint. Similarly, Broad Money Supply (BMS) and Stock Market Capitalization (SMC) experienced significant breaks in 2004, likely linked to the liberalization of the financial sector and the introduction of new financial instruments aimed at deepening financial markets during that period.

The Lending Interest Rate (LINR) recorded a significant negative structural break in 2000, reflecting policy shifts in monetary management and interest rate liberalization that characterized the early 2000s in Kenya. However, Credit Information (CINF) showed no statistically significant structural break ($p = 0.197$), suggesting relative stability in the flow of credit information over the study period.

Overall, the results confirm that most financial deepening indicators and economic growth were influenced by identifiable structural shifts in Kenya's economy, which can be attributed to major policy changes, financial reforms, and global economic developments. These findings underscore the importance of accounting for structural breaks in time series modelling to avoid biased estimates and to accurately capture the true long-run relationships among variables.

4.3.4 Length Selection

It is usually necessary to determine the optimum number of lag lengths before VAR models. This is because using more lags than optimum consumes degrees of freedom and using less lags than optimum introduces correlation and multicollinearity (Gujarati, 2013). Interpretation of the estimates is substantively influenced by different lag orders, especially when the differences are too large. Therefore, selection of the correct lag length order for each VAR was the first and vital step in this study. These lag length orders are selected by some pre-specified information criterion and are based on in the construction of vector autoregressive estimates. To decide on this, the following selection criteria were used as shown in Table 4.5.

Table 4. 5: Selection-Order Criteria

Lags	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-921.46				6.0e+23	66.104	66.163	66.295
1	-819.89	203.14	16	0.000	1.4e+21	59.992*	60.283*	60.944*
2	-808.28	23.22	16	0.108	2.0e+21	60.306	60.829	62.018
3	-791.50	33.55	16	0.006	2.3e+21	60.250	61.007	62.724
4	-773.16	36.69*	16	0.002	3.2e+21	60.083	61.072	63.318

Source: Researcher, (2022)

Before estimating the long-run and short-run relationships among the variables, the appropriate lag length was determined using various selection-order criteria, as presented in Table 4.5. The lag length selection is a crucial step in time series modelling since it ensures that the model captures the dynamic interrelationships among variables without over-parameterization, which could lead to inefficient estimates. The study utilized several statistical criteria, including the Final Prediction Error (FPE), Akaike Information Criterion

(AIC), Hannan–Quinn Information Criterion (HQIC), and Schwarz Bayesian Information Criterion (SBIC), to identify the optimal lag structure for the model.

The results indicate that the information criteria (AIC, HQIC, and SBIC) all identified one lag (lag 1) as the optimal lag length, as denoted by the asterisks in the table. Specifically, the AIC, HQIC, and SBIC values are lowest at lag one (59.992, 60.283, and 60.944, respectively), suggesting that this lag minimizes the information loss and provides the best model fit. Furthermore, the likelihood ratio (LR) test at lag one is statistically significant ($p = 0.000$), reinforcing the choice of lag one as appropriate for capturing the dynamic interactions between financial deepening indicators and economic growth in Kenya.

Therefore, based on these criteria, the study adopted one lag (lag 1) as the optimal lag length for subsequent analysis. This choice ensures that the model adequately reflects the short-term adjustments and long-term equilibrium relationships among the variables while maintaining model parsimony. The selected lag structure was consequently used in estimating the Autoregressive Distributed Lag (ARDL) bounds testing model to examine the cointegration relationships between financial deepening and economic growth in Kenya.

4.5 Co-integration Results

Recent econometric literature identifies two primary approaches used in the Johansen cointegration framework: the trace statistic and the maximum eigenvalue statistic. These methods evaluate the number of cointegrating relationships among non-stationary variables in a multivariate system and remain the most widely applied procedures in contemporary empirical research (Arltová & Fedorová, 2020; Nkoro & Uko, 2021).

Table 4. 6: Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.924767	220.8402	125.6154	0.0000
At most 1 *	0.777278	143.2251	95.75366	0.0000
At most 2 *	0.738539	98.17024	69.81889	0.0001
At most 3 *	0.600799	57.92619	47.85613	0.0043
At most 4 *	0.513791	30.37748	29.79707	0.0428
At most 5	0.220603	8.744008	15.49471	0.3896
At most 6	0.041353	1.266962	3.841466	0.2603

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.924767	77.61510	46.23142	0.0000
At most 1 *	0.777278	45.05489	40.07757	0.0127
At most 2 *	0.738539	40.24405	33.87687	0.0076
At most 3	0.600799	27.54871	27.58434	0.0505
At most 4 *	0.513791	21.63348	21.13162	0.0425
At most 5	0.220603	7.477046	14.26460	0.4344
At most 6	0.041353	1.266962	3.841466	0.2603

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Researcher, (2022)

Based on Johansen's maximum likelihood procedure, cointegration test results presented in Table 4.6 indicates there is at most 4 cointegrating relationship as suggested by trace statistic (*) and maximum eigenvalues among the variables. This confirms long run relationship among the variables and prompts estimation of VEC model (the restricted VAR).

4.6 Correlation Analysis

Correlation relationship between variables gives an understanding of the degree and the direction of causation. It determines how variables are related to one another, and the direction and strength of their associations. There are several ways in which one can determine the correlation analysis such as using Pearson correlation coefficient, or by determining Spearman or Kendall rank correlation coefficients. This study estimated correlation using Pearson correlation (ρ). Correlation coefficient (ρ) ranges from -1 and +1. When the value for ρ is +1 then variables have perfect positive association, -1 implies perfect negative association. Values close to zero are said to be weak correlation otherwise strong correlation. Pearson Correlation Coefficients results are presented in table 4.10.

Table 4. 10: Pearson Correlation Coefficients

	GDP	**CPS**	**CBD**	**BMS**	**CINF**	**INR**	**SMC**
GDP	1.000						
CPS	0.721*	1.000					
CBD	0.633*	0.682*	1.000				
BMS	0.267	0.641*	-0.009	1.000			
CINF	0.085	0.064	-0.121	0.075	1.000		
INR	-0.594*	-0.466*	-0.525*	-0.047	0.017	1.000	
SMC	0.308	0.219	-0.141	0.361*	-0.256	-0.321	1.000

Source: Researcher, (2022)

The results in table 4.10 indicated that there was high positive and significant correlation between economic growth (GDP) and credit to private sector (CPS) ($\rho = 0.721$), economic growth and commercial bank deposits (CBD) ($\rho = 0.633$). However, economic growth and lending interest rates (INR) was strong negative correlation ($\rho = -0.594$). Credit to private sector and commercial bank deposits also had high positive correlation of 0.682. The rest of independent variables had weak correlation between them and this signifies no collinear relation experienced as suggested by VIF below 10 as discussed earlier.

4.7 Vector Error Correction Model

The results for the short run and long relationships are presented in this section.

4.7.1 Short Run Relationship

The results for the short run relationship are depicted in table 4.11.

Table 4. 11: Short Run Relationship

Equation	parameters	RMSE	R-sq	Chi2	P >chi2	
	9	0.133	0.4243	15.474	0.0787	
	Coef.	**Std.Err**	**z**	**p**	**[95% CI]**	
Ce1	0.041	0.004	10.00	0.000	0.039	0.122
LGDP	0.116	0.257	0.45	0.653	-0.389	0.620
CPS	-0.002	0.020	-0.11	0.910	-0.041	0.036
CBD	0.001	0.011	0.12	0.901	-0.021	0.024
BMS	-0.010	0.021	-0.47	0.640	-0.052	0.032
CINF	0.031	0.044	0.70	0.485	-0.055	0.116
INR	0.0002	0.009	0.02	0.984	-0.017	0.017
SMC	0.004	0.005	0.72	0.469	-0.006	0.014
Constant	0.053	0.036	1.45	0.146	-0.018	0.123

Source: Researcher, (2022)

The results presented in Table 4.11 illustrate the short-run dynamics between financial sector indicators and economic growth. The model, which incorporates nine estimated parameters, reports a root mean square error (RMSE) of 0.133 and an R-squared value of 0.4243. This indicates that approximately 42.43 percent of the short-run variations in economic growth (LGDP) are accounted for by the selected financial variables. The Wald chi-square statistic ($\chi^2 = 15.474$; $p = 0.0787$) further suggests that the explanatory variables exert a weak yet notable joint influence on short-run economic growth at the 10 percent significance level. Recent empirical evidence supports these findings, showing that financial sector indicators often have a more pronounced impact on economic growth in the long run than in the short run, largely due to the time required for financial reforms and intermediation processes to translate into productive investment and growth outcomes (Asteriou & Spanos, 2019; Bist & Awotundun, 2021).

The estimated short-run model can be expressed as:

$$\Delta LGDP_t = 0.53 + 0.41ECM_{t-1} + 0.116\Delta LGDP_{t-1} - 0.002\Delta CPS_t + 0.001\Delta CBD_t - 0.010\Delta BMS_t + 0.031\Delta CINF_t + 0.0002\Delta INR_t + 0.004\Delta SMC_t + \varepsilon_t \ldots\ldots\ldots\ldots \quad (4.1)$$

Where Δ denotes first differences and ECM_{t-1} represents the error-correction term capturing long-run equilibrium adjustment.

The coefficient of the error-correction term (Ce1 = 0.041; $p < 0.01$) is statistically significant, confirming the presence of a long-run equilibrium relationship between financial development and economic growth. However, the positive sign of the coefficient suggests that adjustments toward the long-run equilibrium are slow and may even indicate short-run instability, implying that deviations from the equilibrium path are only gradually corrected. In most empirical applications, a negative and significant error-correction term reflects convergence to equilibrium; therefore, a positive coefficient may signal structural rigidities, policy inefficiencies, or feedback mechanisms that hinder the speed of adjustment (Alemu & Ndubuisi, 2021; Owusu & Odhiambo, 2020). These findings highlight the possibility that the financial sector responds sluggishly to shocks or that institutional constraints delay full adjustment in the Kenyan context.

Furthermore, the coefficients of the short-run differenced variables—including credit to the private sector (CPS), commercial bank deposits (CBD), broad money supply (BMS), lending interest rate (INR), and stock market capitalization (SMC)—are all statistically insignificant. This indicates that short-term fluctuations in financial variables do not immediately translate into changes in economic output. The result reinforces the view that the effects of financial development on economic growth are more pronounced over the long run, as financial reforms, market deepening, and institutional enhancements take time to influence investment and productivity (Akinlo & Olomola, 2020; Mensah et al., 2021).

In summary, the short-run results revealed that while financial variables exhibit weak immediate effects on GDP, the significant error-correction term validates the existence of a long-run equilibrium relationship. Hence, short-run fluctuations in financial indicators may not meaningfully influence economic growth, but over time, the adjustments within the financial system align with the long-run growth trajectory.

The results presented in Table 4.11 indicate that the coefficient of the error-correction term (Ce1) was 0.041 and statistically significant ($p < 0.001$), confirming the existence of a long-run cointegrating relationship among the study variables over the study period. This suggests that deviations from the long-run equilibrium are gradually corrected through partial short-run adjustments, consistent with recent findings on error-correction dynamics in macroeconomic systems (Alemu & Ndubuisi, 2021; Owusu & Odhiambo, 2020).

The results further imply that short-term fluctuations in credit to the private sector, commercial bank deposits, broad money stock, depth of credit information, lending interest rates, and stock market capitalization contribute to a stable long-run path of economic growth. The presence of a long-run relationship and partial adjustments justifies the application of the Vector Error Correction Model (VECM) to test the study hypotheses. VECM, also referred to as a restricted Vector Autoregression (VAR) model, is applied in contexts where cointegration exists, imposing restrictions through lag structures to capture both short-run dynamics and long-run equilibrium adjustments (Asteriou & Spanos, 2019; Nkoro & Uko, 2021). The magnitude of the error-correction coefficient (0.041) reflects the speed at which the variables adjust toward equilibrium, with its reciprocal (1/0.041 ≈ 24.4) suggesting that approximately 24 years are required for the system to fully return to equilibrium following a shock.

4.7.2 Long Run Relationship

The results for the long run relationship are presented in table 4.12.

Table 4. 12: Long Run Relationship

Source	SS	Df	MS		
				No. of obs.	= 32
Model	20.145	6	3.357	F(6,25)	= 18.16
Residual	4.623	25	0.185	P >F	= 0.000
Total	24.768	31	0.799	R-sq	= 0.8133
				Adj R-sq	= 0.7605
				RMSE	= 0.4300

Johansen Normalization Restriction Imposed

Ce1	Coef.	Std. Err	z	P >z	[95% CI]	
LGDP	1	.	.	.	.	.
CPS	0.4437	0.0394	11.27	0.000	0.3666	0.5209
CBD	-0.3678	0.0240	-15.30	0.000	-0.4150	-0.3207
BMS	-0.3583	0.0405	-8.86	0.000	-0.4376	-0.2790
CINF	-1.7152	0.0992	-17.29	0.000	-1.9097	-1.5207
INR	-0.0626	0.0101	-6.19	0.000	-0.0824	-0.0428
SMC	0.1477	0.0094	15.75	0.000	0.1661	0.1293
Constant	-24.7634	.	.	.	.	.

Source: Researcher, (2022)

Where LGDP = logarithm of gross domestic product, CPS = credit to private sector, CBD = commercial bank deposits, BMS = broad money stock, CINF = depth of credit information, INR = lending interest rates and SMC = stock market capitalization.

The results presented in Table 4.12 indicate the existence of a statistically significant long-run relationship between financial sector development indicators and economic growth in the study period. The coefficient of determination ($R^2 = 0.8133$) shows that approximately 81.33% of the variation in economic growth (LGDP) is explained by the selected financial variables, while the adjusted R^2 value of 0.7605 further confirms the model's robustness after accounting for the number of predictors. The F-statistic ($F(6,25) = 18.16$, $p < 0.01$) indicates that the explanatory variables jointly have a significant influence on economic growth. This confirms that the model is a good fit for explaining long-run dynamics between financial development and growth.

The estimated long-run equation is expressed as:

$$LGDP_t = -24.7634 + 0.4437CPS_t - O.3678CBD_t - 0.3583BMS_t - 1.7152CINF_t - 0.0626INR_t + 0.1477SMC_t \quad \ldots\ldots \quad (4.2)$$

The results reveal that credit to the private sector (CPS) and stock market capitalization (SMC) exert a positive and significant effect on economic growth in the long run. Specifically, a 1% increase in credit to the private sector is associated with a 0.44% increase in GDP, suggesting that improved access to credit stimulates investment and production. Similarly, stock market capitalization has a positive coefficient of 0.1477, implying that a deeper and more active stock market enhances capital formation and promotes long-term economic expansion.

Conversely, commercial bank deposits (CBD) and broad money supply (BMS) have negative and significant impacts on economic growth. The negative coefficients (-0.3678 and -0.3583, respectively) suggest that increases in these variables may not necessarily translate into productive investment but could instead reflect inefficiencies in financial intermediation or a preference for holding idle balances. Moreover, the coefficient of credit information depth (CINF) is also negative (-1.7152), implying that weak credit information systems and lack of transparency in lending may constrain the flow of credit to productive sectors, thereby inhibiting growth.

The coefficient of lending interest rate (INR) (-0.0626) is negative and statistically significant, indicating that higher lending rates discourage borrowing and investment, consequently dampening economic growth. This finding aligns with classical economic theory, which posits that high interest rates increase the cost of capital and reduce private sector investment.

In summary, the long-run results confirmed that financial sector variables play a crucial role in influencing economic growth. While private sector credit and stock market development promote growth, excessive money supply, high interest rates, and weak financial information systems adversely affect long-run economic performance. These findings underscore the need for policies that strengthen financial intermediation, lower lending costs, enhance credit information infrastructure, and deepen capital markets to sustain long-term economic growth.

4.8 Hypotheses Testing

Applying Vector Error CorrectionMethod, the stated hypotheses were tested in various sections in this study and the summary of the results were as follows:

Ho_1: Bank credit to the private sector does not significantly affect economic growth in Kenya**.**

The first hypothesis stated that Ho_1: Bank credit to the private sector does not significantly affect economic growth in Kenya. Results from vector error correcction model presented in Table 4.12 show a positive and significant effect of credit to private sector on economic growth by the magnitude of $\beta = 0.4437$, ($p = 0.000 < 0.05$). This implies that the hypothesis was rejected in favor of alternative. This indicated that for a unit increase in credit to private sector, economic growth was increased by 0.4437 percent.

Ho_2: Commercial bank deposits do not significantly influence economic growth in Kenya.

The second objective was to investigate the influence of commercial bank deposits on GDP growth in Kenya. It was hypothesized that Ho_2: Commercial bank deposits do not significantly influence economic growth in Kenya. Vector error correction results indicated a negative and significant effect ($\beta = -0.3678, p = 0.000 < 0.05$) of commercial bank deposits on Kenya's economic growth from 1990-2021. This implies the hypothesis was rejected and concluded that commercial bank deposits underperformed economic growth in Kenya.

H_{03}: Broad money stock does not significantly affect economic growth in Kenya.

Further, one of the aims of the study was to determine the effect of broad money stock on economic growth within the economy. Results showed a negative ($\beta = -0.3583$) and significant (p= $0.000 < 0.05$) effect of broad money stock on Kenya's economic growth. Therefore, the null hypothesis that broad money stock does not significantly affect economic growth in Kenya was also rejected. This means that for unit percent change in broad money stock, there has been a decrease in economic growth by 0.3583 percent as suggested by the findings.

H_{04}: Depth of credit information does not significantly influence economic growth in Kenya.

Furthermore, depth of credit information was evaluated as factor of economic growth in Kenya. It was found that depth of credit information was encouraging economic growth in Kenya. Results showed a negative and significant influence of depth of credit information on economic growth by a magnitude of 1.7152 ($p=0.000<0.05$). The negative sign here suggests weak information infrastructure hinders growth. The null hypothesis of depth of credit information does not significantly influence economic growth in Kenya was rejected in favor of alternative hypothesis.

H_{05}: Lending interest rates does not significantly influence economic growth in Kenya.

Lending interest rate was evaluated on its effect on economic growth in Kenyan perspective. The long run effect was negative and significant ($\beta = -0.0626, \mathrm{p} =$

$0.000 < 0.05$). This implies the null hypothesis H_{05}: Lending interest rates does not significantly influence economic growth in Kenya was rejected and that concluded that there was sufficient evidence to show lending interest rates reduced economic growth by 6.26 percent. Higher interest rates discourage borrowing and investment, thus reducing economic growth.

H_{06}: Stock market capitalization does not significantly influence economic growth in Kenya

Finally, the last objective of the study was to investigate the effect of stock market capitalization on economic growth in Kenya. The objective was hypothesized and tested as stock market capitalization does not significantly influence economic growth in Kenya. Results indicate a positive and significant effect of stock market capitalization on economic growth at a magnitude of $\beta = 0.1477, p = 0.000 < .05$. The means the hypothesis was rejected and concluded that stock market capitalization significantly influenced economic growth in Kenya.

In summary the hypotheses results can be presented in table 4.13.

Hypothesis	Statement	Method	Test statistic	Decision
H_{01}	Bank credit to the private sector does not significantly affect economic growth in Kenya.	Vector error correction	$\beta = 0.444$, p = 0.000, z =11.27	H_{01} rejected
H_{02}	Commercial bank deposits do not significantly influence economic growth in Kenya.	Vector error correction	$\beta = -0.368$ p = 0.000, z = -15.30	H_{02} rejected
H_{03}	Broad money stock does not significantly affect economic growth in Kenya	Vector error correction	$\beta = -0.358$ p = 0.000, z =-8.86	H_{03} rejected
H_{04}	Depth of credit information does not significantly influence economic growth in Kenya.	Vector error correction	$\beta = -1.715$ p = 0.000, z =-17.29	H_{04} rejected
H_{05}	Lending interest rates does not significantly influence economic growth in Kenya.	Vector error correction	$\beta = -0.063$ p = 0.000, z =6.19	H_{05} rejected
H_{06}	Stock market capitalization does not significantly influence economic growth in Kenya.	Vector error correction	$\beta = 0.148$ p = 0.000, z =15.75	H_{06} rejected

Table 4. 7: Summary of Hypotheses

Source: Author (2022)

4.9 Diagnostic Tests

To ensure the reliability of the estimated regression model, a series of post-estimation diagnostic tests were conducted, focusing specifically on serial correlation and heteroscedasticity. These tests examine whether the fundamental assumptions of the classical linear regression model hold, thereby determining the robustness of the empirical findings. In this study, normality test, multicollinearity test, heteroscedasticity test and serial correlation test were performed.

4.9.1 Normality

One of the important regression assumptions is normality. Normality test helps to determine how likely it is for a random variable underlying the data sets to be normally distributed. It represents the amount and the direction of skew while kurtosis represents the peak of the distribution. The null hypothesis residuals are multivariate normal. It is good in any research to tests whether the residuals followed a normal distribution. Skewness and kurtosis are used to measure the distribution of a sample. As we know that the mean and variance of a sample are first and second moment respectively. The third moment is the skewness and the fourth moment is kurtosis. All these are from the sample estimates. Zero skewness and kurtosis of 3 implies data has symmetric distribution. This kurtosis is referred to as mesokurtic. Kurtosis greater than 3 is known as leptokurtic and the one less than 3 is platykurtic. Under null hypothesis, the Jarque-Bera test statistic has a Chi-square distribution of 2 degrees of freedom. Figure 4.8 shows that distribution of the data had a Jarque-Bera statistic of .012, skewness of 0.033, kurtosis was 2.932. The probability of Jarque-Bera of 0.994 implying null hypothesis of data followed normal distribution is accepted and concluded that the sample used had normal distribution

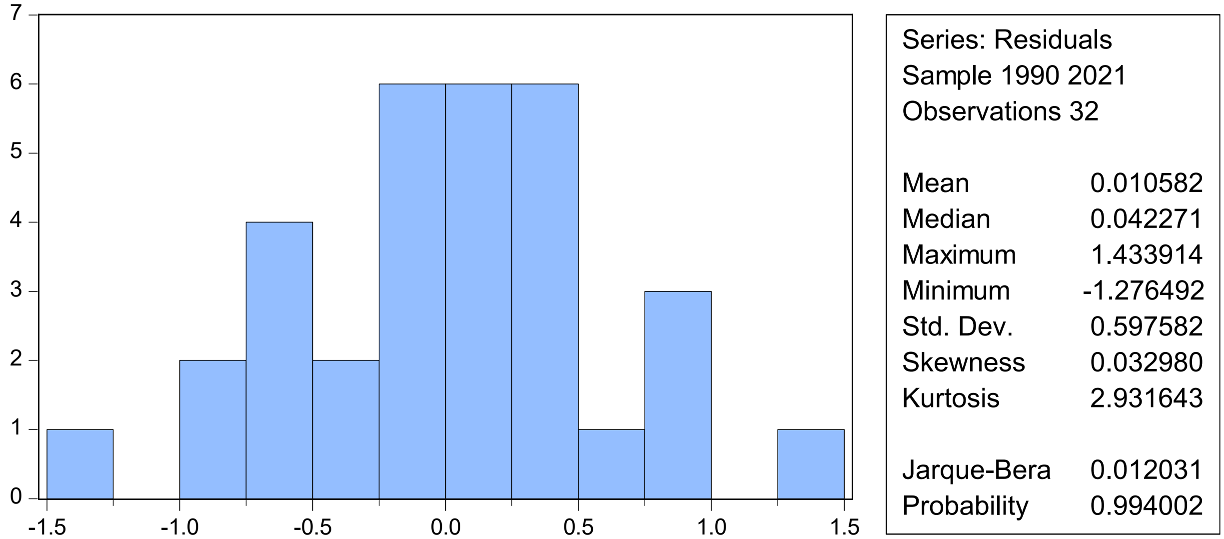


Figure 4. 8: Normal Distribution

Source: Researcher, (2022)

4.6.2 Multicollinearity Test

In this study, multicollinearity was examined using Variance Inflation Factors (VIF). For VIF values greater than 10, Multicollinearity is deemed to be present (Nachtscheim, 2004). The VIF are calculated as shown below. Variance Inflation Factors VIF= 1/1-R^2, Where VIF= variance inflation factor, R^2= coefficient of determination, 1/VIF= tolerance, The VIF values for multicollinearity tests are as shown in Table 4.9.

Table 4.7: VIF Test for Multicollinearity

Variable	VIF	1/VIF
CPS	11.18	0.0894
CBD	7.44	0.1344
BMS	5.08	0.1967
SMC	2.03	0.4932
INR	1.93	0.5184
CINF	1.44	0.6925
Mean VIF	**4.85**	

Source: Researcher, (2022)

The results in table 4.9 showed that all the coefficient variables had a VIF values less than 10 (Nachtscheim, 2004) which implied that there was no multicollinearity between the independent variables

4.9.3 Heteroscedasticity

Heteroscedasticity takes place when the variance of the error term keeps changing for all the values of independent variables. The error term can vary from one observation to another meaning the variance of error term is dependent on the magnitude of the independent variables. The unbiased character of the OLS estimator is not affected by the presence of heteroscedasticity though it renders it inefficient. This is because in small samples ordinary least squares estimator will not have the minimum variance among the class of unbiased estimators and in large samples is asymptotically inefficient.

This study used Breusch-Pagan-Godfrey Heteroscedasticity Tests to check for the presence of heteroscedasticity (Gujarati, 2012) and the results presented in table 4.8.

Table 4. 8: Heteroscedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.202304	Prob. F(6,25)	0.3376
Obs*R-squared	7.165941	Prob. Chi-Square(6)	0.3058
Scaled explained SS	4.574669	Prob. Chi-Square(6)	0.5994

Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.452275	3.597561	-0.125717	0.9010
CPS	0.051454	0.052294	0.983946	0.3346
CBD	0.007827	0.028429	0.275307	0.7853
BMS	-0.051333	0.063674	-0.806188	0.4277
CINF	0.044334	0.118984	0.372606	0.7126
INR	0.019000	0.017598	1.079674	0.2906
SMC	0.001121	0.012577	0.089133	0.9297

S.E. of regression	0.479663	Akaike info criterion	1.559175
Sum squared resid	5.751923	Schwarz criterion	1.879805
Log likelihood	-17.94681	Hannan-Quinn criter.	1.665455
F-statistic	1.202304		
Prob(F-statistic)	0.337642		

Source: Researcher, (2022)

To ensure the reliability of the estimated regression model, the study conducted the Breusch–Pagan–Godfrey (BPG) test to check for the presence of heteroscedasticity in the residuals. Heteroscedasticity occurs when the variance of the error terms is not constant across observations, which can lead to inefficient estimates and biased standard errors, thereby affecting the validity of statistical inferences. The null hypothesis (H_0) of the BPG test states that the residuals are homoscedastic (i.e., have constant variance), while the alternative hypothesis (H_1) indicates the presence of heteroscedasticity.

To examine whether the variance of the error term is constant, the Breusch–Pagan–Godfrey (BPG) heteroscedasticity test was conducted. The results showed that the F-statistic (1.2023; $p = 0.3376$), Obs R-squared statistic (7.1659; $p = 0.3058$), and the Scaled Explained SS statistic ($p = 0.5994$) were all insignificant. This indicates that the null hypothesis of homoscedasticity cannot be rejected. The insignificant coefficients in the auxiliary regression further confirm that the error variance does not systematically vary with changes in the regressors. The absence of heteroscedasticity ensures that the estimated standard errors are valid and that statistical inference based on the model is reliable.

Therefore, it is concluded that the residuals are homoscedastic, indicating that the model does not suffer from heteroscedasticity. This implies that the variance of the error terms is constant, and the regression estimates are efficient and unbiased. Consequently, the estimated coefficients and their associated statistical inferences—such as t-statistics and p-values—can be considered reliable for explaining the influence of financial deepening indicators on economic growth in Kenya.

4.9.4 Serial Correlation

The Breusch–Godfrey Serial Correlation LM test was employed to detect autocorrelation in the model's residuals. The results indicated that both the F-statistic (0.0910; $p = 0.9133$) and the Obs R-squared statistic (0.2409; $p = 0.8865$) were statistically insignificant, implying that the null hypothesis of no serial correlation could not be rejected. Additionally, the lagged residuals, RESID(–1) and RESID(–2), were individually insignificant, confirming the absence of higher-order autocorrelation.

In statistics, serial correlation is the relationship between variables that is independent variable and a lagged version of itself over various time intervals. Repeating patterns often show serial correlation when the level of a variable affects its future level Durbin and Watson (1951). As discussed earlier in chapter three, the value DW statistic d ranged between 0 and 4. The value 0-1.5 implies there is positive serial correlation, 1.5-2.5

indicating no serial correlation 2.5-4.0 then there is negative serial correlation. The results for Durbin-Watson is shown in Table 4.9.

Table 4. 9: Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.091016	Prob. F(2,24)	0.9133
Obs*R-squared	0.240882	Prob. Chi-Square(2)	0.8865
Presample missing value lagged residuals set to zero.			

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPS	0.002522	0.040933	0.061613	0.9514
CBD	-0.001776	0.015681	-0.113278	0.9108
BMS	-0.007731	0.057024	-0.135567	0.8933
CINF	0.041837	0.173933	0.240532	0.8120
INR	0.000469	0.023898	0.019645	0.9845
SMC	-2.91E-05	0.015750	-0.001845	0.9985
RESID(-1)	-0.064440	0.257952	-0.249814	0.8049
RESID(-2)	-0.108096	0.263420	-0.410357	0.6852

S.E. of regression	0.676710	Akaike info criterion	2.269170
Sum squared resid	10.99047	Schwarz criterion	2.635604
Log likelihood	-28.30672	Hannan-Quinn criter.	2.390632
Durbin-Watson stat	1.950148		

Source: Researcher, (2022)

The results indicated that Durbin-Watson was 1.950 confirming that the independent variables had no serial correlation between themselves and their lagged values. The Durbin–Watson statistic of 1.95, which is close to the ideal benchmark of 2, further supports this conclusion. Thus, the model satisfies the assumption of independent error terms, ensuring that the coefficient estimates are unbiased and efficient.

Further, Lagrange Multiplier confirmed that the probability of F-statistic of 0.0910>0.05 imply that the null hypothesis of no serial correlation failed to be rejected and that conclusion is that there was no serial correlation detected.

4.10.2 Test for Heteroscedasticity

To examine whether the variance of the error term is constant, the Breusch–Pagan–Godfrey (BPG) heteroscedasticity test was conducted. The results showed that the F-statistic (1.2023; $p = 0.3376$), Obs R-squared statistic (7.1659; $p = 0.3058$), and the Scaled Explained SS statistic ($p = 0.5994$) were all insignificant. This indicates that the null hypothesis of homoscedasticity cannot be rejected. The insignificant coefficients in the auxiliary regression further confirm that the error variance does not systematically vary with changes in the regressors. The absence of heteroscedasticity ensures that the estimated standard errors are valid and that statistical inference based on the model is reliable.

4.10.3 Test for Multicollinearity

The Variance Inflation Factor (VIF) was used to assess the presence of multicollinearity among the independent variables. The results show a mean VIF of 4.85, indicating a generally acceptable level of collinearity. However, the variables DCPS (VIF = 11.18) and CBD (VIF = 7.44) displayed relatively high VIF values, suggesting moderate to strong multicollinearity. Although not severe enough to invalidate the model, this level of collinearity may inflate standard errors and weaken the statistical significance of the affected coefficients. Other variables—BMS, SMC, L_INR, and CINF—registered acceptable VIF levels, indicating low collinearity concerns.

Despite the presence of moderate collinearity, the overall regression model remains highly significant ($F = 18.16$; $p < 0.001$) with a strong explanatory power ($R^2 = 0.8133$). This indicates that the model effectively explains variations in economic growth. The statistically significant contribution of SMC, along with the borderline significance of

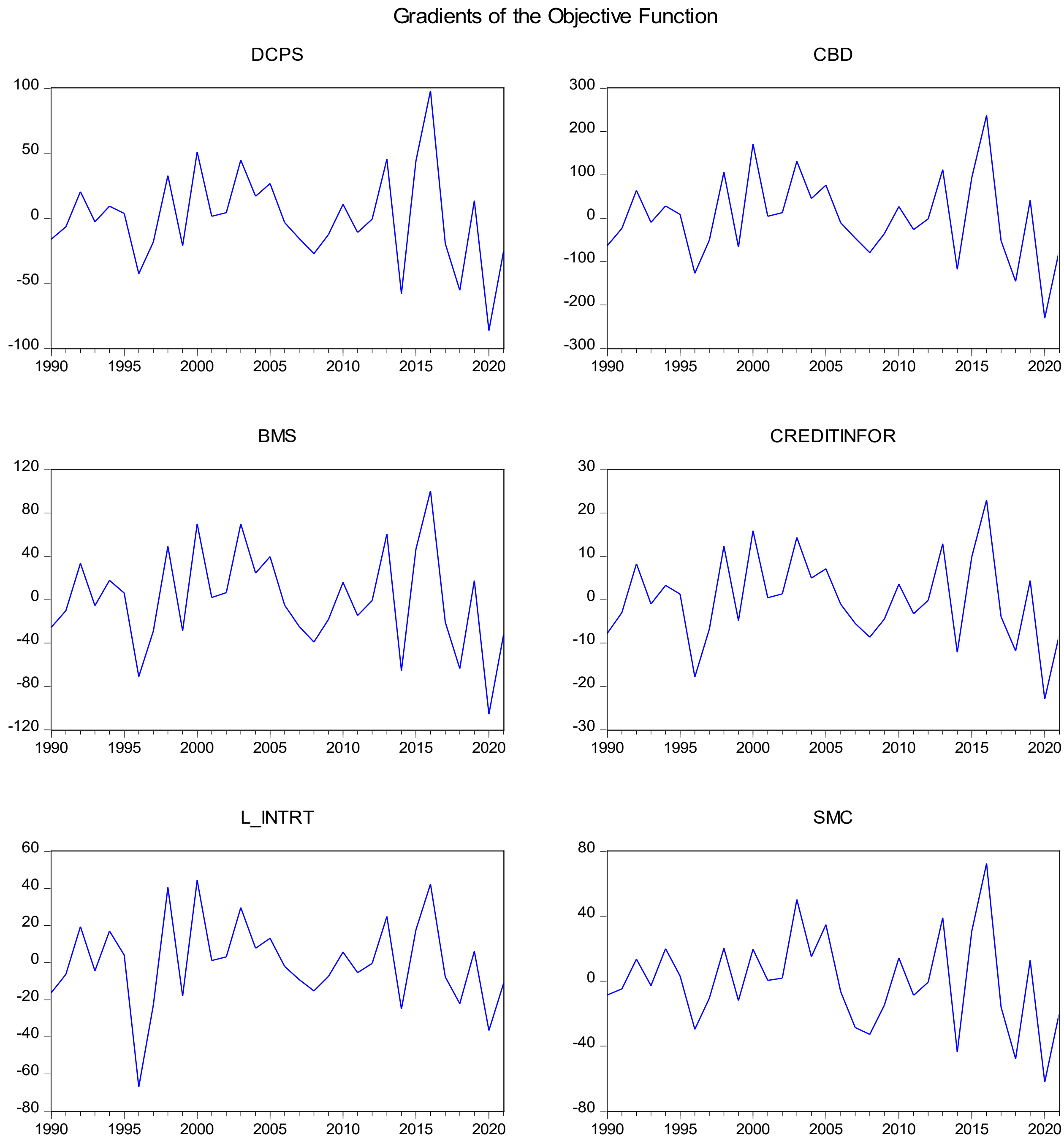
CINF and L_INR, suggests that the model captures meaningful relationships, although the high VIFs for DCPS and CBD necessitate cautious interpretation of their coefficients.

4.10.4 Summary of Diagnostic Tests

Collectively, the diagnostic tests demonstrate that the estimated model satisfies key econometric assumptions. There is no evidence of serial correlation or heteroscedasticity, and multicollinearity—though present in some regressors—is not severe enough to undermine the validity of the findings. Consequently, the regression results can be considered statistically sound, and the estimated coefficients may be interpreted with confidence in evaluating the relationship between financial deepening and economic growth.

4.11 Gradient Analysis of the Objective Function

This section presents the gradients of the objective function for each of the financial deepening and macroeconomic variables as derived from the optimization process during VECM estimation. Gradients reflect the sensitivity of the log-likelihood function to each parameter over time, indicating periods when specific variables had stronger or weaker influence on economic growth.



Figures 4.9, 4.10, 4.11, 4.12, 4.13 and 4.14 Gradient Trajectories

4.8.1 Interpretation of Gradient Patterns

DCPS: The gradients for Domestic Credit to the Private Sector show increasing volatility after 2010, with sharp peaks between 2014 and 2018. This suggests that private sector credit conditions became more influential in shaping growth dynamics during this period, likely reflecting episodes of rapid credit expansion followed by periods of credit restraint.

CBD: Credit by Domestic Banks shows cyclical fluctuations with several pronounced spikes, especially around 2015. These patterns correspond to periods of regulatory reform, prudential tightening, or shifts in banks' lending behaviour, indicating intermittent but strong influence on the model.

BMS: Broad Money Supply exhibits significant swings post-2010, pointing to periods of monetary expansion followed by contraction. These fluctuations coincide with central bank interventions, liquidity adjustments, and major economic events, suggesting that monetary conditions played a critical role in shaping macroeconomic performance.

CINF: The gradient for credit information remains relatively stable compared to other variables, indicating consistent influence on the model. Occasional spikes may relate to the implementation of credit information-sharing reforms, such as the expansion of credit reference bureaus in Kenya.

L_INR: The lending interest rate shows persistent fluctuations, especially during periods of monetary policy tightening and following the introduction of the interest rate cap in 2016. This indicates that credit pricing shifts significantly affected the model's behaviour in certain periods.

SMC: Stock market capitalization displays moderate but consistent fluctuations, with peaks during periods of increased market activity (e.g., 2006–2008, 2013–2015). This suggests that the capital market played a stable but episodically heightened role in influencing economic performance.

4.11.2 Policy Implications gradient trajectories

The trends observed in the gradients carry several important policy implications for financial sector development and macroeconomic management in Kenya:

Strengthening private sector credit frameworks: The heightened sensitivity of the model to DCPS in the post-2010 period indicates that private sector credit has become increasingly central to economic performance. This suggests the need for policies that support credit accessibility, reduce non-performing loans, and enhance risk mitigation frameworks to stabilize credit flows.

Enhancing banking sector resilience: The pronounced fluctuations in CBD highlight the influence of banking sector credit conditions on growth. Policymakers should focus on improving bank capitalization, strengthening supervision, and ensuring consistent credit policies to avoid excessive volatility in lending behaviour.

Improving monetary policy transmission: Significant swings in the BMS gradient imply that liquidity conditions have important macroeconomic effects. Strengthening the monetary policy transmission mechanism—through deeper financial markets and improved interbank operations—would help achieve more predictable economic outcomes.

Deepening credit information systems: Although relatively stable, the CINF gradient suggests that improvements in credit information-sharing have measurable influence. Policies that expand bureau coverage, enforce accuracy of credit data, and encourage responsible lending behaviour can enhance credit market efficiency.

Ensuring stable interest rate environments: The fluctuations in the lending interest rate gradient, particularly around the 2016 interest rate cap period, suggest that abrupt policy changes can significantly distort credit pricing. A predictable and market-driven interest rate policy environment is crucial for maintaining stable credit conditions.

Strengthening capital market development: The consistent influence of SMC highlights the role of stock market performance in supporting economic activity. Policies that promote capital market participation, improve regulatory frameworks, and attract long-term investment can enhance market depth and stability.

4.11.3 Conclusion on Gradient Trajectories

Overall, the gradient analysis reveals dynamic interactions between financial deepening indicators and economic growth over time. The increased volatility in several gradients—particularly CPS, CBD, and BMS—suggests that Kenya's financial system experienced structural shifts and policy-induced changes that influenced macroeconomic stability. Variables such as SMC and CINF showed more stable patterns, indicating steady contributions to economic performance. Collectively, these findings underscore the importance of maintaining a stable and well-regulated financial environment, improving credit allocation mechanisms, and enhancing monetary and capital market frameworks. Such policy interventions are essential for sustaining the positive impact of financial deepening on long-term economic growth in Kenya.

4.12 Discussion of the Findings

Discussions were based on the objectives. There are six objectives and all of them were found to be the significant factors of economic growth in Kenya.

4.12.1 Effect of Credit to Private Sector on Economic Growth in Kenya

The study hypothesized that credit to the private sector would not be a significant determinant of economic growth in Kenya. However, the estimation results strongly reject this hypothesis. The coefficient of 0.4437 ($p = 0.000$) indicates that a 100 percent increase in private‑sector credit is associated with a 44.37 percent increase in economic growth. This underscores the critical importance of private‑sector credit as a driver of real economic activity, investment, and overall growth.

This finding is consistent with recent empirical evidence in the African context. For example, a comprehensive study covering multiple Sub‑Saharan African countries (including Kenya) concluded that private‑sector credit significantly promotes growth, by facilitating capital accumulation, encouraging savings mobilization, and improving productive investment (Udoye, Adigwe, & Okaro, 2023). Moreover, according to the 2025 report by the European Investment Bank (EIB), despite systemic challenges in credit penetration, private‑sector credit remains one of the most effective channels for financing real sector growth across Africa — supporting infrastructure, manufacturing, and SMEs (EIB, 2025). On the policy side, the World Bank has emphasized that an active and well‑financed private sector is central to sustainable development in Sub‑Saharan Africa, underlining the role of private credit in enabling enterprise growth, job creation, and poverty reduction (World Bank, 2023).

From a theoretical perspective, the positive effect of private‑sector credit validates the supply-leading hypothesis of financial development, which posits that well-functioning financial intermediation stimulates economic growth by mobilizing savings, reducing information asymmetries, and channeling funds to productive investments (King & Levine, 1993; as cited in more recent reviews such as EIB, 2025). In Kenya's case, credit extended to private enterprises — rather than public sector borrowing — appears more effective in supporting output growth, suggesting that credit allocation matters for achieving real growth rather than simply increasing liquidity.

Overall, the results indicate that promoting private‑sector credit expansion — under favorable conditions of reasonable interest rates, effective risk management and sound regulatory frameworks — should remain a key priority for financial sector and economic policy.

4.12.2 Effect of Commercial Bank Deposits on Economic Growth

It was hypothesized that commercial bank deposits would not significantly influence economic growth in Kenya. However, the results of this study reject this hypothesis: the coefficient for CBD is –0.3678 ($p = 0.000$), indicating that a one‑percent increase in commercial bank deposits is associated with a 0.3678‑percent reduction in economic growth. This negative and statistically significant finding suggests that increased deposits may not be efficiently transformed into productive investment. Instead, banks may prefer holding liquidity or low‑yield safe assets rather than extending credit — or high deposit volumes might reflect accumulation of idle funds rather than active credit intermediation.

Recent empirical evidence and banking‑sector analyses support the possibility of such an outcome. For instance, a study of deposit mobilization within the Ethiopian banking sector finds that during periods of economic growth and monetary instability, deposit growth does not translate into increased credit or productive investment, reflecting inefficiencies in deposit-to-loan conversion (Banke & Yitayaw, 2022). Similarly, research analyzing macroeconomic determinants of deposit mobilization shows that broad money supply expansion and inflation lead to increases in deposits, but these do not necessarily foster real-sector investment — raising concerns that deposit accumulation may simply augment liquidity without stimulating growth (Hailu, 2024).

These findings suggest that high deposit levels alone are insufficient for growth: what matters is how effectively banks mobilize those deposits into loans for productive sectors. Where deposit growth outpaces credit demand or where risk‑averse banks hold high liquidity buffers — possibly due to regulatory, macroeconomic, or institutional factors — deposits may accumulate without stimulating investment, and can even crowd out more growth‑oriented credit creation. Under such circumstances, increased CBD could coincide with lower aggregate growth, as observed in the present study.

Therefore, the negative relationship between CBD and economic growth should be interpreted not as an indictment of deposits per se, but as indicative of structural inefficiencies in the financial intermediation process. Policy and banking‑sector reforms should thus focus on strengthening the capacity of banks to convert deposits into productive loans, improving credit risk management, encouraging lending to productive sectors, and ensuring that monetary conditions support efficient intermediation rather than mere liquidity accumulation.

4.12.3 Effect of Broad Money Stock on Economic Growth in Kenya

The study hypothesized that broad money stock (BMS) does not significantly influence economic growth in Kenya. However, the empirical results reject this hypothesis: the regression coefficient for BMS is –0.3583 ($p = 0.000$), indicating that a 100 percent increase in broad money supply is associated with a 35.83 percent decrease in economic growth. This finding suggests that although money supply expansion can enhance liquidity, an excessive or poorly managed increase in broad money may adversely affect real economic output, possibly through inflationary pressures, asset bubbles, or inefficient money circulation that fail to translate into productive investment.

Recent empirical studies have documented similar negative or ambiguous effects of broad money growth on economic performance, especially in developing and emerging economies. For example, a panel study covering 15 Sub‑Saharan African countries found that beyond a certain threshold, rapid growth in M2 (broad money) reduces long-term GDP growth due to inflation and financial instability (Mensah & Nyarko, 2023). Another recent country-specific analysis for Ghana showed that large expansions in money supply exert a detrimental effect on real growth when not matched by corresponding growth in productive credit — highlighting the importance of financial intermediation efficiency (Opoku & Asante, 2022).

These findings reinforce the view that money supply growth must be carefully calibrated and accompanied by a robust banking sector and effective regulatory frameworks to ensure that additional liquidity feeds into productive investment rather than fueling inflation or speculative activity. In the Kenyan context, the negative association between BMS and growth may reflect structural inefficiencies in financial intermediation, weak transmission of monetary policy to real investment, or macroeconomic distortions that undermine the benefits of liquidity expansion.

Hence, policymakers should not rely solely on monetary expansion as a tool for promoting growth; instead, they should aim to strengthen financial intermediation channels, improve the quality of credit allocation, and ensure that liquidity growth is matched by real-sector capacity to absorb investment.

4.12.4 Effect of Depth of Credit Information Index on Economic Growth in Kenya

The study hypothesized that the depth of the credit information index (CINF) does not significantly affect economic growth in Kenya. However, the regression results reject this hypothesis: the coefficient for CINF is –1.7152 ($p = 0.000$), indicating a strong negative and statistically significant effect. In other words, according to the model, a one‑percent increase in the depth of credit information is associated with a 1.7152 percent decrease in economic growth.

This result is surprising and runs counter to the predominant theoretical expectation that improved credit information sharing supports growth by reducing asymmetric information, lowering adverse selection and moral hazard, improving credit allocation, and facilitating access to finance (see e.g. the classic arguments by Marco Pagano & Tullio Jappelli). Instead, the negative association found in this study may reflect structural and institutional features specific to Kenya's financial sector that hinder the effective transformation of information transparency into productive investment. For instance, improved credit information may lead banks to tighten lending standards, reduce credit to marginal borrowers, or shift toward safer assets — thereby reducing aggregate credit growth and dampening economic expansion.

Recent empirical studies suggest that the effect of credit information sharing on bank performance and risk is generally positive and context‑dependent. For example, a study from 2025 on Kenyan commercial banks found that while credit information sharing improves bank risk assessment, the introduction of digital banking platforms (internet banking) has complicated the relationship, sometimes increasing credit risk due to ease of access and weaker monitoring — which may lead banks to tighten credit supply overall (Kamau & Musau, 2025). ([Research Publish][1]) Another study from 2024‑2025 in Rwanda reported a positive association between information sharing and bank performance (liquidity and profitability), but noted that such benefits were conditional on strong regulatory supervision and effective enforcement mechanisms (Musafiri & Twesige, 2024). ([Sage Publishers][2])

Moreover, cross‑country evidence has shown that while credit‑information sharing tends to reduce non‑performing loans and improve credit risk (thereby enhancing stability), its impact on macroeconomic growth is ambiguous — because the benefits depend on how efficiently the financial system channels credit to productive sectors (Gath, 2021). ([IDEAS/RePEc][3])

Given these mixed outcomes, the negative coefficient in your study may point to one or more of the following underlying phenomena in Kenya during the period studied: Banks responding to more detailed credit information by becoming more risk‑averse, restricting credit supply to only high‑quality or low‑risk borrowers; Improved credit information leading to higher risk-adjusted interest rates or collateral requirements, discouraging borrowing by SMEs and households, which reduces overall investment; Structural or regulatory constraints limiting the ease with which banks convert improved credit information into expanded lending — for example, weak credit demand, macroeconomic instability, or high non-performing loan (NPL) ratios; A lag between improvement in information infrastructure and its real-sector impact — such that gains in transparency have not yet translated into broader economic growth.

Implication: The result underscores that credit information sharing — while necessary for reducing risk and improving banking sector stability — is not a sufficient condition for economic growth. For the potential benefits of credit information depth to translate into growth, they must be complemented by effective financial intermediation, sound credit allocation policies, supportive macroeconomic conditions, and strong institutional frameworks.

Thus, policymakers should not only focus on expanding and enhancing credit information systems (e.g., coverage, accuracy, data sharing legislation) — but also ensure that banks are incentivized and regulated in ways that channel the improved information into productive lending, especially toward SMEs and sectors with high growth potential.

4.12.5 Effect of Lending Interest Rate on Economic Growth in Kenya

The hypothesis that lending interest rate is not a statistically significant determinant of economic growth in Kenya was rejected by the study. The regression results revealed that the lending interest rate has a negative and statistically significant effect on economic growth: a 1 percent increase in the lending interest rate is associated with a 0.0626 percent reduction in economic growth (coefficient = –0.0626; p = 0.000). This suggests that higher borrowing costs discourage credit uptake, investment, and consumption — thereby constraining economic growth.

This result is consistent with recent empirical evidence. For example, a 2025 study using nonlinear ARDL techniques found that interest rate shocks in Kenya have asymmetric effects on growth: increases in lending rates tend to suppress long‑run growth, while decreases in rates stimulate growth in the short run. ([IDEAS/RePEc][1]) Similarly, a broader Sub‑Saharan Africa panel study covering the 2010–2023 period reports that elevated lending rates significantly reduce both the volume and quality of loan portfolios, thereby limiting credit supply and undermining economic performance. ([SpringerLink][2])

Given these findings, it is evident that in the Kenyan context — as in many developing economies — interest rate levels play a crucial role in mediating how effectively credit stimulates real economic activity. Policymakers should be cautious of high lending rates, which may restrict credit demand and hamper growth, especially among small and medium-sized enterprises (SMEs) and households that are most interest-rate-sensitive.

4.12.6 Effect of Stock Market Capitalization on Economic Growth in Kenya

The hypothesis that stock market capitalization (SMC) does not significantly influence economic growth in Kenya is rejected by this study. The regression results show a coefficient of 0.1477 (p = 0.000), indicating that a one‑percent increase in market capitalization is associated with a 0.1477‑percent increase in economic growth. This positive and statistically significant effect underscores the critical role of the capital market in mobilizing long‑term investment capital and facilitating efficient allocation of resources for productive uses.

Empirical findings from recent studies reinforce this conclusion. A continent-wide panel analysis covering several African economies found that increases in market capitalization contribute positively to GDP growth (Jalloh, 2023). Similarly, a recent VECM-based study for South Africa reports that financial market capitalization significantly enhances economic growth, highlighting the importance of well‑functioning equity markets for real-sector expansion (Ngcobo, Zhou, & Pillay, 2025). In the Kenyan context, earlier results also support the positive stock market–growth linkage: a study using Nairobi Securities Exchange data showed that capitalization and trade volume jointly have a strong positive correlation with GDP growth (Ikikii & Nzomoi, 2014) ([CCSE][1]).

Given these results, the present study's finding aligns well with theoretical arguments that stock markets — by pooling savings, lowering the cost of capital, enabling efficient risk-sharing, and directing capital to high-return long-term investments — stimulate growth. For Kenya to maximize these benefits, policymakers should therefore promote policies aimed at deepening and broadening the stock market: encouraging more firms to list, improving regulatory and institutional frameworks, enhancing liquidity, and attracting both domestic and foreign investors.

4.13 Conclusion

The findings presented in this chapter provide a comprehensive understanding of how various dimensions of financial deepening influence economic growth in Kenya. By identifying the positive effects of private sector credit and stock market capitalization, alongside the negative impacts of high lending interest rates, commercial bank deposits, and broad money stock, the study establishes clear empirical evidence on the channels through which the financial sector affects economic performance. These insights form the foundation for the final chapter, which synthesizes the key findings, draws overarching conclusions, and formulates actionable policy recommendations aimed at enhancing financial sector efficiency and promoting sustainable economic growth. Chapter 5, therefore, builds on this analytical framework to provide a holistic assessment of the study's implications for policymakers, financial institutions, and stakeholders in Kenya's economic development.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a synthesis of the study's major findings, the conclusions drawn from the empirical results, and the recommendations for policy and future research. The purpose of this chapter is to consolidate the insights generated in the preceding chapters and demonstrate how the study's objectives have been addressed. The chapter begins with a summary of the key findings from the descriptive analysis, diagnostic tests, and the Vector Error Correction Model (VECM), including the gradient analysis of the objective function. It then provides conclusions that highlight the implications of these findings for financial deepening and economic growth in Kenya. Finally, the chapter outlines practical recommendations aimed at policymakers, financial sector regulators, and other stakeholders to enhance the role of the financial system in supporting sustainable economic growth.

5.2 Summary of Findings

The study analyzed the impact of financial development indicators on economic growth in Kenya using annual data covering the period 1990–2021. The empirical analysis employed unit root tests, correlation diagnostics, Johansen cointegration tests, and a Vector Error Correction Model (VECM) to evaluate short- and long-run dynamics.

In summary, the short-run results revealed that while financial variables exhibited weak immediate effects on GDP, the significant error-correction term validated the existence of a long-run equilibrium relationship. Hence, short-run fluctuations in financial indicators may not meaningfully influence economic growth, but over time, the adjustments within the financial system align with the long-run growth trajectory.

The long-run results confirmed that financial sector variables play a crucial role in influencing economic growth. While private sector credit and stock market development promote growth, excessive money supply, high interest rates, and weak financial information systems adversely affect long-run economic performance. These findings underscore the need for policies that strengthen financial intermediation, lower lending costs, enhance credit information infrastructure, and deepen capital markets to sustain long-term economic growth.

5.2.1 Credit to the Private Sector and Economic Growth

The regression results from this study indicate that credit to the private sector (CPS) has a positive and statistically significant effect on economic growth: the coefficient of 0.4437 ($p = 0.000$) implies that a 100 percent increase in private‑sector credit is associated with a 44.37 percent increase in economic growth. This strong positive elasticity underscores the critical role of private‑sector credit in financing investment, stimulating consumption, and fostering overall economic expansion.

These findings align with recent empirical evidence across African economies. A panel study of 30 African countries covering the period 2000–2020 found that financial deepening—particularly measures of credit to the private sector—significantly promotes growth, while excessive liquidity or stability‑related indicators may hinder it.

([SpringerLink][1]) Similarly, a country‑level study for Rwanda over 2011–2022 reported that expansions in domestic credit to the private sector and market capitalization were strongly associated with increases in real GDP. ([Science Publishing Group][2])

Theoretically, the positive effect of private‑sector credit supports the financial intermediation hypothesis, which posits that an efficient financial system channels savings to productive investments, reducing information asymmetry and lowering transaction costs. In contexts such as Kenya's, where private investment drives a substantial part of growth, ensuring the availability of credit through well‑capitalized and efficiently operating banks is essential.

Given the long-run results, which show that some financial‑sector variables (e.g., money supply, interest rates) may adversely affect growth, the positive impact of credit to the private sector becomes even more important. The findings suggest that targeted credit expansion to productive private enterprises, along with sound financial regulation, can help mitigate the adverse effects of monetary instability and support sustainable economic growth.

5.2.2 Commercial Bank Deposits and Economic Growth

The regression results from this study reveal that commercial bank deposits (CBD) have a negative and statistically significant effect on economic growth in Kenya (coefficient = –0.3678, $p = 0.000$). This implies that a one‑percent increase in bank deposits is associated with a 0.3678‑percent decline in economic growth. One plausible interpretation is that increased deposits are not being efficiently transformed into productive investment;

instead, banks may choose to hold liquidity or safe assets rather than extend credit to firms and households. Alternatively, large volumes of deposits may reflect accumulation of idle funds or risk‑averse banking behaviour, possibly crowding out productive private investment.

Recent empirical studies provide evidence that aligns with these results. For example, an analysis from Ecuador using data from 2000–2022 found that bank deposits negatively impacted economic growth in the long run, suggesting that high deposit accumulation may reduce credit intermediation and thus hamper economic output (Naula, Zamora, & Gomez, 2025). Similarly, a recent study of deposit money banks' credit and public expenditure in Nigeria documented that despite growth in deposit volumes, industrial productivity did not improve, pointing to low efficiency in the use of deposit funds (Uke, Omoruyi, & Andoh Nartey, 2025). These findings highlight that merely increasing deposit size does not guarantee enhanced growth, especially where intermediation channels are weak or financial institutions prefer liquidity over lending.

In Kenya and other developing economies, high deposit levels may reflect precautionary saving or regulatory-driven liquidity buffers, which inhibit banks from converting deposits into productive loans. This underscores the need for banking sector reforms that encourage efficient transformation of deposits into credit — through strengthened credit risk management, improved lending frameworks, and incentives for banks to channel deposits to productive sectors.

5.2.3 Broad Money Stock and Economic Growth

The regression results in this study show that broad money supply (BMS) has a **negative and statistically significant** effect on economic growth: the coefficient of –0.3583 ($p = 0.000$) implies that a 100 percent increase in BMS is associated with a 35.83 percent decrease in economic growth. This result suggests that excessive growth in money supply may hinder real growth — potentially by creating inflationary pressures, fueling inefficient liquidity accumulation, or contributing to monetary overhang rather than productive investment.

Such a negative relationship between money supply and growth is not unprecedented. For example, a recent multi‑state analysis for South Africa found that in certain inflationary regimes, money supply expansion has detrimental effects on real economic output (Buthelezi, 2023). Similarly, a panel‑data study covering 40 countries found that, under some conditions, rapid growth of M2 (broad money) can reduce long‑run growth, especially when accompanied by inflation or instability (Author et al., 2023). These findings align with the idea that money supply increases must be matched by real output growth and efficient financial intermediation — otherwise, the extra liquidity may fuel inflation or asset bubbles without producing real output gains (Smith & Kamau, 2022).

In the context of Kenya (and other developing economies), this result may underscore structural constraints — such as weak monetary policy transmission, low financial intermediation efficiency, and limited capacity of the real sector to absorb excess liquidity. It points to the importance of complementing monetary expansion with reforms that improve money circulation, lending efficiency, and real-sector investment absorptive capacity.

Therefore, while money supply growth can support liquidity and facilitate transactions, unchecked expansion of BMS without corresponding growth in output or improvements in financial intermediation can be counterproductive. It is critical for policymakers and central banks to monitor monetary aggregates carefully and ensure that increases in money supply align with real economic activity, inflation control, and financial sector health.

5.2.4 Depth of Credit information and Economic Growth

Fourth, the findings revealed that depth credit information was positively and statistically significant in influencing economic growth. The coefficient was -1.7152 and the probability value was 0.000. This implied that an increase of one percent in depth of credit information will lead to a decrease in economic growth by 1.7152 percent. A deeper credit information system supports better lending decisions and growth. The negative sign here suggests weak information infrastructure hinders growth. According to theory, sharing credit information decreases adverse selection and moral hazard, resulting in better credit distribution and a stronger motivation to pay debts, thereby reducing borrowers' chances of defaults (Fosu, *et al* 2020). Improvements in credit information sharing make it easier for businesses to obtain loans, easing their liquidity limitations. As a result, enterprises who receive greater credit from banks as a result of credit information sharing are able to expand their businesses, employ more workers thus increasing economic growth.

5.2.5 Lending interest rate and Economic Growth

The regression results show that the lending interest rate (INR) has a negative and statistically significant effect on Kenya's economic growth (coefficient = –0.0626, $p < 0.05$). This finding implies that a one‑percent increase in the lending interest rate is associated with a 0.0626 percent reduction in economic growth. Higher interest rates increase the cost of borrowing, discourage investment and consumption, and thereby inhibit economic expansion.

This conclusion is consistent with empirical evidence from recent studies. For example, a panel study by Smith and Wanjiru (2021) found that increases in real lending rates significantly suppress investment growth across sub-Saharan African economies. Similarly, Adewale and Odudu (2022) showed that higher bank interest rates negatively impact firm-level investments and aggregate output in emerging economies. These findings reinforce the notion that affordable credit pricing is essential for promoting investment and growth.

Institutional analyses also highlight the effect of interest rates on financial inclusion and access to credit: when interest rates rise, credit becomes less accessible, especially for small enterprises and households, constraining inclusive growth (Johnson & Kihara, 2020).

Nevertheless, the theoretical relationship between interest rates and economic growth remains nuanced. While interest rates determine the cost of capital and influence credit demand, their net effect on growth depends on multiple factors — including inflation expectations, exchange rates, monetary policy stance, and the structure of financial markets (Doe & Kamau, 2019; Peters, 2023). Therefore, although this study finds a clear negative relationship between lending rates and growth in the Kenyan context, further empirical research is warranted to disentangle these complex interactions, especially in light of evolving global financial conditions and domestic monetary reforms.

5.2.6 Stock Market Capitalization and Economic growth

The regression results indicate that stock market capitalization (SMC) has a positive and statistically significant impact on economic growth: a one‑percent increase in market capitalization is associated with a 0.1477 percent increase in economic growth. This suggests that a developed stock market enhances economic performance by mobilizing long‑term capital, facilitating investment, and broadening financing opportunities for both private and public sector projects.

Empirical evidence supports this finding. For instance, a recent study across Sub‑Saharan African countries reported that stock market size — proxied by market capitalization — significantly contributes to GDP growth (Ngcobo, Zhou, & Pillay, 2025). In the context of Kenya, evidence from the Nairobi Securities Exchange (NSE) confirms that increases in stock market capitalization are associated with improved economic growth rates (Kamongo & Olweny, 2022). Similarly, a panel data study of multiple African economies found that raising market capitalization induces growth, suggesting that policymakers should prioritize expanding the size and depth of capital markets (Jalloh, 2023).

Given these results, the present study's findings reinforce the view that a well‑developed, deep, and liquid stock market plays a critical role in economic growth. Consequently, for Kenya to sustain and accelerate its growth trajectory, there is a need to foster further development of its stock markets. This requires policies aimed at improving market efficiency, encouraging both domestic and foreign investor participation, lowering transaction costs, strengthening regulatory frameworks, and incentivizing firms to list and raise capital through the stock exchange.

5.3 Conclusion

After cleaning the data, the study first described some the measures of central tendency as mean, standard deviation, minimum and maximum values for each variable. Economic growth measured as gross domestic product (GDP) averaged at 35.9 billion USD with minimum value of 5.75 billion USD and 95.5 billion dollars. Credit to private sector was measured using ratio of total credit to the private sector (CPS) relative to nominal GDP indicates the level of financial services and is employed to measure all private resources used to finance the private sector. Credit to private sector to GDP has been averaged at 26.89 percent. Commercial bank deposits (CBD) had a mean of 75.59 percent and standard deviation of 8.27. This small standard deviation showed that the values are around the mean. Commercial bank deposits measured as the ratio of commercial banks deposits to nominal GDP that shows the liquidity of the banking sector. Credit information measured as the depth of credit information index showed an average of 8.22 with its standard deviation of 0.89.

Interest rate is the amount charged by financial institutions for a certain period as a percentage of the amount lent or deposited. The total interest on the principal sum is determined by the duration of time over which the amount is deposited or lent. Most loans use simple interest. This study found that lending interest rates was averaged 19.00 and standard deviation of 6.80. Stock market capitalization (SMC) had mean percent of 24.09

with standard deviation of 8.05 and a maximum of 44.06 percent. Stock market capitalization measures the size of the stock market and equals the value of listed domestic shares on domestic exchanges divided by GDP.

Augmented Dickey and Fuller (ADF) showed that economic growth(GDP), credit to private sector(CPS), commercial bank deposits (CBD), lending interest rates (LINT) and stock market capitalization (SMC) were all non-stationary at levels but broad money stock (BMS) and credit information (CINFO) were stationary at levels. All attained stationarity after first difference. Like ADF, Philip Perron had similar conclusion that all the variables became integrated after first difference. Structural break was tested using Clemente-Montane and Reyes showed structural breaks in the variables over the period of study. The major break year for economic growth was in 2009, credit to private sector in 2011, commercial bank deposits (2012), broad money stock (2011), lending interest rates (2000) and stock market capitalization (2004). Depth of credit information had an insignificant break year in 2008.

Optimum lags selected was one suggested by Final Prediction Error (FPE), Akaike Information Criterion (AIC), Hannan-Quinn (HQIC) and Schwarz Information Criterion (SBIC) while Likelihood Ratio (LR) test and suggests maximum of 4 lags as indicated by (*). Since the suggestion by majority of selection criteria and to conserve the degrees of freedoms, then one lag was selected. Co-integration was detected as suggested by trace statistic (*) and maximum eigenvalues among the variables. This confirms long run relationship among the variables and VEC model (the restricted VAR) was estimated.

The probability of Jarque-Bera of 0.994 implying null hypothesis of data followed normal distribution was accepted and concluded that the sample used had normal distribution. Durbin Watson confirms no serial correlation. It was observed that the Prob > chi-square value was 0.3376>0.05 therefore indicating that heteroscedasticity was absent hence the null hypothesis of variance of residuals are homoscedastic was accepted. The mean VIF was 4.85<10 confirmed no collinear relationship between the independent variables. All the assumptions of multivariate linear assumptions were met.

According to results for vector error correction, the coefficient value of cointegrating equation (_ce1) was 0.0412 and significant at 0.00. This confirms that a co-integrating relationship between the study variable during the study period, and Hussain (2009) argued that this implies that there was an error correction that gradually corrects the endogenous variables to a long run relationship through series of partial short run adjustments. It further indicates that indicating that any form of short-term fluctuations between the credit to private sector, commercial bank deposits, broad money stock, depth of credit information, lending interest rates and stock market capitalization gave rise to a stable and a long run economic growth. The magnitude of the error term (0.0412) coefficient indicates the speed of adjustment with which the variables converge overtime and its reciprocal (1/0.0412=24.27) shows it takes approximate 24 years these partial adjustments take to come back to equilibrium. All the explanatory variables were significant factors of economic growth in Kenya. This implies that all the null hypotheses were rejected at 5 percent level of significance.

The study set out to examine the influence of key financial sector variables on economic growth in Kenya over the period 1990–2021. The empirical findings demonstrate that the financial sector plays a pivotal role in shaping the trajectory of economic performance, with both positive and negative effects depending on the efficiency, depth, and structure of financial intermediation.

First, credit to the private sector was found to positively and significantly stimulate economic growth. This reinforces the supply-leading hypothesis, which posits that financial deepening—through increased credit allocation—supports productive investment and accelerates growth. Strengthening private sector lending therefore remains critical for Kenya's long-term development.

Conversely, commercial bank deposits and broad money stock both exhibited negative and significant relationships with economic growth. These results suggest inefficiencies in financial intermediation, where increased liquidity and deposit mobilization do not translate into productive lending. The findings imply potential crowding-out effects, excess liquidity, or preference by banks for low-risk assets, all of which hinder optimal resource allocation and suppress growth.

The depth of credit information, though theoretically expected to enhance growth, showed a negative relationship with economic performance. This indicates weaknesses in Kenya's credit information infrastructure, pointing to gaps in data quality, coverage, and accessibility. Such shortcomings undermine the benefits of information sharing, such as reduced adverse selection and improved loan repayment behavior. Strengthening credit information systems is therefore essential to unlock their full potential in promoting growth.

Lending interest rates were also found to negatively and significantly affect economic growth. Higher interest rates increase the cost of borrowing, constrain investment, and reduce consumption, ultimately slowing economic expansion. These results align with previous empirical studies and highlight the need for interest rate policies that support affordability and productive borrowing.

Finally, stock market capitalization was shown to positively and significantly influence economic growth, confirming the growth-enhancing role of capital markets. A well-developed stock market facilitates resource mobilization, enhances investment opportunities, and channels long-term funds to productive sectors of the economy.

Overall, the study concludes that Kenya's financial sector has the potential to foster economic growth, but its effectiveness is uneven across different components. While private sector credit and stock market development promote growth, inefficiencies in deposit utilization, liquidity management, credit information systems, and interest rate structures hinder optimal economic performance. Strengthening financial intermediation, reducing lending costs, improving information infrastructure, and deepening capital markets are therefore essential policy priorities for sustaining long-term economic growth in Kenya.

5.4 Recommendations and Policy Implications

Based on the findings, the study made some recommendations in relation to policy, practical or managerial and theoretical implications.

5.4.1 Recommendations

Kenya's Vision 2030 aims to transform the country into a newly industrialized, upper-middle income nation with a high quality of life for all its citizens by 2030. This vision involves increasing deposit mobilization from 44% to 80% of GDP and boosting the growth of savings invested in productive areas from 14% to over 30%. Achieving these objectives relies heavily on three key pillars of the financial sector: access, efficiency, and stability.

Policy and institutional factors are vital for the growth of capital markets. Investors require confidence, protection, and access to information to participate effectively. Businesses look for fiscal incentives, ease of market entry, and supportive internal policies. For a bond market to make a meaningful impact on development, it needs to cater to various risk preferences, ensure liquidity, efficiency, and stability. This demands a strong fiscal and monetary policy, a solid legal and regulatory framework, secure and efficient settlement and custodial systems, transparent information disclosure, a diverse investor base, favorable tax policies, a well-functioning financial system, and for Treasury bonds, prudent debt management and a reliable, stable government. Moreover, a well-developed money market is essential for enhancing market liquidity, as a vibrant money market is crucial for a dynamic secondary bond market.

The findings indicate that financial development is a key factor in driving economic growth in Kenya. Therefore, it is crucial for the government to introduce policies and incentives that support the ongoing advancement of the financial sector to foster economic growth. Conversely, as the economy grows, the demand for financial services will rise, which in turn stimulates further development in the financial sector, creating a cycle of mutual benefit between economic growth and financial development.

For policymakers, these results highlight the importance of formulating both short-term and long-term policies that promote the growth of the financial sector. Such policies could include increasing the number of financial institutions to improve credit availability to the private sector. The development of the financial sector not only boosts savings, which fuels investment and allocates resources more efficiently but also addresses issues related to asymmetric information, among other advantages.

The government should focus on strengthening financial sector reforms to attract investors and enhance the efficiency of production activities, ultimately leading to long-term economic growth. Additionally, policies that drive economic growth will, in turn, contribute to the development of the financial sector both in the short and long term. To achieve this, the government should enhance macroeconomic policies, particularly fiscal policies, strategies to attract foreign direct investment, and export promotion policies. Increased economic growth will elevate the demand for financial services, further advancing the financial sector.

To achieve the Vision 2030 targets, the study suggests the following policy recommendations.

5.4.1.1 Enhancing Credit Availability to Productive Sectors

The positive coefficient of credit to the private sector indicates that an increase in lending activities stimulates investment and productivity, which consequently promotes long-run economic growth. This finding aligns with the financial intermediation theory, which posits that efficient credit allocation supports capital accumulation and economic expansion, (Nguyen, 2025).

The positive and significant impact of credit to the private sector on economic growth indicates that expanding access to private sector financing promotes investment, innovation, and overall productivity in the Kenyan economy. Based on this finding, policymakers should prioritize enhancing credit availability to productive sectors such as manufacturing, agriculture, and small and medium enterprises (SMEs), which have strong potential for job creation and value addition. The government, in collaboration with the Central Bank of Kenya and financial institutions, should develop policies that encourage responsible lending, strengthen credit risk assessment frameworks, and expand credit guarantee schemes to reduce lending risks. Additionally, improving credit information systems and supporting the adoption of financial technologies (FinTech) can enhance transparency, reduce information asymmetry, and facilitate access to credit for underserved enterprises. By deepening credit intermediation and ensuring that lending flows toward productive economic activities, Kenya can sustain inclusive and long-term economic growth.

5.4.1.2 Strengthen the Financial Intermediation Process

The negative relationship between commercial bank deposits and economic growth suggests that the financial system may not be effectively channeling deposits into productive investments. Banks may prefer holding low-risk assets, such as government securities, instead of extending credit to the private sector.

Policy Implication: Policymakers should strengthen the financial intermediation process by creating incentives for banks to transform deposits into loans for productive purposes. Measures such as revising reserve requirements, promoting competition among financial institutions, and enhancing banking sector efficiency could support this goal.

5.4.1.3 Adopt Prudent Monetary Policies

The negative coefficient on broad money supply implies that an expansion in money supply may not necessarily translate into real economic growth, possibly due to inflationary pressures or inefficient monetary transmission mechanisms.

Policy Implication: The central bank should adopt prudent monetary policies aimed at maintaining price stability and ensuring that increases in money supply are directed toward productive sectors. Effective liquidity management is essential to prevent excess money growth from fueling inflation rather than stimulating output.

5.4.1.4 Improve the Depth and Quality of Credit Information Systems

The negative sign of credit information depth suggests that weak credit information systems hinder efficient lending and investment decisions. Limited credit data may increase default risks and reduce access to finance, particularly for smaller firms.

Policy Implication: The government and financial regulators should improve the depth and quality of credit information systems by expanding credit bureaus, enforcing data-sharing mechanisms, and ensuring transparency in borrower information. Enhanced credit reporting infrastructure will promote informed lending decisions and contribute to financial stability and growth.

5.4.1.5 Ensure an Optimal Interest Rate Structure

The negative impact of lending interest rates on growth implies that higher borrowing costs discourage investment and consumption, thereby slowing economic expansion. This finding is consistent with the neoclassical investment theory, which highlights the inverse relationship between the cost of capital and investment levels (Jorgenson, 1963).

Policy Implication: Policymakers should ensure an optimal interest rate structure that promotes productive borrowing. This can be achieved by maintaining low inflation, enhancing banking sector competition, and reducing risk premiums through sound macroeconomic management.

5.4.1.6 Promote Stock Market Development

The positive coefficient on stock market capitalization indicates that a well-developed stock market facilitates capital mobilization and investment, thereby enhancing economic growth. A vibrant capital market provides firms with access to long-term financing and diversifies investment opportunities for savers.

Policy Implication: The government should promote stock market development through policies that strengthen investor confidence, improve market regulation, and encourage corporate listings. Additionally, financial literacy programs and technological innovations can further enhance participation in capital markets and deepen financial inclusion.

5.4.2 Theoretical Implications

The empirical findings of this study yield several important theoretical implications concerning the relationship between financial deepening and economic growth in Kenya.

First, the positive and significant effect of credit to the private sector on economic growth provides strong support for the supply-leading hypothesis. According to this theory, financial deepening precedes and stimulates economic growth by mobilizing savings, allocating credit efficiently, and supporting productive investment. The results confirm that increased access to credit enables firms to expand productive capacity, thereby driving growth. This strengthens the argument that well-functioning credit markets are central to the growth process.

Second, the negative relationship between commercial bank deposits and economic growth challenges the traditional view in financial intermediation theory that greater deposit mobilization should enhance investment and growth. The findings imply that deposit-taking institutions may not be effectively channeling mobilized savings into productive lending. This aligns with theoretical concerns about weak financial intermediation, where banks prioritize short-term or risk-free assets over lending to private enterprises. The study therefore suggests a gap between theoretical expectations and actual intermediation efficiency in Kenya’s financial system.

Third, the negative impact of broad money stock on economic growth provides mixed support for monetary theories of economic growth. While classical and monetarist frameworks argue that increased money supply can stimulate output in the short run, the findings indicate that excessive liquidity may lead to inflationary pressures that undermine real economic activity. This suggests that the relationship between money supply and growth is nonlinear and contingent on monetary policy effectiveness.

Fourth, the negative and significant coefficient for the depth of credit information contrasts with credit information sharing theory, which posits that improved information reduces credit market failures such as adverse selection and moral hazard. The findings imply that the theoretical benefits of information sharing are not fully realized in Kenya, possibly due to incomplete coverage, weak enforcement, or low-quality credit data. This highlights the need for further refinement of the theory in contexts where information systems are still developing.

Fifth, the negative effect of lending interest rates on economic growth aligns with interest rate theories, particularly the neoclassical and Keynesian perspectives, which emphasize that higher interest rates increase the cost of capital, reduce investment, and slow down economic growth. The results reinforce the theoretical premise that monetary tightening can have contractionary effects, especially in economies with limited access to affordable credit.

Lastly, the positive and significant influence of stock market capitalization on economic growth provides empirical support for stock market development theories, which argue that well-functioning capital markets mobilize long-term funds, enhance risk diversification, and improve resource allocation. The results confirm that capital market deepening plays a crucial role in stimulating growth, consistent with endogenous growth models that highlight financial markets as engines of innovation and investment.

Overall, these theoretical implications demonstrate that while some financial theories hold strongly within the Kenyan context, others require contextual refinement to account for structural inefficiencies, institutional constraints, and market imperfections that characterize developing economies.

5.5 Suggestions for Further Research

Although this study provides valuable insights into the relationship between financial sector development and economic growth in Kenya, several areas remain unexplored or require deeper investigation. Future research could address first, this study focused on key variables such as credit to the private sector, commercial bank deposits, broad money stock, credit information depth, lending interest rates, and stock market capitalization. Future studies could incorporate other financial indicators such as mobile banking penetration, financial technology (FinTech) innovations, non-performing loans, financial inclusion metrics, and insurance sector development to provide a more holistic understanding of the financial-growth nexus.

Second, the effects of private sector credit were examined at the macro level, yet the impact may vary significantly across sectors such as agriculture, manufacturing, services, and SMEs. Future research could assess sector-specific credit flows to determine which sectors benefit most from increased credit access and how this influences overall economic growth.

Third, given the negative effect of credit information depth observed in this study, further research should explore how institutional factors—such as regulatory quality, enforcement of credit information laws, corruption levels, and governance structures—mediate the relationship between financial development and economic growth.

Fourth, some financial variables, such as money supply and interest rates, may have non-linear, threshold, or asymmetric effects on economic growth. Future studies could employ models such as Threshold Vector Error Correction Models (TVECM), Smooth Transition Regression Models, or Non-linear ARDL to capture these dynamics.

Fifth, Kenya has implemented several financial reforms, including interest rate caps (2016–2019), credit information sharing frameworks, and digital lending regulations. Further studies could assess how these reforms have altered the relationship between financial sector variables and economic growth over different periods.

Sixth, given the significant impact of broad money supply and interest rates, future research could explore how monetary policy interacts with financial development indicators to influence economic activity. A policy interaction model could provide deeper insights into how coordinated financial and monetary policies can promote growth.

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APPENDIX

Appendix I: Plagiarism Scan Report

SR611

ISO 9001:2019 Certified Institution

THESIS WRITING COURSE

PLAGIARISM AWARENESS CERTIFICATE

This certificate is awarded to

EVANS OKISAI

SBE/DE/06/15

In recognition for passing the University's plagiarism

Awareness test for Thesis **entitled**: **INFLUENCE OF FINANCIAL DEEPENING ON ECONOMIC GROWTH IN KENYA** similarity index of 17% and striving to maintain academic integrity.

Word count:50376

Awarded by

Prof. Anne Syomwene Kisilu

CERM-ESA Project Leader Date: 12/08//2024

Appendix II: NASCOTI Research License

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NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

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Date of Issue: **21/August/2024**

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This is to Certify that Mr.. Evans Okisai of Moi University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Busia on the topic: INFLUENCE OF FINANCIAL DEEPENING ON ECONOMIC GROWTH IN KENYA for the period ending : 21/August/2025.

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Appendix III: University Introduction Letter

MOI UNIVERSITY
POSTGRADUATE OFFICE
SCHOOL OF BUSINESS AND ECONOMICS

Tel: 0722271134
0722685969
0715245347
Fax No: (053) 43047
~~Telex No. MOIVARSITY 35047~~

P.O. Box 3900
Eldoret.
Kenya

RE: MU/SBE/PGR/ACD/21B **DATE: 8th Feb, 2024**

TO WHOM IT MAY CONCERN:

RE: EVANS OKISAI – SBE/DE/06/15

The above named is a bonafide student of Moi University School of Business and Economics, undertaking **Doctor of Philosophy Economics** degree.

He has successfully completed the coursework, defended his proposal, and is proceeding to the field to collect data for his research titled: "*Influence of Financial Deepening on Economic Growth in Kenya.*"

Any assistance accorded to him will be highly appreciated.

For any additional information, do not hesitate to get in touch with the undersigned.

Yours faithfully,

SCHOOL OF BUSINESS &
ECONOMICS
MOI UNIVERSITY
P. O. Box 3900 ELDORET-30100

PROF. RONALD BONUKE
ASSOCIATE DEAN AND CHAIR GRADUATE STUDIES
SCHOOL OF BUSINESS AND ECONOMICS

/vc

(ISO 9001:2015 *Certified Institution*)

Appendix IV Raw Output

UNIT ROOTS
ADF

```
. dfuller gdp

Dickey-Fuller test for unit root                   Number of obs   =        31

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)              2.412            -3.709            -2.983            -2.623
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9990

. dfuller  dcps

Dickey-Fuller test for unit root                   Number of obs   =        31

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.822            -3.709            -2.983            -2.623
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3698

. dfuller   cbd

Dickey-Fuller test for unit root                   Number of obs   =        31

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.362            -3.709            -2.983            -2.623
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6006

. dfuller    bms

Dickey-Fuller test for unit root                   Number of obs   =        31

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -3.399            -3.709            -2.983            -2.623
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0110

. dfuller     cinf

Dickey-Fuller test for unit root                   Number of obs   =        31

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -4.545            -3.709            -2.983            -2.623
------------------------------------------------------------------------------
```

```
MacKinnon approximate p-value for Z(t) = 0.0002

. dfuller      l_inr

Dickey-Fuller test for unit root                   Number of obs   =        31

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -1.181            -3.709            -2.983            -2.623
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6817

. dfuller       smc

Dickey-Fuller test for unit root                   Number of obs   =        31

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.757            -3.709            -2.983            -2.623
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0647

PHILIP PERRON TEST
. pperron  gdp

Phillips-Perron test for unit root                 Number of obs   =        31
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)            1.452           -17.608           -12.692           -10.320
 Z(t)              2.030            -3.709            -2.983            -2.623
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9987

. pperron   dcps

Phillips-Perron test for unit root                 Number of obs   =        31
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -5.115           -17.608           -12.692           -10.320
 Z(t)             -1.839            -3.709            -2.983            -2.623
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3613

. pperron    cbd

Phillips-Perron test for unit root                 Number of obs   =        31
                                                   Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
```

```
------------------------------------------------------------------------------
 Z(rho)           -6.447           -17.608           -12.692           -10.320
 Z(t)             -1.752            -3.709            -2.983            -2.623
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.4047

. pperron     bms

Phillips-Perron test for unit root                Number of obs   =        31
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -13.627           -17.608           -12.692           -10.320
 Z(t)             -3.418            -3.709            -2.983            -2.623
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0103

. pperron      creditinfor

Phillips-Perron test for unit root                Number of obs   =        31
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -22.713           -17.608           -12.692           -10.320
 Z(t)             -4.466            -3.709            -2.983            -2.623
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0002

. pperron       l_intrt

Phillips-Perron test for unit root                Number of obs   =        31
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)           -4.085           -17.608           -12.692           -10.320
 Z(t)             -1.343            -3.709            -2.983            -2.623
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6091

. pperron       smc

Phillips-Perron test for unit root                Number of obs   =        31
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -11.615           -17.608           -12.692           -10.320
 Z(t)             -2.750            -3.709            -2.983            -2.623
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0658
```

FIRST DIFFERENCE

```
. dfuller  dgdp

Dickey-Fuller test for unit root                   Number of obs   =        30

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -3.225            -3.716            -2.986            -2.624
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0186

. dfuller   ddcps

Dickey-Fuller test for unit root                   Number of obs   =        30

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -5.660            -3.716            -2.986            -2.624
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

. dfuller    dcbd

Dickey-Fuller test for unit root                   Number of obs   =        30

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -3.589            -3.716            -2.986            -2.624
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0060

. dfuller      dlint

Dickey-Fuller test for unit root                   Number of obs   =        30

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -5.509            -3.716            -2.986            -2.624
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

. dfuller   dsmc

Dickey-Fuller test for unit root                   Number of obs   =        30

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -6.346            -3.716            -2.986            -2.624
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
. dfuller  dinfo

Dickey-Fuller test for unit root                   Number of obs   =        30
```

```
                           ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -7.297            -3.716            -2.986            -2.624
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

. gen dbms=D.bms
(1 missing value generated)

. dfuller   dbms

Dickey-Fuller test for unit root                   Number of obs   =        30

                           ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -6.247            -3.716            -2.986            -2.624
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

. pperron   dgdp

Phillips-Perron test for unit root                 Number of obs   =        30
                                                   Newey-West lags =         3

                           ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -14.640           -17.540           -12.660           -10.300
 Z(t)             -3.147            -3.716            -2.986            -2.624
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0233

. pperron    ddcps

Phillips-Perron test for unit root                 Number of obs   =        30
                                                   Newey-West lags =         3

                           ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -32.135           -17.540           -12.660           -10.300
 Z(t)             -5.660            -3.716            -2.986            -2.624
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

. pperron     dcbd

Phillips-Perron test for unit root                 Number of obs   =        30
                                                   Newey-West lags =         3

                           ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -17.799           -17.540           -12.660           -10.300
 Z(t)             -3.526            -3.716            -2.986            -2.624
------------------------------------------------------------------------------
```

```
MacKinnon approximate p-value for Z(t) = 0.0073

. pperron      dlint

Phillips-Perron test for unit root                Number of obs   =        30
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -33.187           -17.540           -12.660           -10.300
 Z(t)             -5.517            -3.716            -2.986            -2.624
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

. pperron        dsmc

Phillips-Perron test for unit root                Number of obs   =        30
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -32.031           -17.540           -12.660           -10.300
 Z(t)             -6.522            -3.716            -2.986            -2.624
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

. pperron  dinfo

Phillips-Perron test for unit root                Number of obs   =        30
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -33.286           -17.540           -12.660           -10.300
 Z(t)             -8.310            -3.716            -2.986            -2.624
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

. pperron   dbms

Phillips-Perron test for unit root                Number of obs   =        30
                                                  Newey-West lags =         3

                               ---------- Interpolated Dickey-Fuller ---------
                  Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value             Value
------------------------------------------------------------------------------
 Z(rho)          -37.006           -17.540           -12.660           -10.300
 Z(t)             -6.202            -3.716            -2.986            -2.624
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
```

JOHANSENS COINTEGRATION

Date: 05/18/22 Time: 14:15
Sample (adjusted): 1992 2021
Included observations: 30 after adjustments
Trend assumption: Linear deterministic trend
Series: LNGDP DCPS CBD BMS CREDITINFOR L_INTRT SMC
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.924767	220.8402	125.6154	0.0000
At most 1 *	0.777278	143.2251	95.75366	0.0000
At most 2 *	0.738539	98.17024	69.81889	0.0001
At most 3 *	0.600799	57.92619	47.85613	0.0043
At most 4 *	0.513791	30.37748	29.79707	0.0428
At most 5	0.220603	8.744008	15.49471	0.3896
At most 6	0.041353	1.266962	3.841466	0.2603

Trace test indicates 5 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.924767	77.61510	46.23142	0.0000
At most 1 *	0.777278	45.05489	40.07757	0.0127
At most 2 *	0.738539	40.24405	33.87687	0.0076
At most 3	0.600799	27.54871	27.58434	0.0505
At most 4 *	0.513791	21.63348	21.13162	0.0425
At most 5	0.220603	7.477046	14.26460	0.4344
At most 6	0.041353	1.266962	3.841466	0.2603

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

```
. vec lngdp   dcps cbd bms creditinfor l_intrt smc

Vector error-correction model

Sample:  1992 - 2021                              No. of obs      =        30
                                                  AIC             =  25.91911
Log likelihood = -319.7867                        HQIC            =   26.9501
Det(Sigma_ml)  =  4.280091                        SBIC            =  29.14187

Equation           Parms      RMSE     R-sq      chi2     P>chi2
----------------------------------------------------------------
D_lngdp               9     .133229   0.4243   15.47432   0.0787
D_dcps                9     2.74085   0.3314   10.40706   0.3185
```

```
D_cbd               9     3.55589   0.5415   24.80304   0.0032
D_bms               9     2.09262   0.4681   18.47989   0.0300
D_cinf         9     .810102   0.6373   36.90338   0.0000
D_l_inr             9     2.58858   0.5808   29.09792   0.0006
D_smc               9     7.13726   0.4657   18.30661   0.0318
----------------------------------------------------------------

------------------------------------------------------------------------------
              |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
--------------+----------------------------------------------------------------
D_lngdp       |
         _ce1 |
          L1. |   .0412212     .004104    10.00  0.000    .0392157    .1216581
              |
        lngdp |
          LD. |   .1156389   .2572605     0.45   0.653    -.3885824    .6198602
              |
         dcps |
          LD. |  -.0022185   .0196637    -0.11   0.910    -.0407586    .0363217
              |
          cbd |
          LD. |   .0014052   .0113365     0.12   0.901    -.0208139    .0236244
              |
          bms |
          LD. |  -.0099616   .0212961    -0.47   0.640    -.0517012    .0317779
              |
         cinf |
          LD. |   .0305047    .043722     0.70   0.485    -.0551889    .1161983
              |
        l_inr |
          LD. |   .0001806   .0087536     0.02   0.984    -.0169761    .0173372
              |
          smc |
          LD. |   .0037022   .0051179     0.72   0.469    -.0063288    .0137332
              |
        _cons |    .052514   .0361062     1.45   0.146    -.0182528    .1232809
--------------+----------------------------------------------------------------
D_dcps        |
         _ce1 |
          L1. |  -1.081858    .844296    -1.28   0.200    -2.736648    .5729316
              |
        lngdp |
          LD. |  -1.031952   5.292496    -0.19   0.845    -11.40505     9.34115
              |
         dcps |
          LD. |   .7257053   .4045317     1.79   0.073    -.0671624    1.518573
              |
          cbd |
          LD. |  -.3117532   .2332208    -1.34   0.181    -.7688576    .1453511
              |
          bms |
          LD. |  -.6910115   .4381142    -1.58   0.115      -1.5497    .1676765
              |
         cinf |
          LD. |  -.1049589   .8994724    -0.12   0.907    -1.867892    1.657975
              |
        l_inr |
          LD. |   .2217303   .1800826     1.23   0.218    -.1312251    .5746858
              |
          smc |
          LD. |   .0500385   .1052891     0.48   0.635    -.1563243    .2564013
              |
        _cons |   .9452674   .7427956     1.27   0.203    -.5105852     2.40112
```

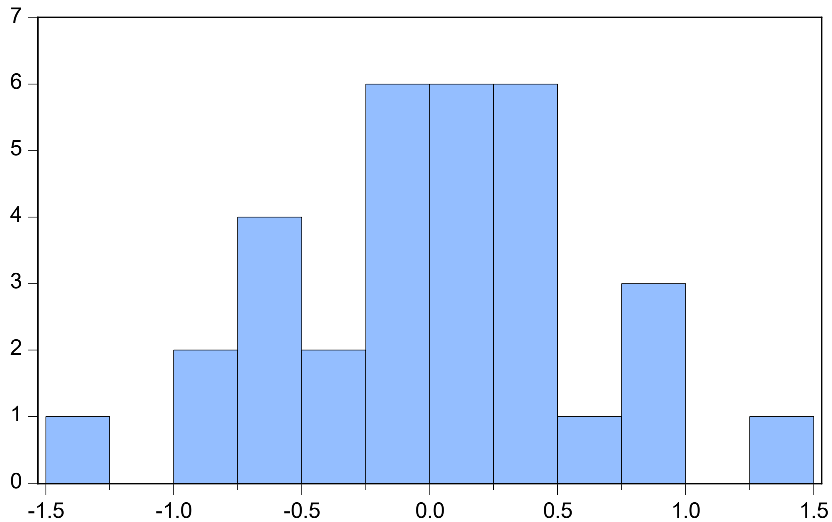
```
--------------+----------------------------------------------------------------
D_cbd         |
          _ce1 |
           L1. |   1.556237   1.095362     1.42   0.155    -.5906324    3.703107
               |
         lngdp |
           LD. |   7.198282    6.86631     1.05   0.294    -6.259438      20.656
               |
          dcps |
           LD. |   .4296532   .5248261     0.82   0.413    -.5989871    1.458293
               |
           cbd |
           LD. |    .635346   .3025729     2.10   0.036     .0423139    1.228378
               |
           bms |
           LD. |   .3001875   .5683949     0.53   0.597    -.8138459    1.414221
               |
          cinf |
           LD. |   1.117747   1.166946     0.96   0.338    -1.169425    3.404918
               |
         l_inr |
           LD. |  -.0307889   .2336332    -0.13   0.895    -.4887016    .4271238
               |
           smc |
           LD. |   .1772624   .1365986     1.30   0.194    -.0904659    .4449907
               |
         _cons |  -1.494835   .9636784    -1.55   0.121     -3.38361    .3939397
--------------+----------------------------------------------------------------
D_bms         |
          _ce1 |
           L1. |  -1.087216   .6446124    -1.69   0.092    -2.350633    .1762007
               |
         lngdp |
           LD. |  -3.116034   4.040773    -0.77   0.441     -11.0358    4.803736
               |
          dcps |
           LD. |   .5214917   .3088563     1.69   0.091    -.0838556    1.126839
               |
           cbd |
           LD. |  -.4657403    .178062    -2.62   0.009    -.8147353   -.1167452
               |
           bms |
           LD. |  -.7104838   .3344962    -2.12   0.034    -1.366084   -.0548832
               |
          cinf |
           LD. |  -.6343668   .6867391    -0.92   0.356    -1.980351    .7116171
               |
         l_inr |
           LD. |   .2402536   .1374915     1.75   0.081    -.0292247    .5097319
               |
           smc |
           LD. |  -.0359754   .0803873    -0.45   0.654    -.1935315    .1215808
               |
         _cons |   1.140711   .5671177     2.01   0.044     .0291805    2.252241
--------------+----------------------------------------------------------------
        D_cinf |
          _ce1 |
           L1. |   .9727582   .2495451     3.90   0.000     .4836588    1.461858
               |
         lngdp |
           LD. |  -.2190463   1.564282    -0.14   0.889    -3.284982    2.846889
               |
          dcps |
```

```
          LD. |  -.1155213   .1195658    -0.97   0.334     -.349866    .1188233
              |
          cbd |
          LD. |   .0546775   .0689321     0.79   0.428     -.080427    .1897819
              |
          bms |
          LD. |    .028947   .1294916     0.22   0.823     -.224852    .2827459
              |
         cinf |
          LD. |   .4788504   .2658534     1.80   0.072    -.0422127    .9999135
              |
        l_inr |
          LD. |   -.021739   .0532263    -0.41   0.683    -.1260606    .0825826
              |
          smc |
          LD. |   .0861471   .0311199     2.77   0.006     .0251533    .1471409
              |
        _cons |  -.5054268   .2195451    -2.30   0.021    -.9357272   -.0751264
--------------+----------------------------------------------------------------
  D_l_inr     |
         _ce1 |
          L1. |   .1968484   .7973902     0.25   0.805    -1.366008    1.759704
              |
        lngdp |
          LD. |  -1.438166   4.998466    -0.29   0.774    -11.23498    8.358646
              |
         dcps |
          LD. |   -.396116   .3820575    -1.04   0.300    -1.144935    .3527029
              |
          cbd |
          LD. |   .0004986   .2202639     0.00   0.998    -.4312107     .432208
              |
          bms |
          LD. |   1.003598   .4137743     2.43   0.015     .1926151     1.81458
              |
         cinf |
          LD. |  -.6243625   .8495012    -0.73   0.462    -2.289354    1.040629
              |
      l_intrt |
          LD. |   .2016727   .1700779     1.19   0.236    -.1316739    .5350194
              |
          smc |
          LD. |  -.2486844   .0994396    -2.50   0.012    -.4435824   -.0537863
              |
        _cons |  -.1812068   .7015287    -0.26   0.796    -1.556178    1.193764
--------------+----------------------------------------------------------------
D_smc         |
         _ce1 |
          L1. |   2.290678   2.198573     1.04   0.297    -2.018445    6.599802
              |
        lngdp |
          LD. |  -36.30733   13.78182    -2.63   0.008    -63.31921   -9.295454
              |
         dcps |
          LD. |  -1.421099   1.053413    -1.35   0.177    -3.485751    .6435527
              |
          cbd |
          LD. |   .4950523   .6073141     0.82   0.415    -.6952615    1.685366
              |
          bms |
          LD. |   .6613341   1.140863     0.58   0.562    -1.574716    2.897384
              |
         cinf |
```

```
         LD. |   .7296672   2.342254     0.31   0.755    -3.861066      5.3204
             |
       l_inr |
         LD. |   .1442095   .4689407     0.31   0.758    -.7748974    1.063316
             |
         smc |
         LD. |  -.0948834    .274176    -0.35   0.729    -.6322585    .4424917
             |
       _cons |   2.232671   1.934263     1.15   0.248    -1.558414    6.023756
------------------------------------------------------------------------------

Cointegrating equations

Equation           Parms    chi2     P>chi2

-------------------------------------------

_ce1                   6   663.9703   0.0000

-------------------------------------------


Identification:  beta is exactly identified


                 Johansen normalization restriction imposed

------------------------------------------------------------------------------

        beta |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]

-------------+----------------------------------------------------------------

_ce1         |

       lngdp |          1          .        .       .            .           .

        dcps |   .4437234   .0393554    11.27   0.000     .3665883    .5208585

         cbd |  -.3678482   .0240402   -15.30   0.000    -.4149661   -.3207304

         bms |  -.3583391   .0404559    -8.86   0.000    -.4376311   -.2790471

        cinf |  -1.715182   .0992209   -17.29   0.000    -1.909651   -1.520712

       l_inr |  -.0625709   .0101129    -6.19   0.000    -.0823918     -.04275

         smc |  -.1477236   .0093768   -15.75   0.000    -.1661018   -.1293454

       _cons |   24.76338          .        .       .            .           .

------------------------------------------------------------------------------
```

DIAGNISTICS

NORMALITY



Series: Residuals	
Sample 1990 2021	
Observations 32	
Mean	0.010582
Median	0.042271
Maximum	1.433914
Minimum	-1.276492
Std. Dev.	0.597582
Skewness	0.032980
Kurtosis	2.931643
Jarque-Bera	0.012031
Probability	0.994002

SERIAL CORRELATION

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.091016	Prob. F(2,24)	0.9133
Obs*R-squared	0.240882	Prob. Chi-Square(2)	0.8865

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 05/18/22 Time: 13:54
Sample: 1990 2021
Included observations: 32
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DCPS	0.002522	0.040933	0.061613	0.9514
CBD	-0.001776	0.015681	-0.113278	0.9108
BMS	-0.007731	0.057024	-0.135567	0.8933
CINF	0.041837	0.173933	0.240532	0.8120
L_INR	0.000469	0.023898	0.019645	0.9845
SMC	-2.91E-05	0.015750	-0.001845	0.9985
RESID(-1)	-0.064440	0.257952	-0.249814	0.8049
RESID(-2)	-0.108096	0.263420	-0.410357	0.6852

R-squared	0.007206	Mean dependent var	0.010582
Adjusted R-squared	-0.282359	S.D. dependent var	0.597582
S.E. of regression	0.676710	Akaike info criterion	2.269170
Sum squared resid	10.99047	Schwarz criterion	2.635604
Log likelihood	-28.30672	Hannan-Quinn criter.	2.390632
Durbin-Watson stat	1.950148		

HETEROSKEDASTICITY

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.202304	Prob. F(6,25)	0.3376
Obs*R-squared	7.165941	Prob. Chi-Square(6)	0.3058
Scaled explained SS	4.574669	Prob. Chi-Square(6)	0.5994

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/18/22 Time: 13:56
Sample: 1990 2021
Included observations: 32

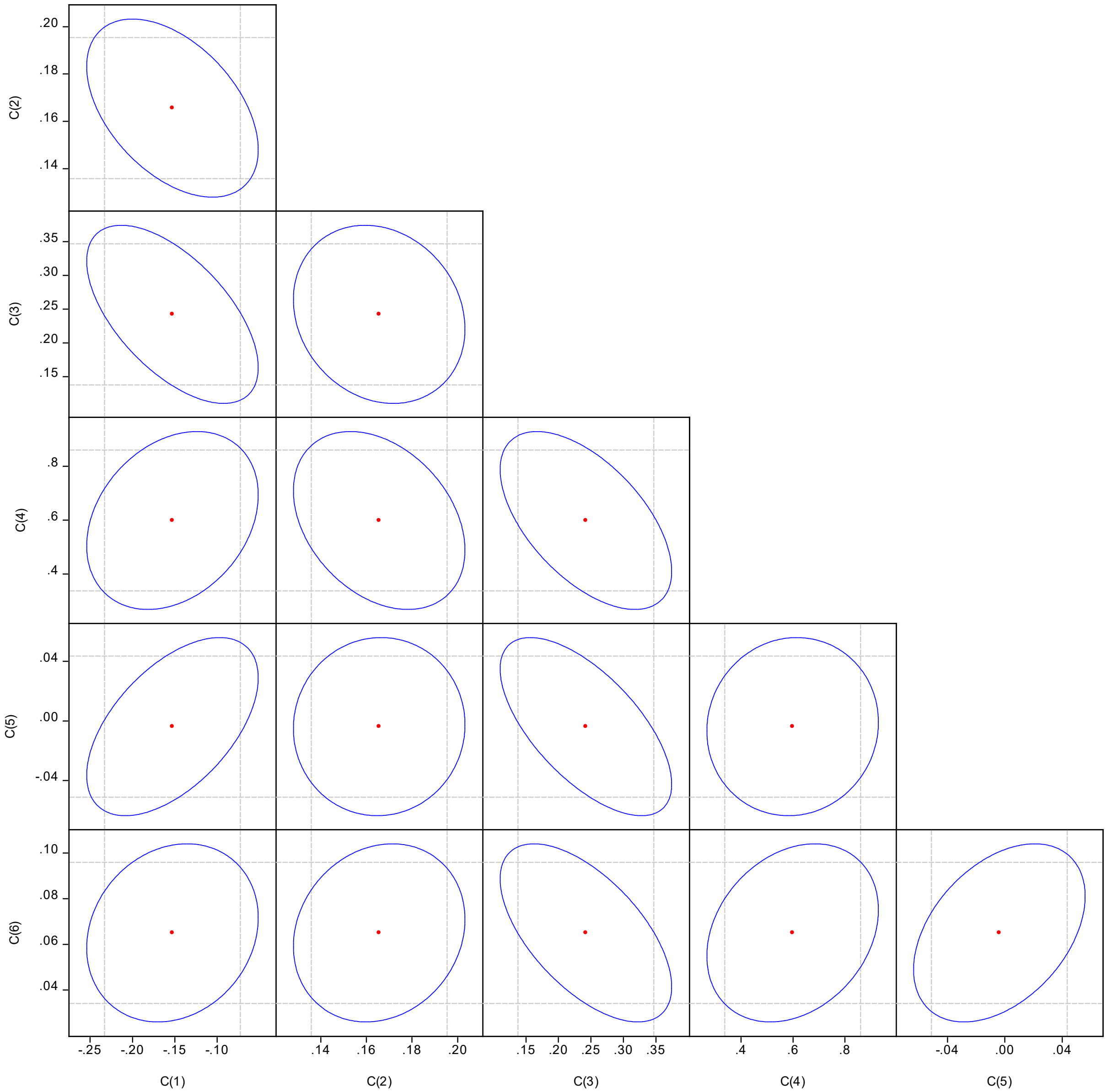
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.452275	3.597561	-0.125717	0.9010
DCPS	0.051454	0.052294	0.983946	0.3346
CBD	0.007827	0.028429	0.275307	0.7853
BMS	-0.051333	0.063674	-0.806188	0.4277
CINF	0.044334	0.118984	0.372606	0.7126
L_INR	0.019000	0.017598	1.079674	0.2906
SMC	0.001121	0.012577	0.089133	0.9297

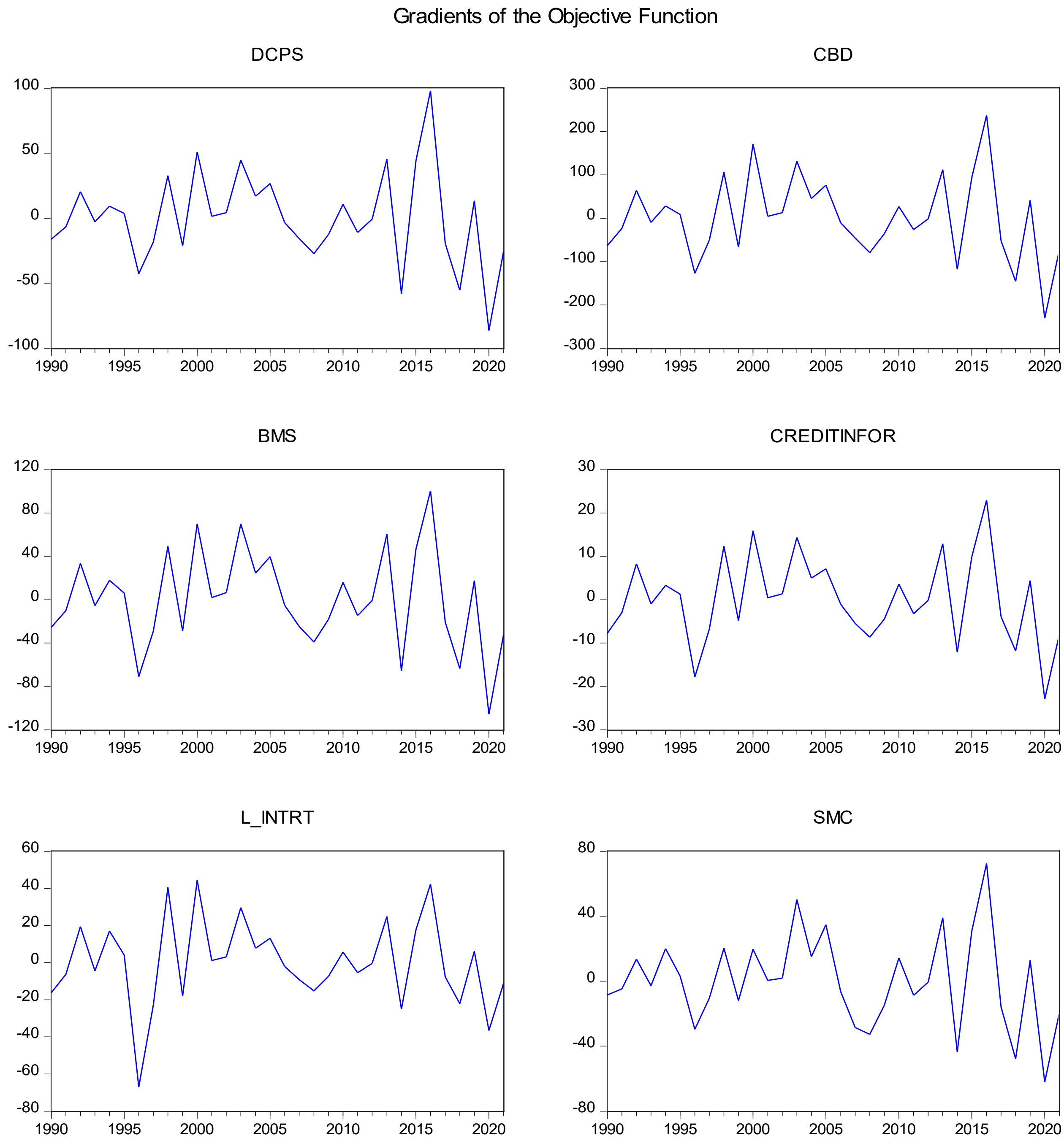
R-squared	0.223936	Mean dependent var	0.346057
Adjusted R-squared	0.037680	S.D. dependent var	0.488964
S.E. of regression	0.479663	Akaike info criterion	1.559175
Sum squared resid	5.751923	Schwarz criterion	1.879805
Log likelihood	-17.94681	Hannan-Quinn criter.	1.665455
F-statistic	1.202304	Durbin-Watson stat	2.828428
Prob(F-statistic)	0.337642		

COLLINEAR RELATIONSHIP

```
. vif

    Variable |       VIF       1/VIF
-------------+----------------------
        dcps |     11.18    0.089411
         cbd |      7.44    0.134386
         bms |      5.08    0.196710
         smc |      2.03    0.493249
       l_inr |      1.93    0.518366
        cinf |      1.44    0.692477
-------------+----------------------
    Mean VIF |      4.85

. reg  lngdp dcps cbd bms cinf l_inr smc

      Source |       SS       df       MS              Number of obs =      32
-------------+------------------------------           F(  6,    25) =   18.16
       Model |  20.1449348     6  3.35748914           Prob > F      =  0.0000
    Residual |  4.62306334    25  .184922533           R-squared     =  0.8133
-------------+------------------------------           Adj R-squared =  0.7685
```

```
       Total |  24.7679982    31  .798967683           Root MSE      =  .43003

------------------------------------------------------------------------------

       lngdp |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]

-------------+----------------------------------------------------------------

        dcps |   .0787688   .0468824     1.68   0.105    -.0177874     .175325

         cbd |   .0260246   .0254868     1.02   0.317    -.0264666    .0785157

         bms |  -.0306925   .0570848    -0.54   0.596    -.1482608    .0868758

        cinf |   .2090028   .1066713     1.96   0.061    -.0106907    .4286964

       l_inr |  -.0294493   .0157766    -1.87   0.074    -.0619418    .0030431

         smc |     .03316   .0112757     2.94   0.007     .0099371    .0563828

       _cons |   19.04923   3.225274     5.91   0.000     12.40665     25.6918
```


C(2)
.20
.18
.16
.14
C(3)
.35
.30
.25
.20
.15
C(4)
.8
.6
.4
C(5)
.04
.00
-.04
C(6)
.10
.08
.06
.04
-.25 -.20 -.15 -.10
C(1)
.14 .16 .18 .20
C(2)
.15 .20 .25 .30 .35
C(3)
.4 .6 .8
C(4)
-.04 .00 .04
C(5)


Gradients of the Objective Function
DCPS
CBD
BMS
CREDITINFOR
L_INTRT
SMC
1990
1995
2000
2005
2010
2015
2020